May 2025 (Version 1)

Final Water Resources Management Plan 2024

ANNEX 18 – HABITATS REGULATIONS ASSESSMENT OF THE WATER RESOURCE MANAGEMENT PLAN 2024

Information to support an assessment under Regulation 63 of the Conservation of Habitats and Species Regulations 2017

from Southern Water

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. project number

Project REF

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1 ANNEX 18 HRA SUMMARY

1.1 OVERVIEW

1.1.1. SWS is preparing its WRMP (WRMP24) for the period 2023 – 2075. SWS consulted on its draft WRMP24 (dWRMP24) in autumn 2022 and submitted an amended version of this to the regulators in September 2023 ('the Sept23 submission' or 'the Sept23 WRMP') that set out SWS's preferred resource and demand management options ('the preferred options') for meeting predicted deficits and for ensuring security of supply.

1.1.2. Water company WRMPs are subject to the provisions of the *Conservation of Habitats and Species Regulations 2017.* SWS has a statutory duty to prepare a WRMP and is therefore the Competent Authority for the HRA of that plan. The Sept23 submission was accompanied by a Habitats Regulations Assessment (HRA) report (Annex 20 to the Sept23 submission, Annex 18 to the rdWRMP24 – the 'Sept23 HRA').

1.1.3. Following regulator feedback on the Sept23 submission and from public consultation on its dWRMP24, SWS published its 'revised draft WRMP24' (rdWRMP24) for consultation between 11 September 2024 and 4 December 2024. SWS has completed a Statement of Response (SoR) of the consultation responses received to the rdWRMP24 consultation. This included submissions received from Natural England (NE) and the Environment Agency (EA) on the accompanying environmental assessments of the rdWRMP24.

1.1.4. Taking into account further modelling, investigation and assessment findings, and the SoR, SWS has now finalised its WRMP24 (final WRMP24) containing its final best value plan, aligned with the WRSE Regional Plan This HRA contains an assessment of the final WRMP24, updated in response to comments received.

1.1.5. It should be recognised that many of the options (particularly those proposed for distant planning periods) are to some extent conceptual, with limited design information that in most cases will be quite provisional (e.g. many pipeline routes are largely indicative). This also requires an acceptance that not all potential outcomes can be examined at the plan-level in the same way they would be at the project-level (despite the appearance individual 'projects' being identified), and that the HRA is to some extent attempting to identify those potential effects that are essentially unavoidable at the scheme level (e.g. due to the fundamental scale or nature of the proposals) regardless of how the scheme is delivered. This report therefore provides a strategic, plan-level assessment to support the WRMP and is not an application-specific ('project-level') assessment. It is based on data and information that can be reasonably gathered at the plan-level and so does not include option-specific survey data or similar. More detailed, application-specific HRAs will be needed to support future planning applications and environmental permits/consents. Whilst the WRMP24 is an adaptive plan that may change marginally depending on how closely future demand matches various scenarios, the HRA necessarily focuses on the plan intended for adoption – i.e. the Southern Water Best Value Plan (BVP) set out in Section 7 of the WRMP24 – rather than alternative plan scenarios that may or may not become relevant at some point in the future.

1.1.6. For each option (or group of options, as appropriate) in the preferred plan the assessment comprises:

- a ‘screening’ to identify those options that cannot have significant effects due to the fundamental nature of the option (this might include, for example, options that are designed to reduce demand but which do not involve any direct physical changes, such as education programmes to reduce water use);
- a ‘screening’ of European sites within the study area to identify those sites and features where there will self-evidently be ‘no effect’, ‘no likely significant effects’, or positive effects due to the option[1], and those where significant effects are likely or uncertain; and
- an ‘appropriate assessment’ of any European sites where significant effects cannot be excluded (this may include ‘down-the-line’ deferral of some options in accordance with established HRA practice, where appropriate).

1.2 SCREENING SUMMARY

1.2.1. The ‘screening’ adopts a low-bar approach; in general, unless the possibility of significant effects can be simply and self-evidently excluded then an ‘appropriate assessment’ is completed (rather than a more detailed ‘secondary screening’ or similar). This applies to the options alone and in combination.

1.2.2. In summary:

- **Demand-side measures** are all either ‘screened out’ (e.g. ‘water efficiency support’ options that cannot have significant effects due to the nature of the option) or ‘screened in’ with the appropriate assessment subsequently deferred to the project level as effect pathways are conceivable but meaningful assessment is not possible with the information available (i.e. any appropriate assessment would be entirely hypothetical).
- **Existing Imports / Transfer Arrangements** are considered as ‘options’ for water resource modelling purposes but are essentially part of the future water resources baseline for SWS and (as with existing licences and consents) are not assessed within this HRA (which necessarily focuses on the new supply-side options rather than the existing consents regime).
- **Demand-side Drought Options** all screened out.
- **Supply-side Drought Options** are assessed using the assessment data available in the HRA of the Drought Plan, with the screening reflecting the screening conclusion of that HRA.

1.2.3. The following **supply-side options** are expected (if progressed as projects) to have ‘no effect’ on any European sites (i.e. there are no reasonable pathways by which the anticipated environmental changes associated with the option could affect a site or its interest features); as these options will have ‘no effects’ they cannot have ‘in combination’ effects, and have been **screened out**:

- Western Area:
  - Bulk import (HKZ): T2ST to HKZ (5Ml/d);
  - Groundwater (HKZ): Remove constraints at Newbury to increase yield (1.2Ml/d);
  - Groundwater (IOW): New borehole at Eastern Yar3 (1.5Ml/d);
  - Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d).
- Central Area:
  - Bulk import (SBZ): SEW to Rottingdean (20Ml/d);

[1] Note, for options with ‘no effects’ or positive effects there is no possibility of ‘in combination’ effects.

- Bulk import (SNZ): SES re-zoning (4Ml/d);
- Bulk import (SNZ): SES to SNZ (10Ml/d);
- Groundwater (SBZ): Lewes Road (3.5Ml/d);
- Interzonal transfer (SBZ-SWZ): Brighton to Worthing;
- Interzonal transfer (SWZ-SBZ): Pulborough winter transfer stage 2 (4Ml/d);
- Storage (SNZ): River Adur Offline Reservoir (19.5Ml/d) ;
- Treatment capacity (SWZ): Pulborough winter transfer stage 1 (2Ml/d).

- Eastern Area:
  - Asset enhancement (KMW): Remove network constraint at Longfield (13Ml/d);
  - Interzonal transfer (KTZ-KME): Utilise full existing transfer capacity (9Ml/d);
  - Recycling (SHZ): Tonbridge to Bewl (5.7Ml/d);
  - Storage (SHZ): Raising Bewl Reservoir 0.4m (3Ml/d).

1.2.4. The remaining **supply-side options** are screened in for appropriate assessment.

1.3 APPROPRIATE ASSESSMENT SUMMARY

LOW IMPACT OPTIONS

1.3.1. Several options only have effect pathways associated with them that can clearly be prevented with avoidance or mitigation measures that are commonly used and known to be available, achievable and effective (see **Appendix C**); typically these are low-probability and/or low magnitude pathways (for example, construction required across a minor up-catchment tributary of a European site) that would have historically been 'screened out with mitigation' prior to 'People over Wind'.

1.3.2. The assessment of these options is detailed in **Appendix E1**, which is 'appropriate' to the nature of the WRMP as a strategic plan, the option under consideration, and the scale and likelihood of any effects. **Appendix E1** also includes more specific assessments for those options that may directly affect a European sites through construction only, if those potential effects are fundamentally avoidable through project design or established engineering solutions (i.e. options with crossings of SAC rivers, which may be avoidable through re-routing or with engineering solutions such as pipe bridges, use of existing crossings, or directional drilling methods).

1.3.3. Specifically, this includes an assessment of options with potential to affect the River Test SAC Compensatory Habitat (River Test and River Meon).

- No options are likely to have operational effects on the River Meon. Two options (Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW (90Ml/d); and Recycling (HSE): Recharge of Havant Thicket from recycled water from Portsmouth Harbour WTW (60Ml/d)) involve pipelines that may cross the river; these are 'screened in' although adverse effects are considered avoidable with established measures.
- With regard to the River Test, several options including Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d), Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d), Interzonal transfer (HRZ-HSW): Romsey Town and Test valve (3.1Ml/d), Groundwater (HRZ): New boreholes at Romsey (4.8Ml/d), and Groundwater (HSW): Test MAR (5.5Ml/d) may affect the River Test catchment; in summary:
  - All construction-related adverse effects are considered avoidable with established project-level measures.

- There are either no pathways for operation of these options to adversely affect these sites (Interzonal transfer (HRZ-HSW): Romsey Town and Test valve (3.1Ml/d)/(5.0Ml/d) option is a network solution only; the Groundwater (HSW): Test MAR (5.5Ml/d) option involves a confined aquifer that is isolated from the Test), or the available evidence suggests that the likely conservation objectives for compensatory habitats on the River Test will not be undermined[2].

1.3.4. In summary, for all of the options in **Table 1-1** – **Table 1-3**:

- there will be no operational effects (all essentially modifications to the network or existing assets that do not require the development of new water resources or alterations to abstraction licences);
- all potential construction effects are of a scale and type that can be reliably prevented with established measures (see **Appendix C**), such that effects 'alone' would be nil or negligible and 'in combination' effects would not be expected.

1.3.5. For these options, therefore, there will be 'no adverse effects, alone or in combination' on any of the European sites noted in Appendix A.

Table 1-1 - Western area options that only have potential effects that can be reliably avoided with established project-level measures

Option	European sites
Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW (90Ml/d)	• River Itchen SAC • River Test SAC Compensatory Habitat (River Meon) • Solent Maritime SAC • Portsmouth Harbour SPA • Solent and Southampton Water SPA • Solent and Dorset Coast SPA • Chichester and Langstone Harbours Ramsar • Chichester and Langstone Harbours SPA • Portsmouth Harbour Ramsar • Solent and Southampton Water Ramsar
Bulk import (HSE): PWC Source A to Otterbourne WSW (21Ml/d)	• River Itchen SAC* • Solent and Dorset Coast SPA • Solent and Southampton Water SPA • Solent and Southampton Water Ramsar • Solent Maritime SAC

[2] Groundwater options in the Test catchment all involve sources that have been part of SWS's 'no deterioration' investigations for the Test, specifically considering the risk of Recent Actual to Fully Licensed abstraction increases. There is no expectation of significant increase in pumping because of the tightened flow constraints of the River Test SSSI, and modelling of the impacts of these sources and all other abstractions and discharges on flows in the Test has demonstrated that these are compliant with CSMG low flow (Q95) thresholds.

Option	European sites
Bulk export (HSE): Otterbourne WSW to PWC Source A (45Ml/d)	• River Itchen SAC* • Solent and Dorset Coast SPA • Solent and Southampton Water SPA • Solent and Southampton Water Ramsar • Solent Maritime SAC
Bulk import (HAZ): T2ST to Andover (20Mld)	• River Itchen SAC • River Test SAC Compensatory Habitat (River Test) (C*) • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent and Dorset Coast SPA
Bulk import (HWZ): T2ST to Yew Hill (95Ml/d)	• River Itchen SAC • River Lambourn SAC* • River Test SAC Compensatory Habitat (River Test) (C*) • Kennet Valley Alderwoods SAC • Solent and Dorset Coast SPA • Kennet and Lambourn Floodplain SAC • Solent Maritime SAC • Solent and Southampton Water SPA • Solent and Southampton Water Ramsar
Groundwater (HRZ): New boreholes at Romsey (4.8Ml/d)	• Mottisfont Bats SAC
Groundwater (HSW): Test MAR (5.5Ml/d)	• River Test SAC Compensatory Habitat (River Test) • Solent and Southampton Water SPA • Solent and Southampton Water Ramsar • Solent Maritime SAC • Solent and Dorset Coast SPA
Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d)	• River Test SAC Compensatory Habitat (River Test) • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent Maritime SAC • Solent and Dorset Coast SPA
Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)	• Mottisfont Bats SAC • River Test SAC Compensatory Habitat (River Test) • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent Maritime SAC • Solent and Dorset Coast SPA
Interzonal transfer (HRZ-HSW): Romsey Town and Test valve (3.1Ml/d)	• River Test SAC Compensatory Habitat (River Test) • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent Maritime SAC • Solent and Dorset Coast SPA

Option	European sites
Interzonal transfer (HRZ-HSW): Romsey Town and Test valve (5Ml/d)	• River Test SAC Compensatory Habitat (River Test) • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent Maritime SAC • Solent and Dorset Coast SPA
Interzonal transfer (HSE-HSW): Yew Hill WSW to River Test WSW bi-directional (60Ml/d)	• River Itchen SAC • Solent Maritime SAC • Emer Bog SAC • Mottisfont Bats SAC • Solent and Southampton Water SPA • Solent and Dorset Coast SPA • Solent and Southampton Water Ramsar
Interzonal transfer (HSE-HWZ): Otterbourne WSW to Yew Hill bi-directional (74Ml/d)	• River Itchen SAC • River Test SAC Compensatory Habitat (River Test) (C*) • Solent Maritime SAC • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent and Dorset Coast SPA
Interzonal transfer (HWZ-HAZ): Winchester to Andover bi-directional (15Ml/d)	• River Itchen SAC • River Test SAC Compensatory Habitat (River Test) (C*) • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent and Dorset Coast SPA

* These sites may be directly affected by pipeline construction, although potential adverse effects are avoidable at the project-level using established measures; however, potential impacts are considered in more detail in Appendix E1.

Table 1-2 Central area options that only have potential effects that can be reliably avoided with established project-level measures

Option	European sites
Bulk import (SNZ): Havant Thicket Reservoir to Pulborough (50Ml/d)	• Duncton to Bignor Escarpment SAC • Kingley Vale SAC • Arun Valley Ramsar • Arun Valley SPA • Arun Valley SAC • Solent Maritime SAC • Chichester and Langstone Harbours Ramsar • Chichester and Langstone Harbours SPA • The Mens SAC • Singleton and Cocking Tunnels SAC • Solent and Dorset Coast SPA

Option	European sites
Bulk import (SNZ): SEW RZ5 to Pulborough	• Arun Valley Ramsar • Arun Valley SAC • Arun Valley SPA • The Mens SAC • Ebernoe Common SAC • Singleton and Cocking Tunnels SAC
Interzonal transfer (SNZ-SWZ): Pulborough to Worthing	• Arun Valley SPA • Arun Valley SAC • Arun Valley Ramsar • The Mens SAC
Recycling (SNZ): Littlehampton WTW with river discharge (15Ml/d)	• Arun Valley Ramsar • Arun Valley SPA • Arun Valley SAC • The Mens SAC • Ebernoe Common SAC

Table 1-3 Eastern area options that only have potential effects that can be reliably avoided with established project-level measures

Option	European sites
Bulk import (KTZ): SEW Canterbury to Near Canterbury (20Ml/d)	• Stodmarsh Ramsar • Stodmarsh SAC • Stodmarsh SPA • Thanet Coast and Sandwich Bay Ramsar • Thanet Coast and Sandwich Bay SPA
Bulk import (SHZ): SEW RZ8 to Rye	• Dungeness SAC • Dungeness, Romney Marsh and Rye Bay SPA • Dungeness, Romney Marsh and Rye Bay Ramsar
Bulk import (KTZ): SEW Kingston to Near Canterbury (2Ml/d)	• Thanet Coast and Sandwich Bay Ramsar • Thanet Coast and Sandwich Bay SPA
Groundwater (SHZ): Reconfigure Rye Wells (1.5Ml/d)	• Dungeness, Romney Marsh and Rye Bay SPA • Dungeness, Romney Marsh and Rye Bay Ramsar
Interzonal transfer (KME-KTZ): KME-KTZ bi-directional (15.8Ml/d)	• Stodmarsh Ramsar • Stodmarsh SAC • Stodmarsh SPA • Thanet Coast and Sandwich Bay Ramsar • Thanet Coast and Sandwich Bay SPA
Recycling (SHZ): Hastings to Darwell (15.3Ml/d)	• Dungeness, Romney Marsh and Rye Bay SPA • Pevensey Levels SAC • Pevensey Levels Ramsar • Dungeness, Romney Marsh and Rye Bay Ramsar

OTHER OPTION ASSESSMENTS

1.3.6. More detailed appropriate assessments (**Appendices E2 – E15**) have been completed for those options with construction or operational effects on a site that are potentially more difficult to avoid (i.e. direct or close-proximity construction effects, or environmental changes that are inherent to the operation of the scheme):

- Desalination (KME): Isle of Sheppey;
- Desalination (KMW): Thames Estuary;
- Desalination (KTZ): East Thanet;
- Desalination (SWZ): Tidal River Arun (10Ml/d);
- Groundwater (IOW): New boreholes at Newchurch (LGS) (1.9Ml/d);
- Groundwater (SNZ): New borehole at Petworth (4Ml/d);
- Groundwater (SNZ): Petersfield Refurbishment (1.6Ml/d);
- Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d);
- Groundwater (KME): Recommission Gravesend (2.7Ml/d);
- Recycling (HSE): Recharge of Havant Thicket from recycled water from Portsmouth Harbour WTW (60Ml/d);
- Recycling (IOW): Sandown (8.5Ml/d);
- Recycling (KME): Sittingbourne industrial water reuse (7.5Ml/d);
- Recycling (KMW): Medway WTW to lake (14Ml/d);
- Recycling (SNZ): Horsham with storage at Pulborough (6.8Ml/d).

1.3.7. In summary, the alone assessments for these options have concluded that adverse effects on integrity will not occur as a result of the options, either because the anticipated magnitude of change etc. is insufficient to constitute an adverse effect, or potential adverse effects can be avoided or mitigated with measures known to be available at the project level. There are however some residual uncertainties for some options related to detailed design elements that cannot be resolved at the strategy-level, see **Table 1-4**.

Table 1-4 Options / sites with residual alone uncertainties at the plan-level

Option	Sites	Uncertainties
Sittingbourne industrial water reuse (7.5Ml/d)	• The Swale Ramsar • The Swale SPA	This option was assessed as having No Adverse Effects at WRMP19 and there have been no substantive amendments in either the scheme or the environmental baseline to alter this conclusion. Adverse effects during construction can be mitigated with established measures. During operation, localised and minor changes to the invertebrate fauna as a result of reductions in non-saline inputs around the confluence with Milton Creek cannot be excluded; however, the reduction of ~7.5Ml/d will be small relative to the inputs from the creek (from the WwTW and surface water catchment in Sittingbourne), and likely inconsequential in relation to the tidal turnover and dominance of saline inputs in Milton Creek and the Swale. Milton Creek is unlikely to represent functionally linked habitat, given that it is a constrained creek / channel in a high-disturbance urban / industrial area set the context of the extensive areas of equivalent mud-flat and creek habitat available in the SPA/Ramsar. Nonetheless, on a precautionary basis, uncertainty is recognised and project level assessment will be necessary to confirm an absence of adverse effects.

IN COMBINATION (WATER RESOURCES AND DROUGHT PLANS)

1.3.8. The assessment of within-plan (i.e. between SWS options) and between plan (i.e. between SWS and other water companies) in combination effects is summarised in **Appendix F** and **Appendix G.**

1.3.9. In summary, no adverse effects on European site integrity are anticipated as a result of the SWS options operating in combination; however, there are some minor residual uncertainties in relation to sites potentially affected by the desalination options that can only be resolved with more detailed investigations (although mitigation or avoidance measures will almost certainly be available given the long lead time before any potential in combination effects are realised), specifically:

- **Margate and Long Sands SAC** (Desalination (KTZ): East Thanet – cumulative effects of all option phases).
- **Medway Estuary and Marshes SPA / Ramsar** (Desalination (KME): Isle of Sheppey; Recycling (KMW): Medway WTW to lake (14Ml/d); Recycling (KME): Sittingbourne industrial water reuse (7.5Ml/d) – effects on different areas of the site)
- **Outer Thames Estuary SPA** (Desalination (KTZ): East Thanet – cumulative effects of all option phases; Desalination (KME): Isle of Sheppey)
- **Thames Estuary and Marshes SPA / Ramsar** (Desalination (KME): Isle of Sheppey; Desalination (KMW): Thames Estuary – cumulative effects of all option phases); Groundwater (KME): Recommission Gravesend (2.7Ml/d).

1.3.10. With regard to between-WRMP24 effects, based on the available information from other water company HRAs:

- **Thames Water**: No European sites will be exposed to operation x operation in combination effects between TW and SWS options (minor construction x construction pathways for some sites are conceivable, but can all self-evidently be avoided with normal measures). **Conclusion: no adverse effects in combination**.
- **Affinity Water**: No European sites will be exposed to operation x operation in combination effects between AFW and SWS options (minor construction x construction pathways for some sites are conceivable, but can all self-evidently be avoided with normal measures). **Conclusion: no adverse effects in combination.**.
- **Sutton and East Surrey Water**: No European sites will be exposed to operation x operation in combination effects between SES and SWS options (all SES options screened out; all effects on relevant European sites from SWS options construction-related and hence can all self-evidently be avoided with normal measures). **Conclusion: no adverse effects in combination.**
- **Portsmouth Water**: The Upgrade Source O Booster to 25Ml/d option in the Portsmouth Water fWRMP identifies potential effects from ground water sources on ten European sites including Chichester and Langstone Harbours SPA/Ramsar, Arun Valley SPA/Ramsar/SAC and Solent sites, with adverse effects upon integrity ruled out through appropriate mitigation techniques. There is potential for in combination effects with SWS options, which should be taken forward to project level assessment to ensure mitigation is refined to enable adverse effects to be ruled out with the necessary level of confidence. The Portsmouth Water WRMP also includes Works A treatment capacity increase to treat water from Havant Thicket Reservoir options, close to the Portsmouth Harbour WTW Recycling option, with potential in-combination effects with other discharges to the Solent identified. However, evidence for the Portsmouth Harbour WTW recycling scheme suggests that the zone of environmental change for the operational effects will not overlap with these sites (since the discharge is via the Eastney LSO to the Solent). **Conclusion: no adverse effects in combination.**
- **Southeast Water**: The Reculver Desalination option (SEW) is located close to the proposed East Thanet Desalination option (SWS). Both will require outfalls that (a) will need to cross the **Thanet Coast SAC** and **Thanet Coast and Sandwich Bay SPA / Ramsar** (construction impacts likely avoidable with engineering solutions); (b) will require permanent outfall structures in or near **Margate and Long Sands SAC** (impacts depend on the nature of the installation, although features will have low sensitivity); (c) require permanent outfall structures in the **Outer Thames Estuary SPA** (impacts depend on the nature of the installation, although features will have low sensitivity); and (d) operational discharges within or close to the **Outer Thames Estuary SPA** and the **Margate and Long Sands SAC**. It is likely that adverse effects can be avoided through appropriate design of these facilities, and evidence from other desalination plants suggests that the environmental changes will be relatively small magnitude (with the interest features having low sensitivity to these changes), however there remains uncertainty over in combination effects due to the proximity of the options and the likelihood of spatially coincident environmental changes that cannot be quantified at the plan-level. **Conclusion: residual uncertainties over in combination effects on Margate and Long Sands SAC and Outer Thames Estuary SPA**.
- **Wessex Water**: The only European site potentially exposed to environmental changes associated with options in the SWS rdWRMP and the Wessex Water rdWRMP is Solent and

Dorset Coast SPA; however, the Wessex Water options involve minor construction near up-catchment tributaries and will have 'no effect' on this site due to their distance from the site boundary (so no possibility of 'in combination' effects). **Conclusion: no adverse effects in combination.**

- **Bournemouth Water**: Information on the options in the rdWRMP is not available; however, based on the dWRMP HRA there is only one option that has the potential for operation x operation in combination effects with SWS options (option BNW1, a groundwater abstraction that may affect Solent and Southampton Water SPA / Ramsar around Lymington SSSI). **Conclusion: no adverse effects in combination.**

1.3.11. There will be no adverse in combination effects with the SWS Drought Plan, or the Drought Plans of other water companies, based on the HRAs of those Drought Plans.

1.3.12. No in combination effects with other plans or projects have been identified (either because there are no potential effects or potential effects can be discounted, or because information available for either other plan or the option is too imprecise to allow a meaningful in combination assessment to be completed (hence this can only be reasonably completed at the project-level).

1.4 CONCLUSION

1.4.1. The HRA of the WRMP24 can conclude that, for virtually all options, there will be **no adverse effects alone or in combination** that cannot be reliably avoided through scheme design or mitigated with measures that are known to be available, achievable and likely to be effective at the project-level. These options are not of a scale or type that would ensure that adverse effects were unavoidable irrespective of how the option is delivered.

1.4.2. There are minor residual uncertainties 'alone' for the **Sittingbourne industrial water reuse (7.5Ml/d)** option and its effects on **The Swale SPA / Ramsar.** This option is a WRMP19 scheme that was assessed as having No Adverse Effects at WRMP19 and there have been no substantive changes to in either the scheme or the environmental baseline to alter this conclusion. However, the discharges from the Sittingbourne WwTW that would be utilised are likely to form a significant component of the non-saline flows into Milton Creek, and although the creek is unlikely to be a notable 'functional habitat' resource (and the habitats will be dominated by tidal turnover) there are uncertainties over this aspect and the effect of reduced non-saline inputs to the Swale that cannot be easily resolved ahead of more detailed project-level field investigations and modelling. However, evidence from the UK Marine SACs Project[3] suggests that whilst alterations in non-saline inputs may locally alter intertidal mudflat biotopes, this does not necessarily translate into adverse effects on the bird qualifying features.

1.4.3. There are minor residual uncertainties relating to the in combination impacts of some desalination schemes, notably the impact of **SWS's East Thanet scheme with SEW's Reculver scheme** which are in close proximity (hence have the potential to operate cumulatively at or near a single location within a European site) and which will, based on available scheme information, may result in unavoidable environmental changes that have the potential to affect **Margate and Long Sands SAC** and the **Outer Thames Estuary SPA**. Based on available proxy data from similar schemes (both in terms of construction and operation) these effects are considered unlikely to be adverse, but

[3] UK Marine SACs Project (2001). http://ukmpa.marinebiodiversity.org/uk_sacs/

this cannot be definitively established at the plan-level with the available site data. There are minor residual in combination uncertainties in relation to the other SWS desalination plants (Thames, Isle of Sheppey) and **Thames Estuary and Marshes SPA/Ramsar** and **Medway Estuary and Marshes SPA/Ramsar**, although environmental changes associated with these options will not be spatially coincident in the sites.

1.4.4. Currently, alternatives to the desalination options are not available within the modelled BVP; however, there is sufficient time for these uncertainties to be investigated and the option(s) amended or abandoned given the 2040+ delivery periods. On this basis, it would be possible to adopt the plan with the support of a detailed investigation timetable for the resolution of these uncertainties.

2 INTRODUCTION

Water Resource Management Plans set out how water supply-demand balances and water supply security will be maintained over the next 25 years and beyond. These plans are subject to the provisions of the *Conservation of Habitats and Species Regulations 2017* (as amended).

2.1 SOUTHERN WATER'S WATER RESOURCES MANAGEMENT PLAN 2024

2.1.1. The Water Act 2003 requires that all water companies in England and Wales prepare and maintain Water Resources Management Plans (WRMPs). These plans set out how public water supply (PWS) will be maintained over a minimum of 25 years in a way that is economically, socially and environmentally sustainable. The WRMPs must be revised every five years.

2.1.2. Southern Water Services (SWS) is preparing its WRMP (WRMP24) for the period 2023 – 2075. SWS consulted on its draft WRMP24 (dWRMP24) between 14 November 2022 and 20 February 2023 and submitted an amended version of this to the regulators in September 2023 (hereafter 'the Sept23 submission' or 'the Sept23 WRMP'). The Sept23 submission set out SWS's preferred resource and demand management options ('the preferred options') for meeting predicted deficits in the water available for PWS, and for ensuring security of supply.

2.1.3. The Sept23 submission was based on the Water Resources South East (WRSE) Best Value Plan with SWS-specific amendments, and it is SWS's intention to adopt the final regional plan prepared by WRSE into the final WRMP24. The Regional Plan for the period 2025 to 2075 will address long-term regional and inter-regional, multi-sectoral water resources management pressures and will draw on water resource options from the member water companies' WRMP24s, as well as the Strategic Resource Options (SROs) being taken forward by the companies.

2.1.4. Following regulator feedback on the Sept23 submission and from public consultation on its dWRMP, SWS published its 'revised draft WRMP' (rdWRMP) for consultation between 11 September 2024 and 4 December 2024. SWS has completed a Statement of Response (SoR) of the consultation responses received to the rdWRMP consultation. This included submissions received from Natural England (NE) and the Environment Agency (EA) on the accompanying environmental assessments of the rdWRMP.

2.1.5. Taking into account further modelling, investigation and assessment findings, and the SoR, SWS has now finalised its WRMP24 (final WRMP) containing its final best value plan, aligned with the WRSE Regional Plan.

2.2 HABITATS REGULATIONS ASSESSMENT

2.2.1. Water company WRMPs are subject to the provisions of the *Conservation of Habitats and Species Regulations 2017* (as amended) (the 'Habitats Regulations')[4].

2.2.2. Regulations 63 and 64 transpose the provisions of Articles 6(3) and 6(4) of Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive') as they relate to plans or projects in England and Wales.

2.2.3. Regulation 63 states that if a land-use plan is "*(a) is likely to have a significant effect on a European site*[5] *or a European offshore marine site*[6] *(either alone or in combination with other plans or projects); and (b) is not directly connected with or necessary to the management of the site*" then the competent authority must "…*make an appropriate assessment of the implications for the site in view of that site's conservation objectives*" before giving consent or authorisation. The plan can only be given effect if it can be concluded (following an 'appropriate assessment') that the plan "…*will not adversely affect the integrity*" of a site, unless the provisions of Regulation 64 are met.

2.2.4. This assessment process is known as Habitats Regulations Assessment (HRA)[7]. An HRA determines whether there will be any 'likely significant effects' (LSE) on any European site as a result of a plan's implementation (either on its own or 'in combination' with other plans or projects)[8] and, if so, whether there will be any 'adverse effects on site integrity'[9].

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[4] The 2017 Regulations have been amended by the *Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019* to reflect the UK's exit from the EU, although these largely carried forward the provisions and terminology of the 2017 Regulations and do not fundamentally alter their interpretation. This report therefore primarily refers to the 2017 Regulations and (where appropriate for clarity) the relevant provisions of the Habitats Directive.

[5] The term 'European site' is retained by the 2019 amendment and for all practical purposes the definition is essentially unchanged from the 2017 Regulations. European sites are therefore: any Special Area of Conservation (SAC) from the point at which the European Commission and the UK Government agreed the site as a 'Site of Community Importance' (SCI) (if this was before 31 Jan 2020); any classified Special Protection Area (SPA); and any candidate SAC (cSAC). However, the term is also commonly used when referring to potential SPAs (pSPAs), to which the provisions of Article 4(4) of Directive 2009/147/EC (the 'new wild birds directive') are applied; and to possible SACs (pSACs) and listed Ramsar Sites, to which the provisions of the Habitats Regulations are applied as a matter of Government policy (NPPF para. 194) when considering development proposals that may affect them. "European site" is therefore used in this document in its broadest sense, as an umbrella term for all of the above designated sites. Note, it is likely that this term will be supplanted at some point in the future although an appropriate UK-wide alternative has not yet been established (e.g. the NPPF in England has adopted the term 'Habitats sites' to refer collectively to those sites defined by Regulation 8; the *Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019* replaces 'Natura 2000' with the 'National Site Network').

[6] 'European offshore marine sites' are defined by Regulation 18 of *The Conservation of Offshore Marine Habitats and Species Regulations 2017* (as amended); these regulations cover waters (and hence sites) over 12 nautical miles from the coast.

[7] The term 'Appropriate Assessment' has been historically used to describe the process of assessment; however, the process is more accurately termed 'Habitats Regulations Assessment' (HRA), with the term 'Appropriate Assessment' limited to the specific stage within the process.

[8] Also referred to as 'screening' or the 'test of significance'.

[9] Also referred to as the 'integrity test'.

2.3 THIS REPORT

2.3.1. SWS has a statutory duty to prepare a WRMP and is therefore the Competent Authority for the HRA of that plan. SWS appointed WSP, supported by Royal Haskoning DHV and APEM, to assist with its assessment of WRMP24 against Regulations 63 and (if required) 64.

2.3.2. An HRA was provided alongside the rdWRMP for public consultation in 2024 comprising a main report (Annex 18 to the rdWRMP) and addendum which captured changes to the assessment further to the dWRMP consultation, Sept23 submission and associated re-runs of the WRSE model (Annex 18A to the rdWRMP). This final report assimilates the two reports and contains an updated assessment of the final WRMP24 against the requirements of the Habitats Regulations.

2.3.3. The report is structured as follows:

- **Section 2** provides a brief summary of the final WRMP24 and the preferred options;
- **Section 3** sets out the approach to HRA of WRMP24, including the key issues for these strategic plans;
- **Section 4** documents the 'screening' of the preferred options;
- **Section 5** summarises the 'appropriate assessments' completed in Appendices E1 – E15, including option-specific 'in combination' assessments and a summarises the plan-level 'in combination' assessment; and
- **Section 7** sets out the conclusions of the HRA of SWS's WRMP24.

2.3.4. The following notes provide context for the assessment:

- The report necessarily focuses on the assessment of the preferred options; the iterative HRA-related processes used to inform the development of the plan (including the feasible options assessments) are documented separately in WRSE 'screening' reports[10], the assessment is of the WRMP only and not the WRSE Regional Plan.
- The HRA draws on the environmental data and assessments undertaken within other assessments, particularly in relation to operational effects and the hydrological zone of influence. These include the Water Framework Directive (WFD) assessment; this HRA report should therefore be read in conjunction with these reports.
- information on the options; where there are uncertainties, either in option operation or in the likely response of European sites and features, these are identified and approaches for resolution identified. This report provides a strategic, plan-level assessment to support the WRMP and is not an application-specific ('project-level') assessment. It is based on data and information that can be reasonably gathered at the plan-level and so does not include option-specific survey data or similar. More detailed, application-specific HRAs will be needed to support future planning applications and environmental permits/consents.
- In-combination assessments are based on the information available at the time of assessment. Specifically, we are not aware of any amendments to the preferred supply-side options of Thames Water (TW), Affinity Water (AW), Sutton and East Surrey Water (SESW), Portsmouth Water (PW), Southeast Water (SEW), or Bournemouth Water BW), since the preparation of HRA submitted alongside the rdWRMP so these companies' submitted rdWRMPs are used for the in-combination assessment. Wessex Water made very minor amendments to one option in the

[10] WRSE (2022) WRSE Regional Plan Habitats Regulations Assessment Stage 1 Screening Report. Report for WRSE by Mott MacDonald. A copy of this can be made available to statutory consultees, if required.

Bristol Avon catchment during the preparation of the SWS WRMP24, which will not interact with any SWS options.

3 SOUTHERN WATER'S FINAL WRMP24

The WRMP process identifies potential deficits between the water available for supply and the projected demand. Southern Water has identified various 'supply-side' 'demand-side' options to resolve predicted deficits in its supply area.

3.1 WATER RESOURCES PLANNING

3.1.1. The context for the development of the final WRMP24, including water resources modelling scenarios, sustainability reductions and environmental destination, and the relationship with Regional Plan, is set out in **Annex 9** and this should be read to provide background and context for the HRA process.

3.1.2. In broad outline, the WRMP process establishes supply and demand balances for each Water Resource Zone[11] (WRZ) operated by the water company, identifying potential deficits between the water available for supply (Water Available For Use or WAFU) and the projected demand plus an allowance for planning uncertainty known as 'headroom'. 'Options' are then proposed to resolve any deficits identified.

3.1.3. The supply-demand balance calculations are completed in accordance with the *Water Resources Planning Guideline*[12] (WRPG), based on deployable output (DO) and demand forecasts. The estimation of DO is based:

- abstraction volumes allowed under current statutory licences, as impacted by actual source yield; and
- any future reductions in abstraction expected under environmental improvement regimes (see WRMP24 Annex 9)[13].

Demand forecasts are completed in accordance with the WRPG and consider (*inter alia*):

- Estimates of baseline demand from:
  - household customers;
  - non-household customers;
  - water leaks;
  - any other losses or uses of water such as water taken unbilled.

[11] The *Water resources planning guideline* [*ibid*. footnote 10] defines a water resource zone as "*an area within which the abstraction and distribution of water to meet demand is largely self-contained (with the exception of agreed bulk transfers)*".

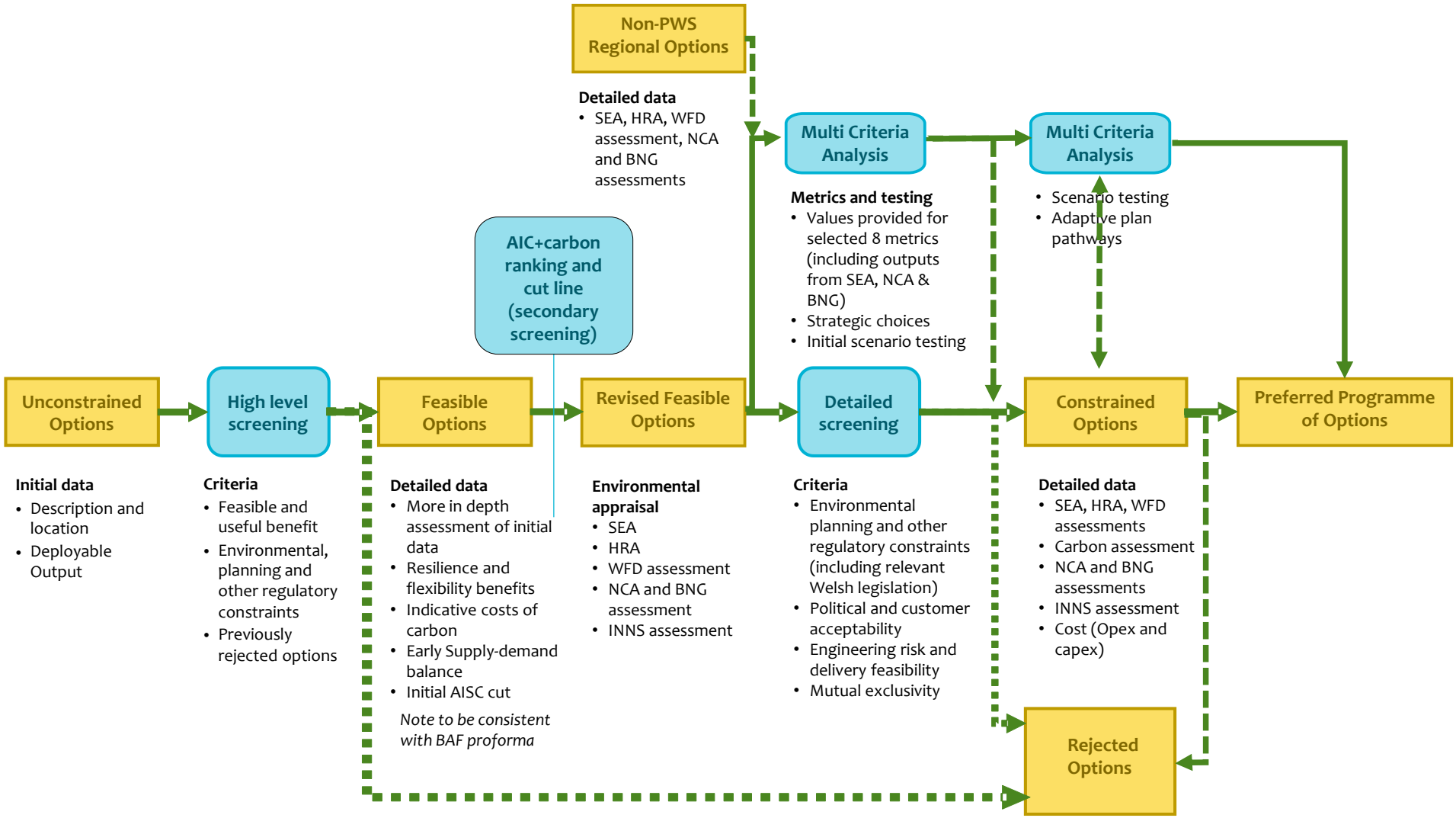
[12] UK Government (2023). *Water Resources Planning Guideline* [online.]. Available at: https://www.gov.uk/government/publications/water-resources-planning-guideline/water-resources-planning-guideline. [Accessed May 2023].

[13] It should be noted that various licence review arrangements and protocols are implemented at the start of each WRMP cycle, which take account of the Environment Agency's requirements through the Water Industry National Environment Programme (WINEP) and National Environment Programme (NEP) respectively. This review process (and WINEP) is undertaken in conjunction with Natural England, which identifies protected sites (including European sites) to the EA where it believes abstraction-related issues are affecting the achievement of favourable conservation status, and where abstraction reductions are considered necessary.

- Future demands which will be subject to many influences, including:
  - housing development and population changes, including changes in occupancy;
  - the impact of prolonged high demand;
  - changes in water use behaviour and distribution of demand (in both household and non-household users);
  - metering and smart metering;
  - changes in government policy and expectations, for example water efficiency standards in new homes and water labelling;
  - changing water efficiency and sustainable water use practices;
  - changing design standards of devices that use water such as more efficient washing machines;
  - changes in technology and practices for leakage detection and repair;
  - a changing climate;
  - weather patterns;
  - potential changes in demand from the energy sector as it moves to low *carbo*n technology.

3.1.4. The WRMP process initially identifies as many potential deficit solutions as possible (the 'unconstrained list' of options) irrespective of cost or technical merit. These are then refined to identify '**feasible options**' and subsequently the '**preferred options**' for meeting any supply-demand deficits. All zones with deficits are subject to a decision-making process using a Multi-Criteria Analysis (MCA), and other methods where appropriate, to identify a preferred plan (comprising 'preferred options') to address the supply demand deficit. The decision-making method factors in multiple costs and benefits and considers the interaction between zones to establish a best value plan (BVP) for the region (and individual company). This staged filtering process allows various assessments, including HRA, to inform the plan development (**see Figure 3-1**).

Figure 3-1 - Environmental assessments into option and plan development



3.1.5. WRMP options are typically characterised as **supply-side** (measures that increase supply, such as new abstractions) or **demand-side** (measures which reduce consumption post-treatment, such as metering or leakage detection and reduction). HRAs generally focus on supply-side options[14] and their potential effects; these options would typically involve one or more of the following:

- development of new surface or groundwater sources, or desalination of sea water ('new water');
- modification of an existing licence to alter the operational and network regimes (e.g. additional abstraction; changes in timing of abstractions; etc);
- use of 'spare water' from existing licensed sources through operational adjustments or capital works (e.g. new treatment facilities);
- re-instatement of existing, mothballed sources (with or without current licences);
- capital works to the distribution network (e.g. to improve resilience);
- transferring water from adjacent water companies or third-parties with a supply / demand surplus; or
- Strategic Resource Options involving multiple companies and sources.

3.2 ENVIRONMENTAL DESTINATION

3.2.1. Alongside the WRMP24 Southern Water is driving forward the 'Catchment First' strategy to improve water quality and investigate the impacts of existing abstractions, to ensure sustainable water management. A key goal is to achieve sustainable abstractions and work to avoid deterioration of protected areas is investigated and delivered through the Southern Water Business Plan and the Water Industry National Environment Programme (WINEP). The evidence from WINEP investigations will inform decision-making related to the potential changes needed to abstraction licences at individual sources or groups of sources.

3.2.2. Known licence change risks and associated drivers are set out in Annex 9, of note to the WRMP24 HRA are the timelines for environmental destination for Pulborough and River Itchen, with summary information provided below. Additionally, of note, the North Kent 'No Deterioration' WINEP due for completion in 2027 considers potential adverse effects upon the North Kent Marshes (including the Medway Estuary and Marshes SPA and Ramsar, and The Swale SPA and Ramsar).

PULBOROUGH AND ARUN VALLEY

3.2.3. There is uncertainty regarding the impact of the Pulborough groundwater licence on SSSIs in the Arun Valley and therefore connected Habitats sites. Natural England have advised that ground water abstraction at Pulborough may be having a negative impact on protected sites in the Arun Valley, comprising the Arun Valley SPA, SAC and Ramsar and set out requirements for water neutrality in the Sussex North Water Resource Zone (SNZ) accordingly (see Annex 22).

3.2.4. Presently, licence caps are proposed at 'recent actual' rates from 2030:

- Pulborough groundwater would be capped at 13Ml/d (daily equivalent of the annual licence)

[14] 'Demand management' options (i.e. options designed to reduce treated water use such as metering or provision of water butts) are generally considered unlikely to have any significant or adverse effects on any European sites (see **Section 4.3**).

- Pulborough surface water licence would be capped at 47.8Ml/d (daily equivalent of the annual licence)

3.2.5. During assessments, it has been identified that whilst it may prevent or reduce risk of deterioration, the licence reductions in isolation may not achieve environmental targets (e.g. EFI or enhanced targets for protected sites). Therefore, Environmental Destination scenarios have been devised to assess a range of potential changes to abstractions beyond licence capping; reductions begin from 2030 and gradually step up each five-year AMP period to be achieved fully by 2045 (see Annex 9).

3.2.6. The future of the existing Pulborough groundwater licence remains uncertain whilst the environmental sustainability investigation is ongoing. The Littlehampton Wastewater Treatment Works (WTW) recycling option, originally included in WRMP19 and due to be delivered in 2029-30 will reduce reliance on the Pulborough source. Beyond this, the strategic nature of the Pulborough source underpins the consideration of different modelled scenarios. Potential licence changes are likely to be a significant factor in the selection of other major schemes in the Central area, such as River Arun desalination option, River Adur Offline Reservoir and the additional transfers into SNZ.

RIVER ITCHEN SOURCES

3.2.7. WINEP investigations in previous AMPs have identified that changes to the current abstraction regime are required in the River Itchen catchment to avoid deterioration. Reductions have already been implemented at some sources, with further changes likely required following the outcomes of the AMP7 WINEP investigations. Additionally, the AMP8 WINEP programme includes interim ecological resilience mitigation schemes to help support ecological resilience if required. The outcomes from the investigations are due in 2025 and will support evidence-based decision making and help inform the AMP8 interim mitigation schemes to be implemented.

3.2.8. The timeline to achieve Environmental Destination for the River Itchen is detailed in Annex 9, in the short-term current abstraction licences on the Lower River Itchen, notably Otterbourne surface water, Otterbourne groundwater and TwyLittlehampton groundwater will require renewal to ensure continued supply whilst alternative, strategic solutions are implemented. This will require separate assessment including HRA, and suitable mitigation and compensation to be put forward given the absence of other abstraction sources available and the imperative need to maintain the supply-demand balance.

3.2.9. Based on the outcome from the Candover Stream Habitats Directive WINEP investigation, the revocation of the AlresLittlehampton licence from 2030 has been assumed in all Environmental Destination scenarios as it cannot meet EFI (or CSMG) targets under any conditions.

3.3 SOUTHERN WATER'S FINAL WRMP24 PREFERRED OPTIONS

3.3.1. The development process for the WRMP24 and its relationship with the WRSE Regional Plan is set out within the final WRMP24. This provides detail on:

- the water resource planning scenarios (WRMP Section 4.4);
- the demand forecast including population growth scenarios (WRMP Section 5.2); and
- the adaptive planning process (WRMP Section 5.5).

3.3.2. **Annex 9** of the WRMP provides additional information relevant to the HRA, including on environmental destination. The preferred Best Value Plan (BVP) is then set out in Section 7 of the WRMP.

3.3.3. The following sections summarise the BVP preferred options in the context of the HRA requirements, to provide a framework for the assessment. This list takes into account amendments made during preparation of the WRMP24, specifically:

- the removal of options that are no longer required, or for clarity / consistency where bi-directional schemes are proposed;
- the addition of new 'resilience options' including new supply-side groundwater schemes;
- minor amendments to some supply-side network schemes (reflecting further engineering information);
- amendments to the first year and/or yield for some options; and
- other minor amendments to reflect consultation responses.

3.4 DEMAND-SIDE OPTIONS

3.4.1. The WRMP24 includes 17 types of demand-side / demand-management options that will be applied to each of the 14 WRZs. The 17 types of option are summarised in Table 3-1. It should be noted that location-specific information on the measures is not available without specific investigations, which would form part of the package (for example, the location and severity of most leakages is not known).

Table 3-1 – Demand-management options proposed for each WRZ

Option Name	Summary
Advanced Find & Fix	Leakage reduction - Active Leakage Control
Advanced Pressure Management	Leakage reduction - Pressure reduction programmes
Comms Pipe Replacement	Comm pipe leakage reduction
Digitalisation/Smart Networks	Leakage reduction - Active Leakage Control
Enabler Activities	Awareness campaigns - Targeted water conservation information (advice on appliance water usage)
Enabler Activities (Non households)	Awareness campaigns - Targeted water conservation information (advice on appliance water usage)
Home Visits	Water use audit and inspection - Household
Mains Replacement (Net of NRR)	Distribution Main Replacement
NHH Smart Metering	Enhanced metering - Non-household
NHH Tariffs	Changes to existing measured tariffs - Volumetric charges
Policy Regulation	Implementation of changes to regulation and policy on building standards and appliances (All WRZs)
Smart Metering USPL	Customer supply pipe leakage reduction
Smart Metering	Enhanced metering - Household

Option Name	Summary
Smart Metering Unmeasured Households	Compulsory metering - Household
Tariffs	Changes to existing measured tariffs - Volumetric charges
Water Audits (Non households)	Water use audit and inspection - Non-household
Water Efficiency Partnership Fund	Sponsoring Water efficiency enabling activities by others

3.5 EXISTING TRANSFERS / CONTINUATION OF SERVICES

3.5.1. Existing transfer schemes or bulk supply agreements are identified as 'options' by WRSE and/or SWS. Existing transfer schemes are summarised in Table 3-2, noting that two were added during preparation of the WRMP marked with an asterix (*) giving a total of seventeen. As these are simply a continuation of existing supply agreements they are considered effectively to be part of the water resources baseline for HRA purposes and are not subject to option-specific assessment.

Table 3-2 – Existing transfers identified in the final WRMP24

Option Name	Notes from the final WRMP24	Area
Bulk export (HSW): Existing supply to large industrial user (10Ml/d	This an existing bulk supply that is include at maximum capacity throughout the planning period.	Western
Bulk import (HSE): PWC Source A to Eastleigh WSR (30Ml/d)	This is an existing bulk import that is selected in all situations from 2026 with a maximum output of 15Ml/d. However, beyond 2039, it is consistently used across all situations under 1:500 DYCP conditions only (see Annex 21).	Western
Interzonal transfer (HSW-HSE): Existing transfer (24Ml/d)	Existing bulk import	Western
Interzonal transfer (HSW-IOW): Cross-Solent main existing (18Ml/d)*	This is an existing transfer between HSW and IOW across the Solent.	Western
Interzonal transfer (HWZ-HSE): Existing transfer (7.5Ml/d)	Existing bulk import	Western
Interzonal transfer (HSE-HRZ): Abbotswood - existing (1.1Ml/d)*	This is the transfer between HSE and HRZ at Sandy Lane Abbotswood.	Western
Bulk export (SNZ): Weir Wood to SEW RZ2 (5.4Ml/d)	This is an existing bulk export to South East Water and is fully utilised in all situations and all planning scenarios from 2026 up to 2031. It is not used thereafter up to 2040 and only used sporadically under 1:100 DYAA and 1:500 DYCP scenarios in some situations (see Annex 21).	Central

Option Name	Notes from the final WRMP24	Area
Bulk import (SNZ): PWC to Pulborough (15Ml/d)	This is an existing bulk import that continues to be selected in most situations under all planning scenarios throughout the planning period (see Annex 21).	Central
Interzonal transfer (SNZ-SWZ): Rock Road bi-directional (15Ml/d)	This is an existing transfer, selected from 2026, that continues to be used in all planning scenarios and in all situations (see Annex 21).	Central
Interzonal transfer (SWZ-SBZ): v6 valve (17Ml/d)	This is an existing transfer that continues to be used in most situations under all planning scenarios except 1:500 DYCP scenario where it is not used at all (see Annex 21).	Central
Interzonal transfer (SWZ-SBZ): V6 valve additional capacity (13Ml/d)	This is an existing trunk main at v6 valve (SWZ to SBZ) with additional capacity (from 2026/27) (negates need for IZT_Har3)	Central
Bulk export (KME): To SEW RZ6 from Hartlip (7.4Ml/d)	This existing bulk supply to South East Water is not used after 2030 until 2041. Thereafter it is only sporadically used under 1:100 DYAA, 1:500 DYAA and 1:500 DYCP scenarios (see Annex 21).	Eastern
Bulk export (KMW): To SEW RZ6 (0.5Ml/d)	This existing bulk export to South East Water is not utilised between 2031 and 2040. After 2040 is only used sporadically 1:100 DYAA, 1:500 DYAA and 1:500 DYCP scenarios (see Annex 21).	Eastern
Bulk export (KMW): To SEW RZ3 via Bewl Reservoir (8Ml/d)	This is an existing bulk export to South East Water and it utilised at maximum capacity in all situations under all planning scenarios throughout the planning period (see Annex 21).	Eastern
Bulk export (KTZ): SWS Deal to AFW AZ7 (4Ml/d)	This existing bulk export to South East Water is utilised in all situations under all planning scenarios throughout the planning period (see Annex 21).	Eastern
Bulk import (KTZ): AFW - existing (0.1Ml/d)	This existing bulk import from Affinity Water is utilised in all situations under all planning scenarios throughout the planning period (see Annex 21).	Eastern
Interzonal transfer (KMW-KME): Existing transfer (44.7Ml/d)	This existing transfer between KME and KME is selected in all situations and planning scenarios from 2026 and is utilised throughout the planning period but with much lower utilisation under the 1:500 DYCP conditions (see Annex 21).	Eastern
Interzonal transfer (KTZ-KME): Existing transfer (14Ml/d)	This transfer is selected from 2026 under 1:500 DYCP scenario but is consistently used in all situations under NYAA, 1:100 DYAA and 1:500 DYAA scenarios from 2031 to 2050. After 2050, it is not utilised in some situations (see Annex 21).	Eastern

3.6 CATCHMENT MANAGEMENT OPTIONS

3.6.1. No specific catchment management options are proposed in the final WRMP24; this is because an assumed quantum of catchment management measures is included as part of the baseline WINEP assumptions (see **Annex 9** of the **WRMP Annex 9**). There has been no change to this position during preparation of the WRMP.

3.7 DROUGHT OPTIONS

DEMAND-REDUCTION DROUGHT OPTIONS

3.7.1. Three demand-reduction drought options are proposed for all WRZs for the planning period:

- Temporary Use Bans (TUBs);
- Non-Essential Use Bans (NEUBs); and
- Reductions in commercial supply.

SUPPLY-SIDE DROUGHT OPTIONS

3.7.2. With regard to supply-side drought options, all options proposed in SWS's Drought Plan 2022 (see Table 3-3) are included in the strategy for WRMP24 although the utilisation of these options is dependent on the various drought scenarios but remain available over the planning period. SWS has committed to not deploying some of these options after specific dates in the planning period due to concerns over their environmental impacts.

3.7.3. During preparation of the WRMP24, consideration was given to including one new supply side drought option; however, following more detailed consideration, this option is not included in the final WRMP:

- **Bulk import (HRZ): Sea Tankering (45Ml/d)**; this option would require the delivery of water from a hydroelectric plant in Norway by sea tanker to Southampton Container Docks, where temporary infrastructure would be installed (dockside storage bladders, pumps etc.) to allow the transfer of water to Test surface water Water Supply Works (WSW) lakes via a temporary above-ground pipeline.

3.7.4. After careful consideration and consultation, SWS decided to withdraw this option from its WRMP24. This decision reflects SWS's commitment to the communities it serves and the environment. During consultation on the rdWRMP24 significant concerns were raised by respondents about the potential impact of the option on the UK's fish farming industry, wild salmon populations and local aquatic life, due to the threat of Gyrodactylus salaris (Gs). Gs is classified as Non-Native Invasive Species and its introduction could have potentially significant ecological consequences.

3.7.5. Currently, there are no proven methodologies to guarantee that water transferred via sea tankering would be free of Gs. Recognising the severity of this risk, SWS accepts the possibility of introducing Gs poses an unacceptable risk. Furthermore, the logistical challenges associated with the option are significant. These include the procurement of services and obtaining planning permission for pipeline construction through environmentally sensitive areas. Given these challenges and the extended timelines required which could potentially lead to considerable disruption, SWS decided it is prudent to consider more sustainable alternatives.

3.7.6. However, recognising the potential of sea tankering as an emergency drought water supply option, SWS are committed to conducting further feasibility studies to mitigate risks associated with water

transfer. These studies will help to inform WRMP29 and will consider whether sea tankering could be viable if the water was sourced from the UK.

Table 3-3 – Supply-side Drought Plan options included in the final WRMP24[15]

Option Name	Donor zone	Recipient zone	Available until*
Bewl Water Reservoir/River Medway Scheme: Stages 1 to 4 (surface water) (SEMD Name*: Drought option - supply side (KMW): River Medway Scheme 1-4 (17Ml/d))	-	Kent Medway West	2040-41
Candover Augmentation Scheme (groundwater) (SEMD Name*: Drought option - supply side (HSE): Candover (22Ml/d))	Hampshire Southampton East	Hampshire Southampton East	2034-35
Caul Bourne WSW (groundwater) (SEMD Name*: Drought option - supply side (IOW): Caul Bourne (1.5Ml/d))	Isle of Wight	Isle of Wight	2040-41
Darwell Reservoir: Stages 1 and 2 (surface water)	-	Sussex Hastings	n/a**
East Worthing WSW (groundwater)	-	Sussex Worthing	2041-42
Eastern Yar Augmentation Scheme (surface water)	-	Isle of Wight	n/a**
Pulborough Stages 1 to 3 (surface water) (SEMD Name*: Drought option - supply side (SNZ): Pulborough surface water phases 1-3 (23Ml/d))	Sussex North	Sussex North	2041-42
Lukely Brook WSW (groundwater)	Isle of Wight	Isle of Wight	n/a**
North Arundel WSW (groundwater)	-	Sussex Worthing	n/a**
Weir Wood Reservoir (surface water)	-	Sussex North	2041-42
Lower Itchen Sources (groundwater and surface water) (SEMD Name*: Drought option - supply side (HSE): Lower Itchen)	Hampshire Southampton East	Hampshire Southampton East	2029-30
Test Surface Water Drought Permit (surface water) Test Surface Water Drought Order (surface water) (SEMD Name*: Drought option - supply side (HSW): River Test (80Ml/d))	Hampshire Southampton West	Hampshire Southampton West	2040-41

[15] Option naming convention is consistent with 2022 Drought Plan.

* SEMD Name – Where the option has also been selected for the WRMP24, the SEMD name has also been provided to ensure consistency in reporting.

* n/a – Options that are available in the planning period but not utilised by the investment model

3.7.7. The Drought Options are proposed in the emerging Drought Plan (and have been assessed as part of the HRA of that plan). These options do not deviate from the Drought Plan proposals but are identified as WRMP24 options for modelling purposes (i.e. they are assumed to still be available for use beyond the end of the current Drought Plan period, although this would necessarily be reviewed each time the Drought Plan is updated). As these have already been subject to assessment in the Drought Plan HRA (available from SWS) they are only considered 'in combination' with the preferred supply-side options.

3.8 SUPPLY-SIDE OPTIONS

3.8.1. SWS has identified a range of preferred supply-side options for the Final WRMP24 to maintain PWS in its supply area. These options are listed alphabetically by the full name in **Table 3-4 – Table 3-6** for each region (Western, Central and Eastern). The list has changed during preparation of the WRMP24 with new options added, options amended and options deselected.

3.8.2. Some of the options in **Table 3-4 – Table 3-6** are WRMP19 schemes that are due for implementation early in the next AMP period. These are included in the WRMP24 for completeness although most are already in the project-design or approval phase. They have therefore been subject to plan-level HRA previously (i.e. for WRMP19) but not a formal assessment of the project against Regulation 63 as part of any planning and / or licence applications. The data for these assessments are being collected independently of the WRMP24 HRA, and project-level HRA will be published to meet the programme requirements of the relevant option.

3.8.3. Similarly, the WRMP24 includes one SRO (the Thames to Southern Transfer (T2ST)) which is assessed as part of RAPID's gated process for SROs; this includes environmental compliance. The Gate 2 submission was supported by an informal HRA assessment[16]. The environmental compliance assessments, and the supporting investigations, are ongoing with the outcomes available to inform the RAPID Gate 3 submission prior to consultation in 2026, emerging data and assessments are referred to as appropriate.

3.8.4. It should also be noted that a direct relationship between a water transfer scheme and 'a source' in surplus is not typical in this region; whilst there are some examples (e.g. the option "*Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW pipeline*" is a transfer of water from Havant Thicket into the SWS supply area) in many cases the additional volumes are generated through the overall integrated functioning of the WRMP24 options with the Regional Plan rather than from specific 1:1 relationships with sources in surplus.

3.8.5. Note, that whilst the **option names** in **Table 3-4 – Table 3-6** are generally consistent throughout the development of the WRMP24, there are some differences (and also between the final WRMP24 and the WRSE naming) that may affect read-across between this report and earlier documents. This is due to changes in SWS's preferences for the SEMD naming in the WRMP. If there are uncertainties

[16] https://www.southernwater.co.uk/media/ojcj2a5r/t2st-gate-2-annex-b2-habitats-regulations-assessment.pdf

over option names then SWS should be contacted to provide the most recent option-mapping spreadsheet.

Table 3-4 – Western Area Supply-Side Options (excludes existing imports / transfer arrangements)

Option Name	Option Description / Summary	Yield	Earliest Year
Bulk import (HAZ): T2ST to Andover (20Mld)	This is a spur from the main T2ST transfer main.	14.3	2048
Bulk import (HKZ): T2ST to HKZ (5Ml/d)	This option transfers water from T2ST to Kingsclere. Note that this option was not explicitly separated out in the Sep23 HRA (Annex 18) but is effectively part of the pipeline associated with Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d) (below), which was assessed (i.e. there are no additional effects from this option). Essentially, two pipelines will be required to deliver Bulk import (HAZ): T2ST to Andover (20Mld) and Bulk import (HKZ): T2ST to HKZ (5Ml/d) (this option), with Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d) then utilising both of these for bi-directional distribution.	3.1	2049
Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW (90Ml/d)	A new raw water transfer (Pumping Station, Pipeline & Break Pressure tank) between Havant Thicket Reservoir and Otterbourne WSW. The capacity of the first section is for 90Ml/d to the mid point and a possible connection to Portsmouth Water. 22h/d operation is assumed.	90.0	2035
Bulk import (HSE): PWC Source A to Otterbourne WSW (21Ml/d)	A new additional potable water transfer of 21Ml/d capacity using a new pipeline from Portsmouth Water Source A to Otterbourne. This scheme is dependent on development of Havant Thicket reservoir to provide the water. 22 h/d operation assumed.	21.0	2032
Bulk export (HSE): Otterbourne WSW to PWC Source A (45Ml/d)	The scheme is a potable 90Ml/d bi-directional transfer from Test Surface Water WSW to Otterbourne WSW. 22h/d operation assumed.	45.0	2040
Bulk import (HWZ): T2ST to Yew Hill (95Ml/d)	This is the main pipeline for the bulk transfer of water from Thames Water (the Thames to Southern Transfer scheme (T2ST)), with volumes essentially derived through delivery of the South East Strategic Reservoir Option (SESRO) by Thames Water.	66.0	2040
Groundwater (HKZ): Remove constraints at Newbury to increase yield (1.2Ml/d)	The scheme is located within the Hampshire Kingsclere resource group (which consists of and is served by Kingsclere and Newbury WSWs). The scheme will increase the yield of the Newbury source within the existing licence by removing the present constraint imposed by mains leaving the site. This option will involve the construction of a dedicated, 7.1 km 300mm DN300 pipe from	1.2	2028

Option Name	Option Description / Summary	Yield	Earliest Year
	Newbury water supply works (WSW) and additional pumps and treatment facilities to increase the supply to Beacon Hill WSR. Additional high-lift pumping capacity would be required at Newbury . Newbury WSW abstracts water from the underlying chalk aquifer. It is considered that the River Enbourne will not be affected by the increased abstractions due to its perched nature above the London Clay.		
Groundwater (HRZ): New boreholes at Romsey (4.8Ml/d)	The existing boreholes and well/adits that supply Romsey WSW are either out of service or operating below their full capacity due to water quality issues. This option proposes three replacement boreholes to increase and recover DO on site. Total source output on delivery of the scheme would be 13.7Ml/d. No additional treatment is required. Replacement borehole locations are distant from existing borehole locations and require new pipelines to connect to the WSW.	4.8	2031
Groundwater (HSW): Test MAR (5.5Ml/d)	This option is a Managed Aquifer Recharge (MAR) scheme. It would provide recharge of the confined chalk aquifer from mains water in winter months, with subsequent onsite abstraction from the same aquifer in summer/autumn critical low flow periods. Treatment is available on site and it is assumed that there is sufficient treatment capacity for the abstracted water. The scheme assumes an extended pilot trial period to prove the viability of yield and water quality, with subsequent development of the MAR scheme. Expected DO from the developed scheme is ~5Ml/d. The pilot scheme assumes one abstraction/recharge borehole and one monitoring borehole, each 250m deep. For the duration of the trial, abstracted water will run to waste (River Test). The developed scheme will comprise a total of five boreholes at 250m depth; three abstraction/recharge boreholes and two monitoring boreholes, inclusive of those used in the pilot scheme. Abstracted water from the developed scheme will be treated onsite as required, before entering supply. The suggested WTW site boundary may not support a DO of 5Ml/d. It is understood that SWS own adjacent land to the north of the River Test, and it is proposed that one abstraction/recharge borehole and one monitoring borehole be located on this land in order to achieve the desired scheme DO. Groundwater from the confined chalk aquifer is expected to be under artesian pressure and therefore gate valves would be required on all boreholes. Pumped recharge from mains water supply would also be required to overcome artesian pressure.	5.5	2036

Option Name	Option Description / Summary	Yield	Earliest Year
Groundwater (IOW): New borehole at Eastern Yar3 (1.5Ml/d)	The option is to drill a new replacement borehole, 100m deep, for Eastern Yar3 Augmentation well on the Isle of Wight. The existing borehole has experienced around a 90%+ loss in performance, and previous well rehabilitation and cleaning has not provided a notable improvement. A replacement well is required to regain resilience within the well field for the river augmentation scheme.	1.5	2040
Groundwater (IOW): New boreholes at Newchurch (LGS) (1.9Ml/d)	This option proposes replacing all 3 Lower Greensand boreholes on site so that the source can operate to its licenced capacity. Currently BH4 is non-operational, BH1 and BH2 are operational but at reduced capacity due to screen-dewatering. No additional treatment is proposed. Total Scheme output would be 4.5Ml/d.	2.0	2037
Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d)	Transfer from Otterbourne to Andover to Kingsclere. This scheme is designed to support network improvements needed for UTMRD transfer to Hampshire and/or the strategic scheme from IoW/South Hampshire	6.8	2050
Interzonal transfer (HRZ-HSW): Romsey Town and Test valve (3.1Ml/d) (WRMP19 option under investigation)	Development and upgrade of existing transfer between Romsey Town & Test valve (HSW-HRZ). This option involves installing a new booster station with 5Ml/d flow capacity to an existing transfer to allow bi-directional flow.	3.1	2026
Interzonal transfer (HSW-HRZ): Romsey Town and Test valve expansion (5Ml/d)	Development and upgrade of existing transfer between Romsey Town & Test valve (HSW-HRZ). This option involves installing a new booster station with 5Ml/d flow capacity to an existing transfer to allow bi-directional flow.	5.0	2031
Interzonal transfer (HSE-HSW): Yew Hill WSW to River Test WSW bi-directional (60Ml/d)	Yew Hill to Rownans Southampton Link Main	60	2031

Option Name	Option Description / Summary	Yield	Earliest Year
Interzonal transfer (HSE-HWZ): Otterbourne WSW to Yew Hill bi-directional (74Ml/d)	Transfer from Otterbourne to Andover to Kingsclere WRZs. This scheme is designed to support network improvements needed for UTMRD transfer to Hampshire and/or the strategic scheme from IoW/South Hampshire. This bi-directional transfer between from Otterbourne WSW in HSE to Yew Hill in HWZ is being developed as part of the Hampshire Grid.	62.2	2031
Interzonal transfer (HWZ-HAZ): Winchester to Andover bi-directional (15Ml/d)	Transfer from Otterbourne to Andover to Kingsclere. This scheme is designed to support network improvements and/or the strategic scheme from IoW/South Hampshire	10.6	2031
Recycling (HSE): Recharge of Havant Thicket from recycled water from Portsmouth Harbour WTW (60Ml/d) (WRMP19 option under investigation)	60Ml/d of recycled water will be sent to Otterbourne via Havant Thicket Reservoir. Portsmouth Harbour WTW WWTW transfer to new Water Recycling Plant then transfer to Havant Thicket. Direct raw water transfer from Havant Thicket to Otterbourne for treatment.	60.0	2035
Recycling (IOW): Sandown (8.5Ml/d) (WRMP19 option under investigation)	This option proposes the transfer of treated effluent from Sandown WwTW (currently discharged to sea), to support flows in the Eastern River Yar upstream of the Sandown WSW abstraction at Alverstone . Treated water in excess of the local demand will be transferred through a new transfer pipeline to a service reservoir near Newport, for supply to much of the island. This option is reliant on the WSR enlargements carried out in IZT_CSM Cross-Solent upgrade. (2) Option 2 also includes upgrades to Sandown WSW to achieve the extra flow.	8.5	2031
Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d)	This new option involves recommissioning the mothballed Chilbolton WSW, with the inclusion of a suitable nitrate removal plant. The generated waste stream will require removal by tanker for treatment at a local WwTW (typically less than one tanker movement per month). This would provide a DO benefit of 2.5Ml/d.	0.5	2073

Option Name	Option Description / Summary	Yield	Earliest Year
Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)	This new option involves the development of a new borehole and pump capacity at the Kings Sombourne site to increase the DO from 1.5Ml/d to the licenced 4Ml/d, giving a potential benefit of 2.5Ml/d.	2.5	2031

Table 3-5 – Central Area Supply-Side Options (excludes existing imports / transfer arrangements)

Option Name	Option Description / Summary	Yield	Earliest Year
Bulk import (SBZ): SEW to Rottingdean (20Ml/d)	This option is for a pipeline to transfer flow from SEW Barcombe WSW to SWS Rottingdean WSR 25Ml/d with 22h/d operation.	20.0	2066
Bulk import (SNZ): Havant Thicket Reservoir to Pulborough (50Ml/d)	This is a pipeline to represent reverse flow from Havant Thicket Reservoir to Pulborough through a bidirectional raw water transfer from Pulborough to Havant Thicket. INNS treatment will be provided at Pulborough.	40.0	2040
Bulk import (SNZ): SES re-zoning (4Ml/d) (WRMP19 option under investigation)	Extension of current re-zoning of supplies to SES water in SNZ beyond 2025 for up to 4Ml/d.	4.0	2026
Bulk import (SNZ): SES to SNZ (10Ml/d)	Proposed new bi-directional transfer from SES Outwood To SWS Buchen Hill, Crawley. 10Ml/d transfer flow rate.	10.0	2034
Bulk import (SNZ): SEW RZ5 to Pulborough	A transfer between Tilmore and Pulborough (possible gravity transfer from Tilmore to Pulborough).	10.0	2040
Desalination (SWZ): Tidal River Arun (10Ml/d)	These options propose a desalination plant to treat seawater abstracted off the coast near Littlehampton to supply treated water to the Sussex Worthing WRZ. It is assumed that the	10.0	2046

Option Name	Option Description / Summary	Yield	Earliest Year
Desalination (SWZ): Tidal River Arun (20Ml/d)	water could be used during drought conditions to meet demand in Sussex Worthing WRZ. There is bi-directional transfer between Sussex Worthing WRZ and Sussex North WRZ which means this option could have result in additional benefit to Sussex North WRZ. This transfer would likely require additional connectivity between Perry Hill WSR and Tennants Hills WSR An investigation in AMP4 indicated that land adjacent to Littlehampton WwTW showed the greatest potential for a new desalination site because of the existing land use, the availability of services (access roads, power, etc.). Development in this area is progressing rapidly and land allocation for the site would need to be secured within the local plan to ensure its available when the scheme is needed. The option is phased, with a first phase 10Ml/d or 20Ml/d desalination plant and second phase development of an additional 20Ml/d desalination capacity contingent on the first phase options (Aru10 or Aru20).	20.0	2041
Desalination (SWZ): Tidal River Arun (20Ml/d) Phase 2		20.0	2050
Groundwater (SBZ): Lewes Road (3.5Ml/d)	Lewes Road is a is a well and adit system that has been out of supply for over 10 years due to poor water quality. The scheme would refurbish the water supply works and add additional water treatment. It would also increase pump capacity and WSR connectivity so that Lewes Road groundwater source works can pump to its Middle or High WSR (output to the Low WSR is currently constrained by the header tanks at Hove). The current demand constraint is approximately 2.3Ml/d (PDO). If the scheme is introduced, the constraint becomes pump capacity; scheme output is approximately 3.9Ml/d under severe drought conditions.	3.5	2031
Groundwater (SNZ): New borehole at Petworth (4Ml/d)	This scheme would return an existing WSW (Petworth) to service. The site has been out of supply due to poor water quality. The scheme would be to drill a new borehole in the Hythe Formation approximately 700m south of the existing WSW. Borehole to be minimum c. 300mm dia ID, and c. 80m depth. Connection to the treatment works and refurbishment of the treatment works would be required.	4.0	2031
Interzonal transfer (SBZ-SWZ): Brighton to Worthing	New bi-directional transfer between Sussex Worthing and Sussex Brighton Water Resource Zones.	16.7	2041

Option Name	Option Description / Summary	Yield	Earliest Year
Interzonal transfer (SNZ-SWZ): Pulborough to Worthing	Additional pipeline to provide extra capacity along the existing transfer route between Sussex North and Sussex Worthing	34.9	2040
Interzonal transfer (SWZ-SBZ): Pulborough winter transfer stage 2 (4Ml/d)	During the winter there is surplus surface water within the River Rother. This scheme would allow the surplus to be used at Pulborough WSW (within licence constraints) which in turn would allow coastal groundwater sources to be rested. This increase in groundwater can be utilised through new transfer mains from Tenants Hill to Brighton A WSR via Shoreham WSW, providing the additional 2Ml/d of water to Brighton WRZ during the summer and autumn of a drought year. This is Phase 2, which is to provide a transfer from Pulborough surface water abstraction to Sussex Brighton WRZ (Shoreham WSR) to allow groundwater sources in SBZ to be rested.	3.0	2041
Recycling (SNZ): Horsham with storage at Pulborough (6.8Ml/d)	New resource. This option is a new 9.5Ml/d water recycling plant producing a DO of 6.8Ml/d near Horsham WwTW and a transfer of the treated effluent to Church Farm reservoir, which feeds into Pulborough WSW. Process losses have been included.	6.8	2058
Recycling (SNZ): Littlehampton WTW with river discharge (15Ml/d) (WRMP19 option under investigation)	This scheme proposes the transfer of treated effluent from Littlehampton WwTW to a new discharge point on the western River Rother upstream of the Pulborough Surface Water abstraction. This would support flows over the weir as the MRF is approached, therefore prolong production at Pulborough during a drought. 20Ml/d represents the upper end of the reliable flow that could be expected from Littlehampton WwTW. Once abstracted at Pulborough WSW this water would be used to meet demand in the Sussex North WRZ.	15.0	2031
Storage (SNZ): River Adur Offline Reservoir (19.5Ml/d)	The option involves the construction of an earth embankment reservoir near River Adur offline with a proposed storage capacity of up to 4,600 Ml. The option will allow treated water to enter the distribution network to supply either the Sussex coastal block or the Pulborough area. The reservoir will be filled with water pumped from the eastern branch of the River Adur. The abstraction of raw water from the river to the reservoir would have a maximum flow of 30Ml/d.	19.5	2046

Option Name	Option Description / Summary	Yield	Earliest Year
Treatment capacity (SWZ): Pulborough winter transfer stage 1 (2Ml/d)	During the winter there is surplus surface water within the River Rother. This scheme would allow the surplus to be used at Pulborough WSW (within licence constraints) which in turn would allow coastal groundwater sources to be rested. This increase in groundwater can be utilised through new transfer mains from Sussex Worthing WRZ to Sussex Brighton WRZ via Shoreham WSW, providing the additional 2Ml/d of water to Brighton WRZ during the summer and autumn of a drought year. This is Phase 1, which is to provide a permanent sludge treatment facility at Pulborough WSW.	2.0	2041
Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d)	This WRMP19 option involves the transfer excess water for enhanced treatment near Midhurst (Nightsfield Midhurst high level WSR) with refurbishment of Midhurst and borehole rehabilitation. The scheme will require full refurbishment of the WSW, including boreholes and treatment.	1.96	2029
Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d)	This WRMP19 option involves bringing the West Chiltington groundwater source back into service by constructing a new borehole, new treatment plant and flood resilience measures at the site.	3.12	2029

Table 3-6 – Eastern Area Supply-Side Options (excludes existing imports / transfer arrangements)

Option Name	Option Description / Summary	Yield	Earliest Year
Asset enhancement (KMW): Remove network constraint at Longfield (13Ml/d)	System simulation modelling has identified that the KMW Water Resource Zone Deployable Output appears to be constrained due to a network capacity issue between Nursted and Pitfield Service Reservoirs. There is also a flow limitation between Cobham and Singlewell Service Reservoirs which restricts the movement of water from the River Medway Scheme. This scheme would undertake further network modelling to remove these network constraints to allow currently locked-in deployable output to be used to support the restricted parts of the network. The potential solutions would be to: • Validate the network constraint through updated and further exploration and validation of the Pywr System model to determine the optimal solution • If required, upgrade new transfer valve and/or booster (Northfleet Nurstead WBS) station Between Northfleet WSW and Nurstead Meopham WSR. • If required, upgrade water treatment process at Longfield WSW (upgrade to Amazon Filtration) to allow source to produce higher output up to licence and historical limit (~7Ml/d) • Increase capacity water main and, if required, an upgraded Booster station at Singlewell or Cobham WSRs	13.3	2026
Bulk import (KTZ): SEW Canterbury to Near Canterbury (20Ml/d)	Bi-directional transfer between South East Water RZ8 and Kent Thanet WRZ in the vicinity of Southern Water's Canterbury WS. Indirectly supplied from SEW Canterbury Reservoir. Maximum capacity of 20Ml/d.	20	2050
Bulk import (KTZ): SEW Kingston to Near Canterbury (2Ml/d)	A 2Ml/d import from SEW Kingston SWS to SWS Canterbury WSW.	2.0	2026
Bulk import (SHZ): SEW RZ8 to Rye	A new bi-directional Transfer between SEW Kingsnorth and Southern Water Brede WSW with a capacity of 10Ml/d.	7.05	2050
Desalination (KME): Isle of Sheppey 20Ml/d	The Isle of Sheppey Desalination options comprise a suite of modular options that represent different sizes of desalination plant that could be developed in one or more phases.	20.0	2041

Option Name	Option Description / Summary	Yield	Earliest Year
Desalination (KME): Isle of Sheppey (10Ml/d) phase 2	Locating a desalination plant on the Isle of Sheppey has a clear advantage: it would meet local demand while significantly reducing the need for transfers along the main from Deans Hill BPT. This option could be enhanced to transfer treated water from the Isle of Sheppey to the wider Kent-Medway WRZ. A number of sites for a desalination plant were investigated and the most suitable would be located on land south of Sheerness Docks, currently used for storage of car imports. Water treated at this site would then be pumped to Southdown WSR and Kins Borough WSR on the island for distribution to customers. This site will be investigated further in the feasibility appraisal. The second phase developing an additional 10Ml/d desalination capacity is contingent on the 20Ml/d first phase option i.e. IoS20.	10.0	2063
Desalination (KMW): Thames Estuary (10Ml/d)	The Thames Estuary Desalination Options are a modular suite of options to develop a desalination plant of differing capacities that could be developed in one or more phases. The plant would be developed adjacent to Britannia Refined Metal on the Swanscombe Peninsula. Treated water would be transferred to Singlewell WSR for distribution to the Kent Medway WRZ and the plant would combine discharge with Swanscombe WwTW's existing outfall. The first phase development of a 10Ml/d or 20Ml/d capacity desalination plant, the second phase developing an additional 10Ml/d or 20Ml/d desalination capacity is contingent on the first phase (Swa10 or Swa20).	10.0	2041
Desalination (KMW): Thames Estuary (10Ml/d) Phase 2		10.0	2041
Desalination (KMW): Thames Estuary (20Ml/d)		20.0	2040
Desalination (KMW): Thames Estuary (20Ml/d) Phase 2		20.0	2040
Desalination (KTZ): East Thanet (20Ml/d)	The East Thanet Desalination Options are a modular suite of options to develop a desalination plant of differing capacities near to the North Thanet Coast and could be developed in one or more phases. The plant would supply potable desalinated water to the Kent Thanet WRZ. The potential first phase development of a 20Ml/d capacity desalination plant, and second phase developing an additional 20Ml/d desalination capacity is contingent on the first phase.	20.0	2041
Desalination (KTZ): East Thanet (20Ml/d) Phase 2		20.0	2051

Option Name	Option Description / Summary	Yield	Earliest Year
Groundwater (KME): Recommission Gravesend (2.7Ml/d)	Gravesend source is a well and adit system that was decommissioned in 2007 due to high nitrate levels. A new nitrate treatment plant was constructed on site in 2006. A Source Investigation and Optimisation Study (SIOS) suggested that the nitrate problem was likely to be a faulty nitrate monitor. The report recommended the source could be recommissioned through a) Undertaking a long-term step test with steps of seven days duration at rates of 3.0Ml/d, 3.3Ml/d and maximum pump capacity (approximately 3.66Ml/d) subject to stabilisation of pumping water levels during each step b) Recalibration or repair of the online raw water nitrate monitor, c) Modify the headworks to the satellite well chamber to facilitate improved access. Refurbishment of the existing nitrate plant will also be required. Scheme Output: 5Ml/d	2.65	2031
Groundwater (SHZ): Reconfigure Rye Wells (1.5Ml/d)	Brede groundwater source is a well & adit system that is over 100 years old, and has reached the end of its asset life. It abstracts from the Ashdown Beds. Operational wells 1 and 3 are to be replaced by boreholes. Additional land may be required for at least one of the boreholes due to space constraints on site. Wells 2 and 4 are out of service and do not require replacement. Scheme output is 1.5Ml/d. There is an existing surface water WSW on site and no further treatment is required.	1.5	2036
Interzonal transfer (KME-KTZ): KME-KTZ bi-directional (15.8Ml/d) (WRMP19 option under investigation)	Conditioning of existing Faversham4-Fleete main to enable bi-directional transfers (and specifically from Kent Thanet to Kent Medway). It is not thought that any additional pipeline would be required, although this is dependent on the existing main being structurally sound. 22 h/d operation assumed.	15.75	2026
Interzonal transfer (KTZ-KME): Utilise full existing transfer capacity (9Ml/d)	The current operational transfer from Kent Medway East to Kent Thanet is limited to the output from Faversham4 WSW. This option enables flows from the Faversham3 groundwater source to be directed, via an existing main, towards Faversham4 WSW. A soakaway is installed at Faversham4 to allow for reconditioning of the existing main and the addition of UV treatment at Faversham4 permits disinfection of the Faversham3 flows.	3.27	2040

Option Name	Option Description / Summary	Yield	Earliest Year
Recycling (KME): Sittingbourne industrial water reuse (7.5Ml/d) (WRMP19 option not yet under investigation)	This option is to use a water recycling scheme to unlock additional volume in an existing industrial borehole licence to increase the scope of the licence trading. The existing industrial user currently utilises the groundwater in its paper/board making processes. It has been assumed at this stage that the reverse osmosis wastewater can be discharged through Sittingbourne WwTW existing outfall.	7.5	2031
Recycling (KMW): Medway WTW to lake (14Ml/d) (WRMP19 option under investigation)	This option involves the transfer of 18Ml/d of treated effluent from AylesLittlehampton WWTW to near Rochester WSW's raw water storage reservoir Eccles Lake.	14.0	2031
Recycling (SHZ): Hastings to Darwell (15.3Ml/d)	This option is a new 21.5Ml/d water recycling plant producing a DO of 15.3Ml/d near Hastings WwTW and a transfer of the treated effluent to Darwell reservoir, which feeds into the Hastings Area. Process losses have been included.	15.3	2051
Recycling (SHZ): Tonbridge to Bewl (5.7Ml/d)	New resource. This option is a new 8Ml/d water recycling plant producing a DO of 5.7Ml/d near Tunbridge WwTW and a transfer of the treated water to Bewl reservoir, which feeds into Darwell reservoir. Process losses have been included.	5.7	2036
Storage (SHZ): Raising Bewl Reservoir 0.4m (3Ml/d)	The scheme involves the raising of Bewl Water, by 0.4m to increase storage and yield. The major works for raising Bewl to higher TWL levels will include: Raising the dam crest and building a new wave wall; Raising the overflow and valve chamber shafts and many ancillary works around the perimeter of the reservoir.	3.0	2061

4 APPROACH TO HRA

The nature of the WRMP (a long-term strategic plan with specific projects) presents challenges for a 'strategic' or plan-level HRA and it is therefore important to understand how the WRMP is developed and hence how it might consequently affect European sites.

4.1 KEY GUIDANCE

4.1.1. The key guidance document for HRA of WRMPs is UKWIR (2021). *Environmental Assessment Guidance for Water Resources Management Plans and Drought Plans*. Ref: 21/WR/02/15. UK Water Industry Research Limited, London.

4.1.2. Other relevant guidance and case-practice includes:

- UK Government (2023). *Water resources planning guideline* [online.]. Available at: https://www.gov.uk/government/publications/water-resources-planning-guideline/water-resources-planning-guideline. [Accessed April 2025].
- Regulators' Alliance for Progressing Infrastructure Development (2022). Strategic regional water resource solutions guidance for Gate 2.
- Defra (2021). *Policy paper: Changes to the Habitats Regulations 2017* [online]. Available at: https://www.gov.uk/government/publications/changes-to-the-habitats-regulations-2017/changes-to-the-habitats-regulations-2017 [Accessed April 2025].
- UK Government (2019). *Appropriate assessment: Guidance on the use of Habitats Regulations Assessment* [online]. Available at: https://www.gov.uk/guidance/appropriate-assessment [Accessed April 2025].
- Tyldesley, D. & Chapman, C. (2021). *The Habitats Regulations Assessment Handbook* [online]. DTA Publications Limited. Available at: https://www.dtapublications.co.uk/handbook/. [Accessed April 2025].
- Natural England (2020). *Guidance on how to use Natural England's Conservation Advice Packages in Environmental Assessments*. Natural England, Peterborough.
- European Commission (2018). *Managing Natura 2000 sites - The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*. European Union, 1-86.
- PINS Note 05/2018: *Consideration of avoidance and reduction measures in Habitats Regulations Assessment: People over* Wind, Peter Sweetman v Coillte Teoranta. [withdrawn].

4.2 APPLICATION OF HRA TO WRMPS

European Commission guidance[17] and established case-practice suggests a four-stage process for addressing Articles 6(3) and 6(4), and hence Regulations 63 and 64 (see **Box 1**), although not all stages will necessarily be required.

[17] *Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC* (EC 2002).

Box 1 – Stages of HRA

Stage 1 – Screening or 'Test of significance'

This stage identifies the likely effects of a project or plan on a European site, either alone or 'in combination' with other projects or plans, and considers whether these effects are likely to be significant. The 'screening' test or 'test of significance' is a low bar, intended as a trigger rather than a threshold test: a plan should be considered 'likely' to have an effect if the competent authority is unable (on the basis of objective information) to exclude the possibility that the plan or project could have significant effects on any European site, either alone or in combination with other plans or projects; an effect will be 'significant' simply if it could undermine the site's conservation objectives. Note that mitigation measures should not be taken into account at the 'screening' stage, in accordance with the People over Wind (Court of Justice of the European Union (ECJ) Case C-323/17); this reinforces the idea of screening as a 'low bar' and makes 'appropriate assessments' more common.

Stage 2 – Appropriate Assessment (including the 'Integrity test')

An 'appropriate assessment' (if required) involves a closer examination of the plan or project where the effects on relevant European sites are significant or uncertain, to determine whether any sites will be subject to 'adverse effects on integrity' if the plan or project is given effect. The scope of any 'appropriate assessment' stage is not set, and the assessments will not be extremely detailed in every case (particularly if mitigation is clearly available, achievable, and likely to be effective). The assessments must be 'appropriate' to the effects and proposal being considered, and sufficient to ensure that there is no reasonable doubt that adverse effects on site integrity will not occur (or sufficient for those effects to be appropriately quantified should Stages 3 and 4 be required).

Stage 3 – Assessment of Alternative Solutions

Where adverse effects remain after the inclusion of mitigation, Stage 3 examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of European sites. A plan or project that has adverse effects on the integrity of a European site cannot be permitted if alternative solutions are available, except for imperative reasons of overriding public interest (IROPI; see Stage 4).

Stage 4 – Assessment Where No Alternative Solutions Exist and Where Adverse Impacts Remain

This stage assesses compensatory measures where it is deemed that there are no alternatives that have no or lesser adverse effects on European sites, and the project or plan should proceed for imperative reasons of overriding public interest (IROPI). The EC guidance does not deal with the assessment of IROPI, although the IROPI need to be sufficient to override the adverse effects on European site integrity, taking into account the compensatory measures that can be secured (which must ensure the overall coherence of the 'national site network'.

4.2.1. The stages in Box 1 (if required) are used to ensure compliance with the Habitats Regulations and so principally reflect the stepwise legislative tests applied to the final, submitted project or plan; there is no statutory requirement for HRA (or its specific stages) to be completed for draft plans or similar developmental stages. Consequently, there is flexibility for the HRA process to be run in a manner that provides maximum benefit for plan-development and sound decision-making, whilst still ultimately meeting the legislative tests.

4.2.2. In practice, HRAs of WRMPs usually have two functional components: they informally guide each water company as it considers which water resource options will be included in the published plan;

and subsequently provide a formal assessment of the published WRMP against Regulation 63. A degree of separation between these functions is therefore sometimes necessary, and the rigid application of the stages in Box 1 to the emerging or interim stages of strategic plans[18] is not always appropriate, reducing the clarity and usefulness of the HRA as a plan-shaping process for both plan-makers and consultees. For WRMPs this is especially true for the assessment of the emerging feasible options and the application of the 'People over Wind' (PoW)[19] case.

4.2.3. Therefore, whilst the principles of HRA have been applied to the emerging WRMP24 and the feasible options, the specific tests associated with Regulation 63 are applied to the preferred programme of options only. The overarching HRA process for the WRMP24 has therefore included the following key steps:

- An initial 'screening' of the supply-side[20] feasible options, undertaken by WRSE (WRSE 2022), that applied the assessment practices of HRA to the options identified within the Emerging Regional Plan to identify those where 'likely significant effects' on European sites could not be excluded[21].
- A 'verification review' of the 'screening' for the preferred options selected by WRSE for SWS, to support SWS's June 2022 submission (Wood 2022). The review of the options applied the normal principles and practices associated with 'HRA screening' but also took account of the

[18] Particularly those (such as WRMPs) where the guideline HRA stages do not map easily on to the agreed or statutory stages in the plan development process.

[19] *People Over Wind and Sweetman v Coillte Teoranta* (C-323/17)

[20] Demand-side options designed to reduce treated water use (such as metering, provision of water butts or leakage reduction options) are not systematically reviewed at this stage as they are invariably generic and geographically unspecified activities or groups of actions that cannot negatively affect any European sites (or be meaningfully assessed at the strategy level). Since they will form part of the adopted WRMP they are formally subject to Regulation 63 as part of the final HRA, but this is typically a simple screening exercise or 'down-the-line' deferral, depending on the nature of the option.

[21] Note, this was not a formal legislatively compliant screening of the regional plan or the SWS options as this cannot be completed for developmental stages of plans and did not include an in combination assessment; in addition, the WRSE Regional Plan is not a statutory plan produced by a plan-making competent authority (and so is arguably not subject to the Regulation 63). In practice, the 'screening' attempted to mirror a formal PoW-compliant screening (i.e. not accounting for mitigation), although this substantially reduced the value of the outputs to the WRSE planning process and so an additional 'step' to allow the consideration of mitigation was subsequently introduced.

deliverability of the options including potential mitigation opportunities[22] (for clarity, this review process is not documented in this report).

- The **assessment of the preferred programme of options** against the provisions of Regulation 63, comprising formal 'screening' and an 'appropriate assessment' designed to meet the legislative tests (this report).

4.3 KEY CHALLENGES AND ASSUMPTIONS

4.3.1. The fundamental nature of the WRMP24 (a long-term strategic plan with specific projects) presents a number of distinct challenges for a 'strategic' or plan-level HRA and it is therefore important to understand how the WRMP24 is developed, its objectives, and hence how it might consequently affect European sites.

4.3.2. In particular, it should be recognised that many of the options (particularly those proposed for distant planning periods) are to some extent conceptual, with limited design information that in most cases will be quite provisional (e.g. many pipeline routes are largely indicative). This also requires an acceptance that not all potential outcomes can be examined at the plan-level in the same way they would be at the project-level (despite the appearance of individual 'projects' being identified), and that the HRA is to some extent attempting to identify those potential effects that are essentially unavoidable at the scheme level (e.g. due to the fundamental scale or nature of the proposals) regardless of how the scheme is delivered. This report therefore provides a strategic, plan-level assessment to support the WRMP24 and is not an application-specific ('project-level') assessment. It is based on data and information that can be reasonably gathered at the plan-level and so does not include option-specific survey data or similar. More detailed, application-specific HRAs will be needed to support future planning applications and environmental permits/consents.

UNCERTAINTY AND PLAN-LEVEL MITIGATION

4.3.3. HRAs of plans and strategies typically have to deal with a degree of uncertainty; very often, it is not possible to provide a detailed assessment of the effects of a proposal as many aspects simply cannot be fully defined at the strategy-level in the planning hierarchy. This is particularly true for options that will only be required over longer-term planning horizons, which are inevitably less defined than options that are required in the near term.

4.3.4. Where the available information is fundamentally insufficient to complete a meaningful appropriate assessment, then case-practice (both for WRMPs and strategic plans in general) suggests some

[22] Applying a PoW-compliant 'screening' assessment to the feasible options would have little value for plan-development since mitigation opportunities, including effective and well-established measures for marginal effects, would be ignored. All options with 'likely significant effects' would therefore be treated equally, with no distinction between options that would (from an HRA perspective) be easily achievable in practice and those that would be extremely challenging or impossible. The review of the feasible options is not therefore intended to be, or replicate, a formal and fully compliant 'HRA screening' or be a 'draft HRA' or similar. It takes a broad view of the 'HRA-related risk' associated with an option that captures both the risk to Southern Water and the delivery of the WRMP within the statutory timescales (for example, the data collection required to definitively demonstrate that an option is acceptable might not be achievable in the time available for delivery of the WRMP), and the risks of the option to European site integrity (i.e. where adverse effects would appear to be an unavoidable outcome of the option as presented). The terminology intentionally reflects a typical RAG risk assessment to provide clarity for Southern Water and to avoid the perception of premature assessment conclusions.

assessment may be deferred 'down the line' to a lower planning tier provided that certain criteria are met.

4.3.5. This is usually only appropriate where there is sufficient certainty that the proposal can (with the implementation of established scheme-level measures that are known to be effective) avoid adverse effects on the integrity of European sites; and/or if appropriate investigation schemes are identified to resolve the uncertainty and commitments are made within the plan to not pursue an option if adverse effects are identified through these investigations.

4.3.6. Case-practice in WRMP HRAs[23] and the WRPG indicates that it may be acceptable to include Preferred Programme options with residual uncertainties provided that:

- there is sufficient flexibility within the terms of the WRMP to ensure adverse effects can be avoided at the project level (e.g. the plan does not dictate specific pipeline routes or yields that cannot be deviated from); and/or
- the option is not required within the first five years of the plan period, so allowing time for additional investigations to be completed; and
- the uncertainty that this creates is mitigated at the plan-level by the inclusion of alternative options which:
  - will meet the required demand / deficit should the Preferred Programme option prove to have an unavoidable risk of adverse effects on the European sites in question; **and**
  - will not themselves have any adverse effect on any European sites.

4.3.7. Note, this is not intended to provide a mechanism for the inclusion of options where there appears to be no reasonable way of avoiding adverse effects. It should be noted that this flexibility is perhaps desirable in any case, since it is possible that a 'no adverse effect' option might be subsequently proven to have adverse effects when brought to the design stage. This approach allows for the WRMP to be compliant with the screening and appropriate assessment tests within the Habitats Regulations, since certainty over outcomes for the plan as a whole is provided. However, it is important to note that some uncertainties will remain (particularly with regard to 'in combination' effects) and for some options it will only be possible to fully assess any potential effects at the pre-project planning stage, when certain specific details are known; for example: construction techniques; site specific survey information; the precise timing of implementation; or the status of other projects that may operate 'in combination. In addition, it may be several years before an option is employed, during which time other factors may alter the baseline or the likely effects of the option.

WRMP development parameters and relevance to HRA

The modelling underpinning the WRMP development and option selection process incorporates several assumptions that influence and are relevant to the scope of the HRA, particularly in relation to the treatment of the existing consent baseline. WRMP24 Annex 9 provides detailed information on the WRMP development process, including the relationship of the WRMP with Water Industry National Environment Programme (WINEP) and other sustainability investigations, scenario testing, and environmental destination.

[23] For example, in relation to DCWW's WRMP14.

Existing Consents

4.3.8. Regulation 9 of the Habitats Regulations requires that *"…a competent authority, in exercising any of its functions, must have regard to the requirements of the Directives so far as they may be affected by the exercise of those functions"*.

4.3.9. For existing abstraction licences and their consideration in WRMPs, the requirements of Regulation 9 are in part met by the Environment Agency and the water companies through the licence review arrangements and protocols that are implemented at the start of each WRMP cycle, which also take account of the Environment Agency's requirements through the WINEP. This review process (and WINEP) is undertaken in conjunction with Natural England, which identifies protected sites (including European sites) to the EA where it believes abstraction-related issues are affecting the achievement of favourable conservation status (these may or may not be subject to current WINEP investigations). This review is important to the development of the supply forecast at the start of the WRMP process and is consequently reflected in Section 5.4 ('Developing Your Supply Forecast') of the WRPG (2020 draft and 2023 published versions) which outlines the requirements for sustainable abstraction taking into account existing statutory requirements and environmental destination. Any required (or reasonably anticipated) licence amendments are factored into the supply-deficit calculations (see WRMP24 Annex 9), and the EA will have confirmed those licences that are considered valid for the planning period when the WRMP modelling is undertaken.

4.3.10. The supply forecast informs the supply-demand balance calculations for the planning period, which is in effect the 'predicted future baseline' for water resources in a supply area. The water company then develops 'options'[24] for resolving any predicted deficits in the supply-demand balance, which are then tested against various metrics to determine the 'preferred plan'.

4.3.11. Consideration of the existing consenting regime in relation to European sites is noted in the WRPG (2020 draft and 2023 published versions) solely in relation to the development of the supply forecast (Section 5.4), and not in those sections of the guidance that explicitly consider the application of HRA to the WRMP; and whilst the 2023 guidelines refer to "*Your plan, including any options within it…*" in relation to the Habitats Regulations, all references to HRA (as both a process and legislative test) are explicitly and/or implicitly linked to the options identified by the WRMP. Consequently, the WRMP HRA addresses Regulation 63 of the Habitats Regulations and necessarily focuses on the assessment of the additional effects that the WRMP introduces over the predicted future baseline (i.e. the supply forecast determined at the start of the WRMP process that takes account of the agreed sustainability reductions and any that are reasonably anticipated).

4.3.12. Therefore, the HRA of the WRMP is necessarily a forward looking assessment of the specific options (feasible and preferred) proposed by the WRMP to resolve deficits; it does not (and cannot) re-litigate the existing licences agreed for the planning period (and hence the WRMP supply-demand baseline) since there has to be a starting point / basis for the development of the WRMP (i.e. the modelling / optioneering process cannot start with the assumption that no current consents are reliable; and the HRA of the WRMP does not and cannot determine the licensing baseline from which the supply-demand balance is calculated). In some instances, when considering water that

[24] Note that all references to WRMP 'options' in the WRPG are made in the commonly-accepted sense, i.e. explicit interventions proposed by the WRMP to increase water supply or reduce consumption (e.g. as per WRPG Section 1.1), not a broad 'catch all' for ongoing water company operations such as those existing abstractions that will form part of the 'predicted future baseline'.

may be available from existing sources, consultees have indicated that consideration of 'recent actual' abstraction is more appropriate than the currently licenced maximum, particularly for waterbodies that are considered 'over-licensed'; it is understood that these licences have been identified to SWS during the plan-development process and factored into the supply-demand balance calculations.

4.3.13. The WRMP supply-demand balance modelling takes account of predicted local and regional growth when identifying risk areas and potential solutions, based (*inter alia*) on Local Plans and population growth models, and in accordance with methods set out in the WRPG. Likewise, the modelling accounts for climate change. 'In combination' effects with population growth and water use that may be related to land-use plans are therefore inherently considered and accounted for as part of the WRMP option development process (i.e. an option that does not account for local growth is not a solution) and this can be relied on by the HRA; the HRA may consider the potential for 'in combination' effects with specific proposals within Local Plans (and similar), such as major site allocations, but does not (and cannot) attempt to define and model an alternative 'population growth' scenario to somehow test against specific options.

In combination effects with SROs

4.3.14. With regard to schemes involving multiple water companies (particularly some SROs) the assessment will necessarily focus on those European sites directly exposed to the activities proposed and managed by SWS, rather than sites that will only be affected by those scheme elements proposed and managed by other water companies; i.e. when undertaking the 'in combination' assessment of a scheme that appears in multiple plans the effects from source/donor will be considered distinct from supply/beneficiary.

4.3.15. For example, the source/donor plan will typically consider the implications of the abstraction (etc.) on relevant European sites and water bodies within its catchment (and downstream catchments where relevant), and the supply/beneficiary plan would consider any implications on European sites / water bodies from the application of the supplied water within its catchment/s[25]. This approach is intended to ensure unnecessary duplication is avoided, and pragmatism will be applied to address indirect, downstream effects and effects on functional habitat.

4.3.16. The WRMP includes one SRO (the Thames to Southern Transfer (T2ST)) which has undergone assessment as part of RAPID's gated process for SROs; this includes environmental compliance and existing data and assessments are referred to as appropriate. Note that any in combination effects with SROs will be addressed by the forthcoming SRO Gate 3 investigations and in future WRMP cycles and so there is no risk of 'in combination' effects being overlooked.

4.4 HRA OF THE PREFERRED OPTIONS

GEOGRAPHICAL SCOPE

4.4.1. 'Arbitrary' buffers are not generally appropriate for HRA. However, as distance is a strong determinant of the scale and likelihood of effects, the application of a suitably precautionary study

[25] Note: for the Severn Thames transfer we would expect the in-combination assessment of impacts on the Severn to feature in both WRW and WRSEs plans. This is due to the complex interaction of releases and abstractions particular to this scheme.

area (based on a thorough understanding of both the options and European site interest features) has some important advantages due to the number of options and the benefits of a consistent approach:

- using buffers allows the systematic identification of European sites using GIS, so minimising the risk of sites or features being overlooked;
- it ensures that sites for which there are no reasonable impact pathways can be quickly and transparently excluded from any further screening or assessment; and
- when assessing multiple options it provides a consistent point of reference for consultees following the assessment process, and the 'screening' can therefore focus on the assessment of effects, rather than on explaining why certain sites may or may not have been considered in relation to a particular option.

4.4.2. Professional experience and case-practice relating to typical water industry schemes demonstrates that environmental changes associated with construction in terrestrial environments are rarely notable more than 2 km from a source, and the UKWIR (2021) guidance includes accepted 'zones of influence' for certain aspects (for example, noise impacts would almost never be significant over 1km from the source). Operational effects can extend further, depending on the scale and nature of the option, and so an intentionally precautionary overarching assessment scope has been used as a starting point for the assessment; this includes:

- All European sites that are within 10km of any operational facilities or new infrastructure required to deliver each option (including temporary infrastructure). This is an intentionally large buffer that can also reliably capture the vast majority of possible interactions with 'mobile species' and 'functionally-associated habitats' in terrestrial environments.
- All European sites that are downstream of any operational facilities or new infrastructure required to deliver each option (including temporary infrastructure), or upstream sites that support migratory fish (no distance thresholds). This reflects the potential for hydrological impacts to operate over greater distances, and to address the potential for catchment-scale in combination effects from operation.

4.4.3. These parameters are used as a starting point for identifying potentially exposed sites. It is not a 'hard buffer' and in some instances it may be appropriate to consider more distant sites[26]; however, unless otherwise noted, sites over 20km from the options that are not hydrologically linked and which do not support wide-ranging mobile species are typically considered sufficiently remote such that any environmental changes will be effectively nil, and so there will be 'no effects' on sites beyond this distance (and so no possibility of 'in combination' effects).

4.4.4. The European sites and interest features considered potentially exposed to the outcomes of the WRMP are listed in **Appendix A**[27].

[26] For example, where an option is likely to directly affect the marine environment (e.g. through desalination schemes) and so potentially result in environmental changes that could coincide with areas used by wide-ranging marine species; however, wide-ranging marine / marine dependent species associated with marine sites that are not directly connected to the hydrological zone of influence are not typically considered to be both sensitive and exposed to the effects of the options.

[27] It should be noted that there will be variations in the approach to 'scoping' the WRMP HRAs between water companies and with the HRA of the WRSE Regional Plan as this aspect has not been managed and agreed

DATA COLLECTION

European site data collection and conservation objectives

4.4.5. The screening and appropriate assessment stages take account of the baseline condition of the European sites and their interest features[28], including (where reported) data on

- the site boundaries and the boundaries of the component SSSIs;
- the conservation objectives;
- information on the attributes of the European sites that contribute to and define their integrity;
- the condition, vulnerabilities and sensitivities of the sites and their interest features, including known pressures and threats;
- the approximate locations of the interest features within each site (if reported); and
- designated or non-designated 'functional habitats' (if identified).

4.4.6. These data were derived from:

- the most recent JNCC-hosted GIS datasets;
- the Standard Data forms for SACs and SPAs and Information Sheets for Ramsar sites;
- Article 12 and 17 reporting;
- the published site Conservation Objectives;
- Supplementary Advice to the Conservation Objectives (SACO) where available[29];
- Site Improvement Plans (SIPs); and
- the supporting SSSI's favourable condition tables where relevant and where no SACOs applicable to the features are available.

4.4.7. Note:

- For SPAs, the qualifying features are taken as those identified on the most recent JNCC datasets and citations where these post-date the 2nd SPA Review (i.e. it will be assumed that any amendments suggested by the SPA review have been made) unless otherwise identified to us by NE; any site-specific issues relating to the SPA Review can be addressed in the screening and appropriate assessment of the preferred options (see below).
- The conservation objectives for Ramsar sites are taken to be the same as for the corresponding SACs / SPAs (where sites overlap); SSSI Definition of Favourable Condition Tables (FCTs) will be used for those features not covered by SAC/SPA designations.

centrally; as a result, different water companies may identify slightly different sites that may be theoretically exposed to effects, which will have relevance for the in combination assessments. However, any such variations will almost always be at the assessment margins, where impact pathways are generally theoretical or speculative rather than systematic, and typically avoidable through normal project-level design processes.

[28] The interest features are taken to be the qualifying features; and other within-site features that may be relevant to site integrity, particularly 'typical species' (for SACs) and within-site supporting habitats for SPAs. 'Functional land' would not usually be considered an interest feature of the site (although it may be important to the integrity of some interest features).

[29] NE has published '*Supplementary advice on conserving and restoring site features*' for most European sites in England which describe in more detail the range of ecological attributes which are most likely to contribute to a site's overall integrity, and the targets each qualifying feature needs to achieve in order for the site's conservation objectives to be met.

4.4.8. Where possible the site data are used to identify other features that may be relevant to site integrity, particularly 'typical species' (for SACs), within-site supporting habitats, and designated or non-designated 'functional habitats'.

4.4.9. A 'typical species' is broadly described by EC guidance as being any species (or community of species) which is particularly characteristic of, confined to, and/or dependent upon the qualifying Annex I habitat feature at a particular site. This may include those species which:

- are critical to the composition or structure of an Annex I habitat (e.g. constant species identified by the National Vegetation Classification (NVC) community classification);
- exert a critical positive influence on the Annex I habitat's structure or function (e.g. a bioturbator (mixer of soil/sediment), grazer, surface borer or predator);
- are consistently associated with, and dependent upon, the Annex I habitat feature for specific ecological needs (e.g. feeding, sheltering), completion of life-cycle stages (e.g. egg-laying) and/or during certain seasons/times; or
- are particularly distinctive or representative of the Annex I habitat feature at a particular site.

4.4.10. Within-site supporting habitats are those which support the population(s) of the qualifying species and which are therefore critical to the integrity of the feature.

4.4.11. 'Functional habitats' are generally taken to be habitats or features outside a European site boundary that are important or critical to the functional integrity of the site habitats and / or its interest features. These might include, for example:

- 'buffer' areas around a site (e.g. dense scrub areas preventing public access; areas of land that reduce the effects of agricultural run-off; etc.);
- specific features or habitats relied on by mobile species during their lifecycle (e.g. high-tide roosts for waders; significant maternity colonies for bats known to hibernate within an SAC; areas that are critical for foraging or migration based on available data, typically due to their proximity to the designated site; etc. Note, this is not intended as a speculative catch-all covering any habitat that might be occasionally used by or suitable for a particular species)[30].

4.4.12. Conservation Objectives benchmark Favourable Conservation Status (FCS) for each feature. Guidance[31] from the UK Statutory Nature Conservation Bodies (SNCBs) provides a broad characterisation of FCS, stating that it "*relates to the long-term distribution and abundance of the populations of species in their natural range, and for habitats to the long-term natural distribution, structure and functions as well as the long-term survival of its typical species in their natural range. It describes a situation in which individual habitats and species are maintaining themselves at all relevant geographical scales and with good prospects to continue to do so in the future*".

[30] Case law notes that such land should be necessary to the conservation of the protected habitat types and species (*Holohan v An Bord Pleanala C-461/17*) or play an important role in maintaining or restoring the population of qualifying species at favourable conservation status.

[31] JNCC (2018). *Favourable Conservation Status: UK Statutory Nature Conservation Bodies Common Statement* [online]. Available at: https://data.jncc.gov.uk/data/b9c7f55f-ed9d-4d3c-b484-c21758cec4fe/FCS18-InterAgency-Statement.pdf. [Accessed April 2025].

4.4.13. The conservation objectives for European sites in England have been revised by Natural England in recent years to improve the consistency of assessment and reporting. As a result, the high-level conservation objectives for all sites are effectively the same:

- For SACs in England:
  - *With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features'...), and subject to natural change; ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring [as applicable to each site];*
  - *The extent and distribution of the qualifying natural habitats;*
  - *The extent and distribution of the habitats of qualifying species;*
  - *The structure and function (including typical species) of the qualifying natural habitats;*
  - *The structure and function of the habitats of qualifying species;*
  - *The supporting processes on which the qualifying natural habitats rely;*
  - *The supporting processes on which the habitats of qualifying species rely;*
  - *The populations of qualifying species; and,*
  - *The distribution of qualifying species within the site.*
- For SPAs in England:
  - *With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features'...), and subject to natural change; ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:*
  - *The extent and distribution of the habitats of the qualifying features;*
  - *The structure and function of the habitats of the qualifying features;*
  - *The supporting processes on which the habitats of the qualifying features rely;*
  - *The population of each of the qualifying features; and*
  - *The distribution of the qualifying features within the site.*

4.4.14. NE has published '*Supplementary advice on conserving and restoring site features*' for most sites, which describe in more detail the range of ecological attributes which are most likely to contribute to a site's overall integrity, and the minimum targets each qualifying feature needs to achieve in order to meet the site's conservation objectives. These are considered at the screening and appropriate assessment stages.

4.4.15. The conservation objectives for Ramsar sites are taken to be the same as for the corresponding SACs / SPAs (where sites overlap); where Ramsar sites do not coincide with an SAC or SPA, or where the Ramsar features are not ecologically coincident with SAC or SPA features, the conservation objectives and definitions of favourable condition for the underlying SSSIs are used.

4.4.16. The conservation objectives and supplementary advice are considered at both screening and appropriate assessment stages but are not explicitly reproduced in this report as (a) they are freely available online and (b) the narrative nature of much of the supplementary advice can be challenging to co-opt in a clear and concise manner, particularly given the number of preferred options and the high-level nature of the available option design information. The assessments therefore focus on the key conservation objectives that might be undermined by an option, rather than attempting to exhaustively document the assessment of an option against all conservation

objectives / supplementary advice measures for all features. Information on the sensitivities of the interest features also informs the assessment.

Compensatory habitat sites (River Test Compensatory SAC Habitat)

4.4.17. Areas secured as sites to provide compensatory measures for adverse effects on a European site are protected by UK government planning policy[32]; UK Government guidance on HRA[33] states that these areas should be subject to HRA when considering proposals that may affect them.

4.4.18. The current use of drought options in the Western Area to secure SWS' supply deficit was established in the 2018 Hampshire Public Inquiry (the Inquiry) and constitutes the 'interim abstraction scheme' within an agreement made under Section 20 of the Water Resources Act 1991 (the Section 20 Agreement). The Section 20 Agreement is due to expire in March 2030.

4.4.19. These drought options could, if implemented to meet demand during a drought, result in adverse effects on the River Itchen SAC[34]. As a result, retention of these options in SWS' 2019 Drought Plan required an 'imperative reasons of over-riding public importance' (IROPI) argument, and the identification of suitable compensation measures for the anticipated adverse effects. These compensation measures, which are included in the HRA of the Drought Plan and the Section 20 Agreement as well as project-level HRAs for the relevant individual drought options, include areas of the River Test and River Meon[35].

4.4.20. NE has provided favourable conservation status targets for the River Test Compensatory SAC Habitat, specific to the River Dun, Bourne Rivulet, River Dever (sections within and beyond the R. Test SSSI) and Middle Test. These targets are consistent with NE guidance for the River Itchen SAC[36] that states that "*Targets for water quality and flows are determined for Natura 2000 sites by Natural England with reference to Common Standards Monitoring Guidance (CSMG)*" and that "…*where achievement of the targets based on CSMG is not possible in the next river basin planning cycle then interim progress goals have been agreed by Natural England and the Environment Agency*". The River Meon is not a SSSI and so does not have CSMG targets associated with it, although it is possible that these could be applied to the compensation habitats associated with the River Meon in the future.

4.4.21. The WRMP24 options that may affect these watercourses have been reviewed and screened accordingly.

[32] For example, under para. 194 of the National Planning Policy Framework (NPPF).

[33] Department for Environment, Food & Rural Affairs, Natural England, Welsh Government and Natural Resources Wales Joint Guidance (2021). Available at: https://www.gov.uk/guidance/habitats-regulations-assessments-protecting-a-european-site#European-sites.

[34] Although it should be noted that these options need to be available only until 2035, when the transfers and yield associated with Havant Thicket reservoir become fully available.

[35] The exact position is still to be finalised. The HRA of the drought plan indicated that the compensatory measures would be implemented for a Drought Order ; and NE and SWS are discussing measures for the River Test and River Meon, and a timetable for delivery.

[36] Available at: https://publications.naturalengland.org.uk/file/5976606933778432

WATER RESOURCES BASELINE DATA

4.4.22. Information on the water resources baseline in the region is drawn from other assessment reports (e.g. the WFD), SWS (e.g. groundwater (GW) and surface water (SW) abstraction locations, source operational parameters, WRZ operation, emergency or drought plan operations) and the EA (Public Water Supply (PWS) and other GW/ SW abstractions, CAMS documentation).

4.4.23. Note, unless otherwise stated by the EA during the options development process, it is assumed that the relevant Catchment Abstraction Management Strategy (CAMS) documents are correct and reliable, and that there is 'water available' where this is confirmed by the CAMS.

OPTION DATA

4.4.24. Information on the preferred options is provided by SWS. This includes an outline of how the option will function, including the intended outcomes (design yields/capacities); and the scheme delivery requirements, including the type and indicative location of any permanent or temporary infrastructure.

4.4.25. It should be noted that the location of some scheme aspects cannot always be established at the WRMP level: whilst some elements may be clear (for example, new plant will often be located within or close to existing water company assets) the exact routes of pipelines (etc.) cannot be finalised at this stage. In most instances an indicative design route is provided for option costing purposes, which has been informed by the feasible options review process at the stage (i.e. in most cases direct impacts on designated sites would be avoided if possible). However, **it should be recognised that the options are not fixed proposals for delivery that cannot be deviated from**, and there will be many aspects (particularly relating to construction) that cannot be defined at the strategy level ahead of scheme-specific investigations (e.g. the location of any temporary enabling works; precise locations for additional materials storage; etc.)).

4.5 PREFERRED OPTIONS ASSESSMENT

OVERVIEW

4.5.1. Whilst the WRMP24 is an adaptive plan that may change depending on how closely future demand matches various scenarios, the HRA necessarily focuses on the plan intended for adoption – i.e. the Southern Water Best Value Plan (BVP) set out in Section 7 of the WRMP – rather than alternative plan scenarios that may or may not become relevant at some point in the future.

4.5.2. For each option (or group of options, as appropriate) in the preferred plan the assessment comprises:

- a 'screening' to identify those options that cannot have significant effects due to the fundamental nature of the option (this might include, for example, options that are designed to reduce demand but which do not involve any direct physical changes, such as education programmes to reduce water use);
- a 'screening' of European sites within the study area to identify those sites and features where there will self-evidently be 'no effect', 'no likely significant effects', or positive effects due to the option[37], and those where significant effects are likely or uncertain; and

[37] Note, for options with 'no effects' or positive effects there is no possibility of 'in combination' effects.

- an ‘appropriate assessment’ of any European sites where significant effects cannot be excluded (this may include ‘down-the-line’ deferral of some options in accordance with established HRA practice, where appropriate).

4.5.3. The conservation objectives and supplementary advice have been taken into account throughout the screening and appropriate assessment stages; as noted, however, these metrics are not explicitly reproduced in this report and the assessments do not attempt to exhaustively document the assessment of an option against all conservation objectives / supplementary advice measures for all features.

GENERAL ASSUMPTIONS

4.5.4. Most environmental changes associated with construction and operation will have an inherent range over which they naturally attenuate[38], and many interest features will have little or no sensitivity to the likely magnitude of the environmental changes expected as the result of an option. Broad or universal assumptions that can be robustly applied to the assessments of the individual options or interest features are set out in **Appendix B**.

4.5.5. In addition:

- It is assumed that all normal licensing, consenting and management procedures will be employed at option delivery and throughout operation, and that established best-practice avoidance and mitigation measures will be employed throughout scheme design and construction to safeguard environmental receptors, including European site interest features. The HRA will not therefore assess speculative or hypothetical effects based on assumptions of non-compliance (e.g. accidental spillages of treatment chemicals from a new WTW). Guidance from the EA suggests that significant direct effects on groundwater dependent terrestrial ecosystems (GWDTEs) from drawdown associated with abstraction are unlikely for European sites over 5 km from the abstraction (National EA guidance: Habitats Directive Stage 2 Review: Water Resources Authorisations – Practical Advice for Agency Water Resources Staff).
- Options that are within the terms of existing licences and recent actual abstractions (e.g. options to repair underperforming boreholes) are typically considered to be acceptable where these have not been identified to SWS or the EA as licences requiring investigation, and where the Abstraction Licensing Strategy (ALS) indicates water is available for licensing.

SCREENING

4.5.6. The screening identifies possible effects on European sites based on:

- the anticipated operation of each option and predicted hydrological zone of influence;
- the anticipated scope of any construction or enabling works required for each option;
- the European site interest features and their sensitivities; and

[38] For example, construction noise will almost invariably be indistinguishable from background levels over 600m from the source due to natural attenuation alone; several studies have demonstrated that visual disturbance of wading birds by construction plant or personnel is inconsequential over ~500m.

- the exposure of the site or features to the likely effects of the option (i.e. presence of reasonable impact pathways, taking into account species mobility and the likelihood of functional habitats being affected[39]).

4.5.7. The screening therefore identifies:

- those European sites where significant effects are considered likely as the result of an option;
- those European sites where significant effects are considered uncertain as the result of an option;
- those European sites where significant effects were considered unlikely (alone) as the result of an option (but where in combination effects might still be possible); and
- those options that will have no effects on any European sites due to their nature or location (and hence no possibility of 'in combination' effects).

4.5.8. The 'low-bar' principle is used for the screening of the preferred options[40]; in general, unless the possibility of significant effects can be simply and self-evidently excluded then an 'appropriate assessment' is completed (rather than a more detailed 'secondary screening' or similar). This applies to the options alone and in combination (i.e. unless it is evident that there will be 'no effects' from any options the possibility of 'in combination' effects is not excluded and these are taken forward to 'appropriate assessment'). This approach simplifies the overall assessment and ensures procedural clarity.

4.5.9. The 'low bar' approach is consistent with the 'People Over Wind'[41] case law, which requires that mitigation not be considered at screening. Historically, HRAs of plans typically assumed that established best-practice avoidance and mitigation measures (see **Appendix C**) would be employed at the project level to safeguard environmental receptors, including European site interest features, and accounted for this at the screening stage. However, it is arguable that an assumption such as this, albeit in relation to a lower-tier project that would itself be subject to HRA, might constitute an 'avoidance measure' that the WRMP24 is effectively relying on to ensure that significant effects do not occur.

4.5.10. In this instance, therefore, mitigation measures (including the established best-practice avoidance and mitigation measures noted in **Appendix C**) are not taken into account at screening but are instead introduced at the 'appropriate assessment' stage (if required).

APPROPRIATE ASSESSMENTS

4.5.11. The 'appropriate assessments' are an extension of the assessment processes undertaken at the screening stage, with significant effects (or areas of uncertainty) examined to determine whether there will be any adverse effects on the integrity of any European sites taking into account the conservation objectives. They are documented in **Appendices E1 – E15**.

[39] With regard to functional habitat, it should be noted that field investigations would not be undertaken for a plan-level assessment except in very exceptional circumstances, and so specific areas of 'functional habitat' may not be identifiable for assessment at the plan level unless explicitly noted in the site documentation.

[40] The low-bar nature of the screening test is characterised in case-law (*C-258/11 - Sweetman and Others*) as '*should we bother to check?*' – i.e. is a closer examination of possible effects required (i.e. appropriate assessment) or can effects self-evidently be excluded as nil or entirely nugatory?

[41] Case *C 323/17 Court of Justice of the European Union: People Over Wind*

4.5.12. The appropriate assessments are 'appropriate' to the nature of the WRMP24 as a strategic plan, the option under consideration, and the scale and likelihood of any effects; for example, exhaustive examination of feature sensitivities and possible effect pathways is not undertaken for options that would have previously been 'screened out with mitigation' if there is a high degree of confidence in the likely effectiveness of the mitigation measures available at the project-level.

4.5.13. There are essentially three 'types' of assessment appendix:

- A 'simple' appropriate assessment (**Appendix E1**) covering all options and/or European sites that would have historically been 'screened out with mitigation', typically where there is a theoretical possibility of construction-related effects that (if they occur) will be of a magnitude that can be reliably avoided with established best-practice measures or normal project planning and construction design processes. These assessments are 'appropriate' to the nature of the WRMP24 as a strategic plan, the option under consideration, and the scale and likelihood of any effects.
- More detailed appropriate assessments (**Appendices E2 – E10 and E13 – E15**) for those options with unavoidable construction or operational effects on a site (i.e. direct or close-proximity construction effects that cannot obviously be avoided with established engineering solutions such as directional drilling, or environmental changes that are inherent to the operation of the scheme).
- 'Summary' assessment appendices that cross-reference the more detailed HRA-related studies being undertaken for the WRMP19 schemes that are due for delivery in the next AMP (e.g. Portsmouth Harbour WTW Recycling, Sandown Recycling) or being completed for the Gate 2 SROs (**Appendices E11 – E12**).

4.5.14. In this case the assessments are 'option led' (i.e. each assessment appendix relates to a specific option or group of co-located options, rather than being grouped by European sites). Shared evidence applicable to multiple sites or features (for example, in relation to birds and construction noise) are provided in **Appendix B** to reduce repetition.

4.5.15. Within-plan 'in combination' assessments are documented in Appendix F (i.e. between SWS options). Note, the in combination assessment tables in Appendix F identify all SW options (both those screened out 'alone' and those carried forward to appropriate assessment); this is to ensure that all options potentially affecting a site are explicitly considered, and for simplicity / clarity.

4.5.16. In addition, it must be recognised that many construction aspects of the options (particularly new pipeline routes), are essentially indicative only at the WRMP level and are not definitive design proposals that cannot be deviated from. Therefore, to some extent, it is more appropriate for the appropriate assessments to focus on those adverse effects that are likely to be unavoidable at the project-stage irrespective of how the option is delivered, rather than attempt to exhaustively assess speculative effects based on (for example) indicative pipeline routes that could clearly be avoided if necessary. In practice such unavoidable adverse effects are more likely for scheme operation rather than construction.

PLAN-LEVEL IN COMBINATION ASSESSMENTS

4.5.17. HRA requires that the effects of other projects, plans or programmes be considered for effects on European sites 'in combination' with the WRMP24. There is limited guidance on the precise scope of 'in combination' assessments for strategies, particularly with respect to the levels within the

planning hierarchy at which ‘in combination’ effects should be considered, although guidance is provided by the ACWG.

4.5.18. Broadly, it is considered that the WRMP24 could have the following in combination effects:

- Within-plan effects, i.e. separate options within the WRMP24 affecting the same European site(s); these are addressed as part of the option assessment process outlined above.
- Between-plan abstraction effects, i.e. effects with other abstractions, in association with or driven by other plans (for example, other water company final WRMPs);
- Other between-plan effects, i.e. 'in combination' with non-abstraction activities promoted by other plans – for example, with flood risk management plans.
- Between-project effects, i.e. effects of a specific option with other specific projects and developments.

4.5.19. In undertaking the ‘in combination’ assessment it is important to note the following:

- The WRMP24 development process explicitly accounts for land-use plans, growth forecasts and population projections when determining future treatment and water management requirements.
- The detailed examination of non-water company consents for ‘in combination’ effects can only be undertaken by the EA through their permitting procedures.
- Likely water resource demands of known major projects are also taken into account during the development of the WRMPs, unless otherwise noted.

4.5.20. Therefore:

- It is considered that (for the HRA) potential 'in combination' effects in respect of water-resource demands associated with known plans or projects will not occur since these demands are explicitly considered when developing the WRMP24 and its associated and related plans (including the SROs). The main exception to this is other water company WRMP24s, which are developed concurrently.
- With regard to other strategic plans, the list of plans included within the SEA of the WRMP24 is used as the basis for a high-level ‘in combination’ assessment. The SEA is used to provide information on themes, policies and objectives of the ‘in combination’ plans, with the plans themselves examined in more detail as necessary. Plans are obtained from the SEA datasets or internet sources where possible.
- With regard to projects:
  - The WRMP24 development process explicitly accounts for the water-resource demands of known major projects (e.g. power station decommissioning; large-scale housing development) during its development, and so these ‘in combination’ effects are not considered in detail.
  - Potential ‘in combination’ effects between individual options and Nationally Significant Infrastructure Projects (NSIPs) identified by The Planning Inspectorate, and other known major projects, are assessed where sufficient information is available for a meaningful assessment (typically, this would require that environmental assessment documentation (and ideally an HRA) be available online). However, it should be noted that NSIPs registered with The Planning Inspectorate often have little information associated with them (including delivery timescales) unless they are in the later stages of the permitting process; and the time-scales over which the WRMP24 operates means that there are substantial uncertainties over the nature or potential for in combination effects. The in combination assessment of

this aspect therefore focuses on other projects and options that are likely to be delivered in the next AMP (i.e. prior to WRMP29) and speculative assessment of long-horizon schemes is not pursued.

- It is not possible to produce a definitive list of minor existing or anticipated planning applications within the zone of influence of each proposed option to review possible local 'in combination' effects. The nature of the WRMP24 and the timescales over which it operates ensure that generating a list of local planning applications at this stage would be of very little value, and this aspect can only be meaningfully undertaken at the scheme-level.

4.5.21. With regard to the 'inter-company' assessment of WRMP24 options, an inter-company in combination assessment has been completed by WRSE (*WRSE Revised Draft Regional Plan SEA Environmental Report – Appendix H*) which has informed this assessment.

4.5.22. This HRA has initiated an inter-WRSE in combination assessment mirroring the approach used for the SWS-only in combination assessment (see **Appendix G**). In summary, the approach uses assessment data from the other water company HRAs to identify all European sites that may be exposed to two or more WRMP options; this then allows possible option-option interactions to be clearly identified for each European site. Published HRA information for other water company plans informs the assessment, which limits detailed information available for non-SWS options, and strategic oversight available to SWS to identify all possible options and in combination interactions for specific European sites. A precautionary approach has been taken, recognising these limitations applicable to all water company WRMP HRA reporting.

4.5.23. Currently, HRA conclusions have been made available in a database format (hence easily processed to identify all European sites that may be exposed to particular options) by SWS, South East Water and Portsmouth Water; HRA outputs for Thames Water (TW) and Affinity Water (AW) are currently only available in long-form reporting and so have not been fully integrated into the assessment in **Appendix G**. However, for TW and AW options all European sites within 10km have been identified using shapefiles provided by the companies (so reflect the HRA scope of the SEW and PW HRAs[42]) to allow a high-level appraisal of in combination risk.

4.5.24. The approach and format of **Appendix G** is discussed further in the 'Overview' section of that appendix.

[42] Note, the SWS HRA considered some downstream sites over 10km also, but these are not explicitly identified in all other HRAs or the WRSE assessments.

5 PREFERRED OPTIONS SCREENING SUMMARY

The 'screening' adopts a low-bar approach; in general, unless the possibility of significant effects can be simply and self-evidently excluded then an 'appropriate assessment' is completed (rather than a more detailed 'secondary screening' or similar). This applies to the options alone and in combination.

5.1 DEMAND-SIDE OPTIONS

5.1.1. The demand side options are set out in **Table 3-1**(**Section 3**). Broadly, the options are either

- 'water efficiency support' measures that are designed to reduce water use without the need for significant physical intervention in the network or other development (for example, enhanced metering, tariff changes, water use audits, awareness campaigns); or
- leakage reduction interventions that may require construction works.

5.1.2. Of these, the 'water efficiency support' options cannot have significant effects due to the nature of the option (based on established guidance for similar policies and proposals in other strategic planning documents, i.e. they are not locationally specific; they do not promote development or similar changes; and are designed to reduce water use [43]). These options would all be categorised as having 'no significant effect, alone or in combination'.

5.1.3. The leakage reduction options are likely to require some form of physical intervention or amendment to the network. The works required for the vast majority of these interventions will be very minor with virtually no risk of significant effects on European sites. In some instances, effect pathways might be conceivable (for example, a hypothetical leaking pipe might be located in or near a European site) but it is not possible to predict or identify specific locations where such measures might be applied at the WRMP-level and so effects on specific European sites cannot be identified.

5.1.4. Non-specific residual risks such as these can almost always be avoided with established scheme-level mitigation measures and it is extremely unlikely that significant or significant and adverse effects as the result of a particular demand-side measure would be unavoidable at the scheme level; however, these options are carried forward to the 'appropriate assessment' stage for procedural reasons and to avoid potential conflict with the 'People over Wind' case.

5.2 EXISTING IMPORTS / TRANSFER ARRANGEMENTS

5.2.1. As noted (**Section 3.5**) several of the preferred supply-side options identified in the WRMP24 and the WRSE Regional Plan are existing imports or transfers that will continue over the plan period but which are essentially considered as 'options' for water resource modelling purposes; these are essentially part of the future water resources baseline for SWS and (as with existing licences and consents) are not assessed within this HRA (which necessarily focuses on the new supply-side options rather than the existing consents regime).

[43] e.g. Tyldesley, D. & Chapman, C. (2021). *The Habitats Regulations Assessment Handbook* [online]. DTA Publications Limited. Available at: https://www.dtapublications.co.uk/handbook/.

5.3 DROUGHT OPTIONS

DEMAND-REDUCTION DROUGHT OPTIONS

5.3.1. Three demand-reduction drought options are proposed for all WRZs for the planning period:

- Temporary Use Bans (TUBs);
- Non-Essential Use Bans (NEUBs); and
- Reductions in commercial supply.

5.3.2. These demand-reduction options will have no significant effects on any European sites, alone or in combination, due to the nature of the options (will reduce demand but will not require physical intervention in the network to implement).

SUPPLY-SIDE DROUGHT OPTIONS

5.3.3. The screening of the supply-side drought options is based on the screening undertaken for the Drought Plan 2022 HRA. This screening is summarised in **Table 5-1** (note Drought Plan option names are used, with SEMD names also included, where relevant):

Table 5-1 – Screening summary for supply-side Drought Plan options included in the final WRMP24

Option Name	Available until	Screening Summary
Bewl Water Reservoir/River Medway Scheme: Stages 1 to 4 (surface water) (SEMD Name: Drought option - supply side (KMW): River Medway Scheme 1-4 (17Ml/d))	2040-41	No LSE alone or i/c
Candover Augmentation Scheme (groundwater) (SEMD Name: Drought option - supply side (HSE): Candover (22Ml/d))	2034-35	LSE identified (River Itchen SAC)
Caul Bourne WSW (groundwater) (SEMD Name: Drought option - supply side (IOW): Caul Bourne (1.5Ml/d))	2040-41	LSE identified (Solent and Southampton Water SPA; Solent and Southampton Water Ramsar; Solent Maritime SAC)
Darwell Reservoir: Stages 1 and 2 (surface water)	n/a	LSE identified (Dungeness SAC; Dungeness, Romney Marsh and Rye Bay SPA; Dungeness, Romney Marsh and Rye Bay Ramsar)
East Worthing WSW (groundwater)	2041-42	No LSE alone or i/c
Eastern Yar Augmentation Scheme (surface water)	n/a	LSE identified (Solent and Southampton Water SPA; Solent and Southampton Water Ramsar)

Option Name	Available until	Screening Summary
Pulborough Stages 1 to 3 (surface water) (SEMD Name: Drought option - supply side (SNZ): Pulborough surface water phases 1-3 (23Ml/d))	2041-42	LSE identified (Arun Valley SAC, Arun Valley SPA; Arun Valley Ramsar) in 2022 reporting; note that the EAR and HRA for this option are subject to updates.
Lukely Brook WSW (groundwater)	n/a	No LSE alone; LSE i/c identified (Solent Maritime SAC; Solent and Southampton Water SPA; Solent and Southampton Water Ramsar).
North Arundel WSW (groundwater)	n/a	No LSE alone or i/c
Weir Wood Reservoir (surface water)	2041-42	No LSE alone or i/c
Lower Itchen Sources (groundwater and surface water) (SEMD Name: Drought option - supply side (HSE): Lower Itchen)	2029-30	LSE identified (River Itchen SAC, Solent and Southampton Water SPA; Solent and Southampton Water Ramsar)
Test Surface Water Drought Permit (surface water) Test Surface Water Drought Order (surface water) (SEMD Name: Drought option - supply side (HSW): River Test (80Ml/d))	2040-41	LSE identified (River Itchen SAC, Solent and Southampton Water SPA; Solent and Southampton Water Ramsar)

* n/a – Options that are available in the planning period but not utilised by the investment model

5.4 SUPPLY-SIDE OPTIONS

5.4.1. The initial ‘alone’ screening assessments for each preferred option are set out in **Appendix D**. **Table 5-2** to **Table 5-4** below summarises the outcomes of the ‘alone’ screening assessment for each option, identifying those European sites that have been screened out and screened in (i.e. subject to AA). For simplicity, detailed narratives for each site are not included in **Table 5-2** to **Table 5-4** (as this would essentially involve replicating **Appendix D**).

5.4.2. The following should be noted when reviewing **Table 5-2** to **Table 5-4**:

- European sites outside the scope (i.e. over 10km from an option and not downstream) are not identified as it is assumed that there will be essentially ‘no effect’ on these sites (see **Section 4.3**)[44].
- European sites are only screened out where there are considered to be no reasonable pathways for the anticipated environmental changes to affect a European site or feature – i.e. in most cases sites are only screened out where there will be ‘no effect’ in the absence of mitigation[45] and hence no possibility of ‘in combination’ effects. This is to ensure a precautionary

[44] Note, the 10km buffer may result in some apparent inconsistencies where nominally similar sites (e.g. New Forest SAC and New Forest SPA) do not have the same boundaries.

[45] As opposed to the theoretically somewhat higher bar of ‘no likely significant effect’.

assessment, and to simplify the assessment process. The rationale for each site is explicitly set out in **Appendix D**.

- The 'screened in' column provides an indication of whether the anticipated environmental changes relate to construction ('C' in **Table 5-2** to **Table 5-4**), operation ('O'), or both.
- For many options, particularly those involving construction only, the vast majority of potential effects can almost certainly be avoided or mitigated at the project-level through normal project controls, designed avoidance measures, and/or mitigation (see **Appendix C**). Sites to which this applies are identified with a 'C*' or 'O*' (i.e. indicating that potential effects are anticipated to be relatively minor and resolvable with established measures).

Table 5-2 – Screening Summary for Western Area Supply-Side Options (excludes existing imports / transfer arrangements)

Option Name	Key Outcomes / Pathways for Environmental Change	Sites Screened Out (alone)	Sites Screened In (alone)
Bulk import (HAZ): T2ST to Andover (20Mld)	Utilises water from SESRO or STT (assessed within Thames WRMP HRA); environmental changes associated with construction only but can be reliably avoided with project-level mitigation (applied at AA); no pathways for operational effects.	• Solent Maritime SAC • Emer Bog SAC	• River Itchen SAC (C*) • River Test SAC Compensatory Habitat (River Test) (C*) • Solent and Southampton Water Ramsar (C*) • Solent and Southampton Water SPA (C*) • Solent and Dorset Coast SPA (C*)
Bulk import (HKZ): T2ST to HKZ (5Ml/d)	This option transfers water from T2ST to Kingsclere, it is effectively part of the pipeline associated with Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d) (below); construction works are considered either outside the catchment of the nearest European sites or considered sufficiently distant that construction effects would not be anticipated irrespective of any additional mitigation measures. No operational effects.	• Kennet and Lambourn Floodplain SAC • River Lambourn SAC • Solent Maritime SAC • Solent and Southampton Water SPA • Solent and Dorset Coast SPA • Solent and Southampton Water Ramsar	None
Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW (90Ml/d)	Utilises water from Havant Thicket; environmental changes associated with construction only but can be reliably avoided with project-level mitigation (applied at AA); no pathways for operational effects.	• Kingley Vale SAC • Solent and Isle of Wight Lagoons SAC • Butser Hill SAC • Emer Bog SAC	• River Itchen SAC (C*) • River Test SAC Compensatory Habitat (River Meon) (C*) • Solent Maritime SAC (C*) • Portsmouth Harbour SPA (C*) • Solent and Southampton Water SPA (C*)

Option Name	Key Outcomes / Pathways for Environmental Change	Sites Screened Out (alone)	Sites Screened In (alone)
			• Solent and Dorset Coast SPA (C*) • Chichester and Langstone Harbours Ramsar (C*) • Portsmouth Harbour Ramsar (C*) • Solent and Southampton Water Ramsar (C*)
Bulk import (HSE): PWC Source A to Otterbourne WSW (21Ml/d)	Utilises water from Havant Thicket; environmental changes associated with construction only but can be reliably avoided with project-level mitigation (applied at AA); no pathways for operational effects.	• Emer Bog SAC • The New Forest SAC	• River Itchen SAC (C*) • Solent and Dorset Coast SPA (C*) • Solent and Southampton Water SPA (C*) • Solent and Southampton Water Ramsar (C*) • Solent Maritime SAC (C*)
Bulk export (HSE): Otterbourne WSW to PWC Source A (45Ml/d)	Utilises water from Havant Thicket; environmental changes associated with construction only but can be reliably avoided with project-level mitigation (applied at AA); no pathways for operational effects.	• Emer Bog SAC • The New Forest SAC	• River Itchen SAC (C*) • Solent and Dorset Coast SPA (C*) • Solent and Southampton Water SPA (C*) • Solent and Southampton Water Ramsar (C*) • Solent Maritime SAC (C*)
Bulk import (HWZ): T2ST to Yew Hill (95Ml/d)	Utilises water from SESRO or STT (assessed within Thames WRMP HRA); environmental changes associated with construction only but can be reliably avoided with project-level mitigation (applied at AA); no pathways for operational effects.	• Emer Bog SAC • Cothill Fen SAC	• River Itchen SAC (C*) • River Lambourn SAC (C*) • River Test SAC Compensatory Habitat (River Test) (C*) • Kennet Valley Alderwoods SAC (C*)

Option Name	Key Outcomes / Pathways for Environmental Change	Sites Screened Out (alone)	Sites Screened In (alone)
			• Solent and Dorset Coast SPA (C*) • Kennet and Lambourn Floodplain SAC (C*) • Solent Maritime SAC (C*) • Solent and Southampton Water SPA (C*) • Solent and Southampton Water Ramsar (C*)
Groundwater (HKZ): Remove constraints at Newbury to increase yield (1.2Ml/d)	The scheme is an alteration to an existing asset to maximise pumping capacity and within existing licence constraints, therefore no LSEs are anticipated. This option will involve the construction of a dedicated, 7.1 km 300mm DN300 pipe from Newbury water supply works (WSW) and additional pumps and treatment facilities to increase the supply to Beacon Hill WSR. Additional high-lift pumping capacity would be required at Newbury . Newbury WSW abstracts water from the underlying chalk aquifer. It is considered that the River Enbourne will not be affected by the increased abstractions due to its perched nature above the London Clay. European sites associated with the River Kennet are understood to be supported principally by surface flows from the river rather than directly by groundwater, based on the SIPs. It is also assumed in the WFD assessment that there would be no impact on any nearby surface water bodies where the Chalk is unconfined, since the abstraction is downgradient of the unconfined aquifer.	• Kennet Valley Alderwoods SAC • Kennet and Lambourn Floodplain SAC • River Lambourn SAC • River Test SAC Compensatory Habitat (River Test) (C*)	None
Groundwater (HRZ): New boreholes at Romsey (4.8Ml/d)	The existing boreholes and well/adits that supply Romsey WSW are either out of service or operating below their full capacity due to water quality issues. This option proposes 3 replacement boreholes to increase and recover DO on site	• Emer Bog SAC • The New Forest SAC • New Forest SPA • The New Forest Ramsar	Mottisfont Bats SAC (C*)

Option Name	Key Outcomes / Pathways for Environmental Change	Sites Screened Out (alone)	Sites Screened In (alone)
	plus new pipelines to connect to the WSW. Environmental changes associated with construction can be reliably avoided with project-level mitigation (applied at AA). Operation will be within the terms of the existing licence but will increase abstraction over recent actuals. Wetland habitats of Emer Bog SAC cannot be affected (SAC is located on the confining London Clay); European sites associated with Southampton Water cannot be affected due to the presence of HOF constraints at Test Surface Water.	• River Test SAC Compensatory Habitat (River Test) (C*) • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent Maritime SAC • Solent and Dorset Coast SPA	
Groundwater (HSW): Test MAR (5.5Ml/d)	This option is a Managed Aquifer Recharge (MAR) scheme. It would provide recharge of the confined chalk aquifer from mains water in winter months, with subsequent onsite abstraction from the same aquifer in summer/autumn critical low flow periods. Construction would be required close the European sites associated with the Southampton Water (environmental changes associated with construction can be reliably avoided with project-level mitigation (applied at AA)). Operation will have no effect on any sites (all the available geological evidence strongly suggests that the aquifer is deeply confined beneath the London Clay and so there are no pathways by which the scheme operation could affect this site; importantly, if this is proven to not be the case then the scheme would not be able to operate as intended and so would not be viable as an option (i.e. effects would not occur because the scheme would not be technically achievable).	• Mottisfont Bats SAC • River Avon SAC • The New Forest SAC • New Forest SPA • The New Forest Ramsar • Emer Bog SAC • River Itchen SAC	• River Test SAC Compensatory Habitat (River Test) (C*) • Solent and Southampton Water SPA (C*) • Solent and Southampton Water Ramsar (C*) • Solent Maritime SAC (C*) • Solent and Dorset Coast SPA (C*)
Groundwater (IOW): New borehole at Eastern Yar3 (1.5Ml/d)	The option is to drill a new replacement borehole. Construction works are very small scale (borehole replacements) located in open fields and so construction effects would not be anticipated irrespective of any additional	• Solent and Isle of Wight Lagoons SAC • Isle of Wight Downs SAC • South Wight Maritime SAC	None

Option Name	Key Outcomes / Pathways for Environmental Change	Sites Screened Out (alone)	Sites Screened In (alone)
	mitigation measures. With regard to operation, the Eastern Yar3 borehole feeds into the existing IoW Augmentation Scheme and is therefore a resilience scheme to improve reliability of the Augmentation scheme, with abstraction in line with recent actuals and the licence; notably, the DO benefits of the existing augmentation scheme are already part of the baseline DO for Sandown (the SW source on the Eastern Yar) and so effectively accounted for.	• Solent and Dorset Coast SPA • BriddlesLittlehampton Copses SAC • Solent and Southampton Water SPA • Solent and Southampton Water Ramsar • Solent Maritime SAC	
Groundwater (IOW): New boreholes at Newchurch (LGS) (1.9Ml/d)	This option proposes replacing all three Lower Greensand boreholes on site so that the source can operate to its licenced capacity. Construction works are very small scale (borehole replacements) located in open fields and so construction effects would not be anticipated irrespective of any additional mitigation measures. The option would operate within licence, although the availability of the licensed volumes vs. recent actual abstraction requires confirmation as CAMS suggests restricted GW available, and restricted or no SW for this location depending on flows.	• BriddlesLittlehampton Copses SAC • Solent and Dorset Coast SPA • South Wight Maritime SAC • Solent Maritime SAC • Isle of Wight Downs SAC	• Solent and Southampton Water Ramsar (O) • Solent and Southampton Water SPA (O) • Solent and Isle of Wight Lagoons SAC (O)
Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d)	This option is a new distribution pipeline associated with water delivered by T2ST; construction works are considered either outside the catchment of the nearest European sites, or considered sufficiently distant that construction effects would not be anticipated irrespective of any additional mitigation measures. No operational effects.	• Kennet and Lambourn Floodplain SAC • River Lambourn SAC • Solent Maritime SAC • Solent and Southampton Water SPA • Solent and Dorset Coast SPA • Solent and Southampton Water Ramsar	None

Option Name	Key Outcomes / Pathways for Environmental Change	Sites Screened Out (alone)	Sites Screened In (alone)
Interzonal transfer (HRZ-HSW): Romsey Town and Test valve (3.1Ml/d) (WRMP19 option under investigation)	Construction required in parkland within 500m of the River Test; significant and/or significant adverse effects are certainly avoidable with established measures / normal best-practice, although these must necessarily be accounted for at AA (hence 'screened in'). No pathways for operational effects (network scheme).	• Emer Bog SAC • The New Forest SAC • The New Forest Ramsar • New Forest SPA • Mottisfont Bats SAC • River Itchen SAC	• River Test SAC Compensatory Habitat (River Test) (C*) • Solent and Southampton Water Ramsar (C*) • Solent and Southampton Water SPA (C*) • Solent Maritime SAC (C*) • Solent and Dorset Coast SPA (C*)
Interzonal transfer (HSW-HRZ): Romsey Town and Test valve expansion (5Ml/d)	Construction required in parkland within 500m of the River Test; significant and/or significant adverse effects are certainly avoidable with established measures / normal best-practice, although these must necessarily be accounted for at AA (hence 'screened in'). No pathways for operational effects (network scheme).	• Emer Bog SAC • The New Forest SAC • The New Forest Ramsar • New Forest SPA • Mottisfont Bats SAC • River Itchen SAC	• River Test SAC Compensatory Habitat (River Test) (C*) • Solent and Southampton Water Ramsar (C*) • Solent and Southampton Water SPA (C*) • Solent Maritime SAC (C*) • Solent and Dorset Coast SPA (C*)
Interzonal transfer (HSE-HSW): Yew Hill WSW to River Test WSW bi-directional (60Ml/d)	Yew Hill to Rownans Southampton Link Main.	• River Test SAC Compensatory Habitat (River Test) (C*)	• River Itchen SAC (C*) • Solent Maritime SAC (C*) • Emer Bog SAC (C*) • Mottisfont Bats SAC (C*) • Solent and Southampton Water SPA (C*) • Solent and Dorset Coast SPA (C*) • Solent and Southampton Water Ramsar (C*)

Option Name	Key Outcomes / Pathways for Environmental Change	Sites Screened Out (alone)	Sites Screened In (alone)
Interzonal transfer (HSE-HWZ): Otterbourne WSW to Yew Hill bi-directional (74Ml/d)	Transfer of treated water to/from Otterbourne via new pipeline; environmental changes associated with construction only, but can be reliably avoided with project-level mitigation (applied at AA); no pathways for operational effects.	• Emer Bog SAC • Solent Maritime SAC	• River Itchen SAC (C*) • River Test SAC Compensatory Habitat (River Test) (C*) • Solent and Dorset Coast SPA (C*) • Solent and Southampton Water Ramsar (C*) • Solent and Southampton Water SPA (C*)
Interzonal transfer (HWZ-HAZ): Winchester to Andover bi-directional (15Ml/d)	Transfer of treated water to/from Otterbourne via new pipeline; environmental changes associated with construction only, but can be reliably avoided with project-level mitigation (applied at AA); no pathways for operational effects.	• Emer Bog SAC • Solent Maritime SAC	• River Itchen SAC (C*) • River Test SAC Compensatory Habitat (River Test) (C*) • Solent and Dorset Coast SPA (C*) • Solent and Southampton Water Ramsar (C*) • Solent and Southampton Water SPA (C*)
Recycling (HSE): Recharge of Havant Thicket from recycled water from Portsmouth Harbour WTW (60Ml/d) (WRMP19 option under investigation)	Option will require construction close to sites associated with Chichester harbour; operation will potentially effect sites associated with the Solent due to changes in discharges from Portsmouth Harbour WTW WwTW.	• Butser Hill SAC • Kingley Vale SAC	• Solent and Dorset Coast SPA (C*,O) • Chichester and Langstone Harbours SPA (C*,O) • Chichester and Langstone Harbours Ramsar (C*,O) • Portsmouth Harbour Ramsar (C*,O) • Solent and Isle of Wight Lagoons SAC (C*,O) • Portsmouth Harbour SPA (C*,O)

Option Name	Key Outcomes / Pathways for Environmental Change	Sites Screened Out (alone)	Sites Screened In (alone)
			• Solent Maritime SAC (C*,O) • River Test SAC Compensatory Habitat (River Meon) (C*)
Recycling (IOW): Sandown (8.5Ml/d) (WRMP19 option under investigation)	WRMP19 option currently in investigation / delivery phase. Option proposes the transfer of treated effluent from Sandown WwTW (currently discharged to sea), to support flows in the Eastern River Yar upstream of the Sandown WSW abstraction at Alverstone . Treated water in excess of the local demand will be transferred through a new transfer pipeline to a service reservoir near Newport. Environmental changes associated with construction but can be reliably avoided with project-level mitigation (applied at AA). Operation will affect flows / water quality / etc. in the Yar (which ultimately flows to Bembridge harbour and hence the European sites associated with that) although the effects should largely be limited to the reaches of the Yar upstream of Sandown WSW (as the recycled water is effectively used on a put and take basis).	• Isle of Wight Downs SAC • Solent Maritime SAC	• Solent and Dorset Coast SPA (C*,O) • South Wight Maritime SAC (C*,O) • Solent and Southampton Water SPA (C*,O) • Solent and Southampton Water Ramsar (C*,O) • BriddlesLittlehampton Copses SAC (C*) • Solent and Isle of Wight Lagoons SAC (C*,O)
Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d)	This new option involves recommissioning the mothballed Chilbolton WSW, with the inclusion of a suitable nitrate removal plant. There are no European sites within 10km although the European sites associated with Southampton Water are potential downstream receptors. Environmental changes associated with construction can be reliably avoided with project-level mitigation (applied at AA). Operation will be within the terms of the existing licence, but will increase abstraction over recent actuals, although the European sites associated with Southampton Water cannot be affected through this mechanism due to the presence of HOF constraints at Test surface water WSW.	▪ None	▪ River Test SAC Compensatory Habitat (River Test) (C*) ▪ Solent and Southampton Water Ramsar (C*) ▪ Solent and Southampton Water SPA (C*) ▪ Solent Maritime SAC (C*) ▪ Solent and Dorset Coast SPA (C*)

Option Name	Key Outcomes / Pathways for Environmental Change	Sites Screened Out (alone)	Sites Screened In (alone)
Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)	This new option involves the development of a new borehole and pump capacity at the Kings Sombourne site to increase the DO from 1.5Ml/d to the licenced 4Ml/d, giving a potential benefit of 2.5Ml/d. Environmental changes associated with construction can be reliably avoided with project-level mitigation (applied at AA). Operation will be within the terms of the existing licence but will increase abstraction over recent actuals. Wetland habitats of Emer Bog SAC cannot be affected (distance from abstraction, plus the SAC is located on the confining London Clay); European sites associated with Southampton Water cannot be affected through operation due to the presence of HOF constraints at Test surface water WSW.	■ Emer Bog SAC	■ Mottisfont Bats SAC (C*) ■ River Test SAC Compensatory Habitat (River Test) (C*) ■ Solent and Southampton Water Ramsar (C*) ■ Solent and Southampton Water SPA (C*) ■ Solent Maritime SAC (C*) ■ Solent and Dorset Coast SPA (C*)

Table 5-3 – Screening Summary for Central Area Supply-Side Options (excludes existing imports / transfer arrangements)

Option Name	Option Description / Summary	Sites Screened Out (alone)	Sites Screened In (alone)
Bulk import (SBZ): SEW to Rottingdean (20Ml/d)	This option is for a pipeline to transfer flow from SEW Barcombe WSW to SWS Rottingdean . Environmental changes are associated with construction only (water provided by SEW, understood to be associated with the Brighton recycling scheme, which will not affect any European sites given its location).	• Lewes Downs SAC • Castle Hill SAC	None
Bulk import (SNZ): Havant Thicket Reservoir to Pulborough (50Ml/d)	Transfer of raw water from is Havant Thicket Reservoir direct to Pulborough through a new bidirectional pipeline. INNS treatment will be provided at Pulborough. Environmental changes associated with construction only but can be reliably avoided with project-level mitigation (applied at AA); no pathways for operational effects (water treated on arrival at Pulborough).	• Solent and Isle of Wight Lagoons SAC • Rook Clift SAC • Butser Hill SAC • Portsmouth Harbour Ramsar • Portsmouth Harbour SPA • Ebernoe Common SAC • Pagham Harbour SPA • Pagham Harbour Ramsar	• Duncton to Bignor Escarpment SAC (C*) • Kingley Vale SAC (C*) • Arun Valley Ramsar (C*) • Arun Valley SPA (C*) • Arun Valley SAC (C*) • Solent Maritime SAC (C*) • Chichester and Langstone Harbours Ramsar (C*) • Chichester and Langstone Harbours SPA (C*) • The Mens SAC (C*) • Singleton and Cocking Tunnels SAC (C*) • Solent and Dorset Coast SPA (C*)
Bulk import (SNZ): SES re-zoning (4Ml/d) (WRMP19 option under investigation)	Extension of current re-zoning of supplies to SES water in SNZ; these are minor construction works located over 10km from any European sites with no reasonable pathways for effects.	None	None

Option Name	Option Description / Summary	Sites Screened Out (alone)	Sites Screened In (alone)
Bulk import (SNZ): SES to SNZ (10Ml/d)	Transfer of treated water to/from SES Outwood To SWS Buchen Hill, Crawley via new pipeline; environmental changes associated with construction only, but will not affect any sites (distance, no pathways); no pathways for operational effects.	• Ashdown Forest SPA • Ashdown Forest SAC • Mole Gap to Reigate Escarpment SAC • Thames Estuary and Marshes SPA • Thames Estuary and Marshes Ramsar	None
Bulk import (SNZ): SEW RZ5 to Pulborough	This bulk import from South East Water to Pulborough is first selected in 2040. Environmental changes associated with construction only but can be reliably avoided with project-level mitigation (applied at AA); no pathways for operational effects.	• East Hampshire Hangers SAC • Duncton to Bignor Escarpment SAC • Butser Hill SAC • Wealden Heaths Phase 2 SPA • Rook Clift SAC • Woolmer Forest SAC • Kingley Vale SAC • River Test SAC Compensatory Habitat (River Test) (C*)	• Arun Valley Ramsar (C*) • Arun Valley SAC (C*) • Arun Valley SPA (C*) • The Mens SAC (C*) • Ebernoe Common SAC (C*) • Singleton and Cocking Tunnels SAC (C*)
Desalination (SWZ): Tidal River Arun (10Ml/d) Desalination (SWZ): Tidal River Arun (20Ml/d) Desalination (SWZ): Tidal River Arun (20Ml/d) Phase 2	This option proposes an initial 10Ml/d or 20Ml/d desalination plant (with a second 20Ml/d module added in Phase 2) to treat estuarine water from the tidal River Arun to supply treated water to the Sussex Worthing WRZ via a new pipeline. Environmental changes associated with construction can be reliably avoided with project-level mitigation (applied at AA); with regard to operation, the principal pathways for operational effects will be through environmental changes at the intake (no European sites / features likely to be exposed here) and the outfall which will be located	• Duncton to Bignor Escarpment SAC • Arun Valley SAC	• Arun Valley SPA (C*) • Arun Valley Ramsar (C*) • Solent and Dorset Coast SPA (C*,O)

Option Name	Option Description / Summary	Sites Screened Out (alone)	Sites Screened In (alone)
	offshore in the English Channel (where brine from the desalination process will be discharged).		
Groundwater (SBZ): Lewes Road (3.5Ml/d)	Lewes Road is a is a well and adit system that has been out of supply for over 10 years due to poor water quality. The scheme would refurbish the water supply works and add additional water treatment. The site is located in urban Brighton and so there are no pathways for environmental changes associated with construction or operation to affect European sites or features.	▪ Castle Hill SAC	None
Groundwater (SNZ): New borehole at Petworth (4Ml/d)	This scheme would return an existing WSW (Petworth) to service which has been out of supply due to poor water quality. Construction will involve works in rural areas close to the River Rother (pathways for site-derived pollutants); operation will be within the terms of the existing licence but abstraction will be greater than recent actuals, which may affect flows within the River Rother.	• Duncton to Bignor Escarpment SAC	• The Mens SAC (C*) • Arun Valley Ramsar (C*,O) • Arun Valley SPA (C*,O) • Arun Valley SAC (C*,O) • Ebernoe Common SAC (C*)
Interzonal transfer (SBZ-SWZ): Brighton to Worthing	New bi-directional transfer between Sussex Worthing and Sussex Brighton Water Resource Zones. The scheme would require a new pipeline along the northern edge of Worthing / Brighton. Environmental changes will be associated with construction only.	• Lewes Downs SAC • Castle Hill SAC	None
Interzonal transfer (SNZ-SWZ): Pulborough to Worthing	Additional pipeline to provide extra capacity along the existing transfer route between Sussex North and Sussex Worthing. Environmental changes associated with construction only but can be reliably avoided with project-level mitigation	• Duncton to Bignor Escarpment SAC • Ebernoe Common SAC	• Arun Valley SPA (C*) • Arun Valley SAC (C*) • Arun Valley Ramsar (C*) • The Mens SAC (C*)

Option Name	Option Description / Summary	Sites Screened Out (alone)	Sites Screened In (alone)
	(applied at AA); no pathways for operational effects.		
Interzonal transfer (SWZ-SBZ): Pulborough winter transfer stage 2 (4Ml/d)	During the winter there is surplus surface water within the River Rother. This scheme would allow the surplus to be used at Pulborough WSW (within licence constraints) which in turn would allow coastal groundwater sources to be rested. This phase of the scheme would require a new distribution pipeline along the northern edge of Worthing / Brighton.	• Castle Hill SAC	None
Recycling (SNZ): Horsham with storage at Pulborough (6.8Ml/d)	This option would utilise 9.5Ml/d recycled water from Horsham WwTW (DO of 6.8Ml/d after process losses) that would otherwise be discharged to the River Arun. Construction will involve works within the Arun catchment; operation will reduce discharges of treated water to the River Arun (so reducing flows marginally within the river).	• Duncton to Bignor Escarpment SAC • Ebernoe Common SAC	• Arun Valley SAC (C*,O) • Arun Valley Ramsar (C*,O) • Arun Valley SPA (C*,O) • The Mens SAC (C*,O)
Recycling (SNZ): Littlehampton WTW with river discharge (15Ml/d) (WRMP19 option under investigation)	This is a WRMP2019 deliverable that has been delayed slightly. The scheme proposes the transfer of treated effluent from Littlehampton WwTW to a new discharge point on the western River Rother upstream of the Pulborough Surface Water abstraction. This would support flows over the weir as the MRF is approached, therefore prolong production at Pulborough during a drought. Pipeline construction would be required close (<2km) to the Arun Valley European sites (environmental changes associated with construction can be reliably avoided with project-level mitigation (applied at AA)). Operation of the scheme would involve highly-treated effluent being	• Duncton to Bignor Escarpment SAC • Solent and Dorset Coast SPA	• Arun Valley Ramsar (C*, O) • Arun Valley SPA (C*, O) • Arun Valley SAC (C*, O) • The Mens SAC (C*) • Ebernoe Common SAC (C*)

Option Name	Option Description / Summary	Sites Screened Out (alone)	Sites Screened In (alone)
	used to augment river flows in the Western Rother upstream of the Pulborough abstraction (effectively on a put and take basis); this may affect water quality in the Rother hence the Arun.		
Storage (SNZ): River Adur Offline Reservoir (19.5Ml/d)	The option involves the construction of an earth embankment reservoir near River Adur offline with a proposed storage capacity of up to 4,600 Ml. No sites will be exposed to effects as a result of the scheme, irrespective of any mitigation measures.	• Arun Valley SPA • Arun Valley SAC • Arun Valley Ramsar	None
Treatment capacity (SWZ): Pulborough winter transfer stage 1 (2Ml/d)	During the winter there is surplus surface water within the River Rother. This scheme would allow the surplus to be used at Pulborough WSW (within licence constraints) which in turn would allow coastal groundwater sources to be rested. This component of the scheme would require small-scale minor works at Pulborough WSW to facilitate transfer to Sussex WRZ through an existing pipe (environmental changes not expected as a result of construction; operation within existing licence constraints).	• Arun Valley Ramsar • Arun Valley SPA • Arun Valley SAC	None
Groundwater (SNZ): Petersfield refurbishment (1.6Ml/d)	This WRMP19 option involves the transfer excess water for enhanced treatment near Midhurst with refurbishment of a WSW and borehole rehabilitation. No European sites or features are expected to be exposed to the environmental changes associated with construction irrespective of any mitigation, based on the distance to the sites and effect pathways. Operation will be within the terms of the existing licence, but will increase abstraction over recent actuals. The wetland features of the Arun Valley SAC, Arun Valley SPA	• Butser Hill SAC • East Hampshire Hangers SAC • Rook Clift SAC • Wealden Heaths Phase 2 SPA • Woolmer Forest SAC	• Arun Valley SAC (O) • Arun Valley SPA (O) • Arun Valley Ramsar (O)

Option Name	Option Description / Summary	Sites Screened Out (alone)	Sites Screened In (alone)
	and Arun Valley Ramsar may be affected if the abstraction affects flows in the River Rother (hence the River Arun as it passes the European sites) although the small scale of the increase in abstraction, the distance downstream, and the characteristics of the relationship between the River Arun and the European sites are likely to moderate any effects (albeit that it is reasonably to consider this through appropriate assessment, alone and in combination). The Wealden Heaths SPA and Woolmer Forest SAC are approx. 5 – 7km (respectively) from the boreholes, and support some groundwater dependent terrestrial ecosystems (GWDTEs); however, these designated sites are separated from the boreholes by the River Rother, and are at a significantly greater elevation. The GWDTEs (essentially, habitats associated with peatlands and impeded drainage) are also not typically supported by deep groundwater from aquifers. Modelling currently being undertaken for this option (following from WRMP19) excludes these designated sites for these reasons (i.e. there is no reasonable pathway). Note that the 2019 HRA concluded that this option would have no significant effects on any European sites, alone or in combination.		
Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d)	This WRMP19 option involves bringing the West Chiltington groundwater source back into service by constructing a new borehole, new treatment plant and flood resilience measures at the site.	• The Mens SAC	• Arun Valley SAC (C*, O) • Arun Valley SPA (C*, O) • Arun Valley Ramsar (C*, O)

Option Name	Option Description / Summary	Sites Screened Out (alone)	Sites Screened In (alone)
	Operation will be within the terms of the existing licence but will increase abstraction over recent actuals. The wetland features of the Arun Valley SAC, Arun Valley SPA and Arun Valley Ramsar may be affected if the abstraction affects flows in the River Stor and hence the River Arun as they pass these European sites. These sites may also be affected by site-derived pollutants from construction, in the absence of mitigation. No other sites are potentially exposed to significant effects (any construction works will be relatively small-scale / localised at existing SWS assets, which are located substantially beyond the core sustenance zone (CSZ) of bat species associated with The Mens SAC.		

Table 5-4 – Screening Summary for Eastern Area Supply-Side Options (excludes existing imports / transfer arrangements)

Option Name	Option Description / Summary	Sites Screen Out (alone)	Sites Screened In (alone)
Asset enhancement (KMW): Remove network constraint at Longfield (13Ml/d)	This option would involve relatively minor construction works within urban areas to remove network capacity constraints and realise currently locked-in deployable output. Construction works are small scale / local within urban / developed areas and so construction effects would not be anticipated irrespective of any additional mitigation measures. Network solution, so no environmental changes associated with operation.	• North Downs Woodlands SAC • Peter`s Pit SAC • Thames Estuary and Marshes SPA • Medway Estuary and Marshes SPA • Medway Estuary and Marshes Ramsar • Thames Estuary and Marshes Ramsar	None
Bulk import (KTZ): SEW Canterbury to Near Canterbury (20Ml/d)	This is a new bi-directional transfer between South East Water and Kent Thanet WRZ, indirectly supplied from SEW Canterbury Reservoir. Environmental changes associated with construction only (operation utilises spare water made available through SEW Canterbury), can be reliably avoided with project-level mitigation (applied at AA).	• Blean Complex SAC • Tankerton Slopes and Swalecliffe SAC • Outer Thames Estuary SPA • The Swale SPA • The Swale Ramsar • Margate and Long Sands SAC • Lydden and Temple Ewell Downs SAC • Sandwich Bay SAC	• Stodmarsh Ramsar (C*) • Stodmarsh SAC (C*) • Stodmarsh SPA (C*) • Thanet Coast and Sandwich Bay Ramsar (C*) • Thanet Coast and Sandwich Bay SPA (C*)
Bulk import (KTZ): SEW Kingston to Near Canterbury (2Ml/d)	This option would involve a new pipeline to transfer spare water from SEW. Environmental changes associated with construction can be reliably avoided with project-level mitigation (applied at AA); no environmental changes associated with operation.	• Stodmarsh SPA • Stodmarsh SAC • Stodmarsh Ramsar • Parkgate Down SAC • Lydden and Temple Ewell Downs SAC • Sandwich Bay SAC • Blean Complex SAC	• Thanet Coast and Sandwich Bay Ramsar (C*) • Thanet Coast and Sandwich Bay SPA (C*)

Option Name	Option Description / Summary	Sites Screen Out (alone)	Sites Screened In (alone)
Bulk import (SHZ): SEW RZ8 to Rye	This is a new bi-directional transfer pipeline between SEW Kingsnorth and Southern Water Brede WSW. Environmental changes associated with construction only (network solution), can be reliably avoided with project-level mitigation (applied at AA).	• Wye and Crundale Downs SAC • Hastings Cliffs SAC	• Dungeness SAC (C*) • Dungeness, Romney Marsh and Rye Bay SPA (C*) • Dungeness, Romney Marsh and Rye Bay Ramsar (C*)
Desalination (KME): Isle of Sheppey (10Ml/d) phase 2 Desalination (KME): Isle of Sheppey 20Ml/d	This option proposes an initial 10 or 20Ml/d desalination plant (with a second 20 or 10Ml/d module added in Phase 2) to treat estuarine water from the tidal Thames to supply treated water to the Kent Medway WRZ via a new pipeline. Environmental changes associated with construction can be reliably avoided with project-level mitigation (applied at AA); with regard to operation, the principal pathways for operational effects will be through environmental changes at the intake and outfall, which may affect downstream sites or sites supporting mobile species.	• Queendown Warren SAC • North Downs Woodlands SAC • Benfleet and Southend Marshes SPA • Benfleet and Southend Marshes Ramsar • Essex Estuaries SAC • Foulness (Mid-Essex Coast Phase 5) Ramsar • Foulness (Mid-Essex Coast Phase 5) SPA	• The Swale SPA (C*, O) • Medway Estuary and Marshes SPA (C*, O) • Medway Estuary and Marshes Ramsar (C*, O) • The Swale Ramsar (C*, O) • Thames Estuary and Marshes Ramsar (C*, O) • Thames Estuary and Marshes SPA (C*, O) • Outer Thames Estuary SPA (C*, O)
Desalination (KMW): Thames Estuary (10Ml/d) Desalination (KMW): Thames Estuary (10Ml/d) Phase 2 Desalination (KMW): Thames Estuary (20Ml/d) Desalination (KMW): Thames Estuary (20Ml/d) Phase 2	This option proposes an initial 20Ml/d desalination plant (with a second 20Ml/d module added in Phase 2) to treat estuarine water from the tidal Thames to supply treated water to the Kent Medway WRZ via a new pipeline. Environmental changes associated with construction can be reliably avoided with project-level mitigation (applied at AA); with regard to operation, the principal pathways for operational effects will be through environmental changes at the intake (no European sites / features likely to be exposed here) and the outfall which would combine discharge with Swanscombe WwTW's existing outfall (where brine from the desalination process will be discharged; may affect downstream sites).	• North Downs Woodlands SAC • Peter`s Pit SAC	• Thames Estuary and Marshes Ramsar (C*,O) • Thames Estuary and Marshes SPA (C*,O)

Option Name	Option Description / Summary	Sites Screen Out (alone)	Sites Screened In (alone)
Desalination (KTZ): East Thanet (20Ml/d) Desalination (KTZ): East Thanet (20Ml/d) Phase 2	This option proposes an initial 20Ml/d desalination plant (with a second 20Ml/d module added in Phase 2) located on the north coast of Thanet (new offshore intake / outfall required), and a new terrestrial pipeline to supply potable desalinated water to the Kent Thanet WRZ. Environmental changes associated with onshore construction can be reliably avoided with project-level mitigation (applied at AA); however, the outfall will require construction in the marine environment close to or within European sites (direct effects possible). With regard to operation, the principal pathways for operational effects will be through environmental changes at the intake (no European sites / features likely to be exposed here) and the outfall (where brine from the desalination process will be discharged; may affect offshore sites or features).	• Sandwich Bay SAC • Stodmarsh SAC • Stodmarsh Ramsar • Blean Complex SAC	• Thanet Coast and Sandwich Bay SPA (C,O) • Outer Thames Estuary SPA (C,O) • Thanet Coast and Sandwich Bay Ramsar (C,O) • Thanet Coast SAC (C,O) • Margate and Long Sands SAC (C,O) • Stodmarsh SPA (C*)
Groundwater (KME): Recommission Gravesend (2.7Ml/d)	Gravesend source is a well and adit system that was decommissioned in 2007 due to high nitrate levels. A new nitrate treatment plant was constructed on site in 2006. A Source Investigation and Optimisation Study (SIOS) suggested that the nitrate problem was likely to be a faulty nitrate monitor. This option would involve minor construction works at the site, with no realistic pathways for environmental changes associated with construction given the distance between the site and nearest European site. Operation would be within the terms of the existing licence (but involve an increase over recent actuals); the ALS indicates that water is available for licensing but there is a potential risk associated with groundwater drawdown and hence water supply to Thames Estuary and Marshes Ramsar and SPA.	North Downs Woodlands SAC	• Thames Estuary and Marshes Ramsar (O) • Thames Estuary and Marshes SPA (O)

Option Name	Option Description / Summary	Sites Screen Out (alone)	Sites Screened In (alone)
Groundwater (SHZ): Reconfigure Rye Wells (1.5Ml/d)	Brede groundwater source is a well and adit system that is over 100 years old, and has reached the end of its asset life. Operational wells 1 and 3 are to be replaced by boreholes. Environmental changes associated with construction will be minor given the scale of the works, and can be reliably avoided with project-level mitigation (applied at AA). Operation might theoretically affect inputs to the River Brede, although abstraction will be within the existing licence and recently abstracted volumes; the Rother ALS indicates that water is available for abstraction from the relevant groundwater body and the River Brede.	• Dungeness SAC • Hastings Cliffs SAC	• Dungeness, Romney Marsh and Rye Bay SPA (C*) • Dungeness, Romney Marsh and Rye Bay Ramsar (C*)
Interzonal transfer (KME-KTZ): KME-KTZ bi-directional (15.8Ml/d) (WRMP19 option under investigation)	Conditioning of existing Faversham4-Fleete main to enable bi-directional transfers (and specifically from Kent Thanet to Kent Medway). It is not thought that any additional pipeline would be required, although this is dependent on the existing main being structurally sound and so a new pipeline has been assumed as a worst case. Environmental changes associated with construction can be reliably avoided with project-level mitigation (applied at AA); no environmental changes associated with operation.	• Blean Complex SAC • Tankerton Slopes and Swalecliffe SAC • Outer Thames Estuary SPA • The Swale SPA • The Swale Ramsar • Margate and Long Sands SAC • Lydden and Temple Ewell Downs SAC • Sandwich Bay SAC	• Stodmarsh Ramsar (C*) • Stodmarsh SAC (C*) • Stodmarsh SPA (C*) • Thanet Coast and Sandwich Bay Ramsar (C*) • Thanet Coast and Sandwich Bay SPA (C*)

Option Name	Option Description / Summary	Sites Screen Out (alone)	Sites Screened In (alone)
Interzonal transfer (KTZ-KME): Utilise full existing transfer capacity (9Ml/d)	The current operational transfer from Kent Medway East to Kent Thanet is limited to the output from Faversham4 WSW. This option enables flows from the Faversham3 groundwater source to be directed, via an existing main, towards Selling WSW. This is a network solution that would utilise an existing main, and so no potentially notable environmental changes associated with construction or operation are expected.	• The Swale Ramsar • The Swale SPA • Blean Complex SAC • Wye and Crundale Downs SAC • Outer Thames Estuary SPA • Tankerton Slopes and Swalecliffe SAC • Thanet Coast and Sandwich Bay SPA • Thanet Coast and Sandwich Bay Ramsar • Stodmarsh Ramsar • Stodmarsh SAC • Stodmarsh SPA • Sandwich Bay SAC • Thanet Coast SAC • Margate and Long Sands SAC	None
Recycling (KME): Sittingbourne industrial water reuse (7.5Ml/d) (WRMP19 option not yet under investigation)	This option would use recycled water from Sittingbourne WwTW to supply an industrial process / customer, so allowing groundwater currently abstracted by that industrial user to be used for PWS through licence trading. The scheme will require construction close to the Milton Creek in Sittingbourne (tributary of the Swale); the net effect of the scheme operation would be a minor reduction to non-saline inputs to Milton Creek from Sittingbourne WwTW, and to alter concentrations of some determinands (not total load however) that are discharged to this waterbody (It has been assumed at this stage that the reverse osmosis wastewater can be discharged through Sittingbourne WwTW existing outfall), hence to the Swale.	• Queendown Warren SAC • Outer Thames Estuary SPA • Thames Estuary and Marshes RamsarThames • Estuary and Marshes SPA	• The Swale SPA • The Swale Ramsar • Medway Estuary and Marshes SPA • Medway Estuary and Marshes Ramsar

Option Name	Option Description / Summary	Sites Screen Out (alone)	Sites Screened In (alone)
Recycling (KMW): Medway WTW to lake (14Ml/d) (WRMP19 option under investigation)	This option involves the transfer of 18Ml/d of treated effluent from Medway WwTW to near Rochester WSW's raw water storage reservoir Eccles Lake. It will require construction close to the River Medway, and will remove a proportion of the treated water / non-saline flows that would otherwise flow into the Medway Estuary from the WwTW; however, the zone of influence for this operational environmental change will not extend a substantive distance downstream due to the dominance of tidal mixing.	• Peter`s Pit SAC • North Downs Woodlands SAC • Queendown Warren SAC	• Medway Estuary and Marshes SPA (C*,O) • Medway Estuary and Marshes Ramsar (C*,O)
Recycling (SHZ): Hastings to Darwell (15.3Ml/d)	This option is a new 21.5Ml/d water recycling plant producing a DO of 15.3Ml/d near Hastings WwTW and a transfer of the treated effluent to Darwell reservoir, which feeds into the Hastings Area. Process losses have been included.	• Dungeness SAC • Hastings Cliffs SAC	• Dungeness, Romney Marsh and Rye Bay SPA (C*, O) • Pevensey Levels SAC (C*) • Pevensey Levels Ramsar (C*) • Dungeness, Romney Marsh and Rye Bay Ramsar (C*)
Recycling (SHZ): Tonbridge to Bewl (5.7Ml/d)	New resource. This option is a new 8Ml/d water recycling plant producing a DO of 5.7Ml/d near Tunbridge WwTW and a transfer of the treated water to Bewl reservoir, which feeds into Darwell reservoir. Process losses have been included.	• Medway Estuary and Marshes Ramsar • Medway Estuary and Marshes SPA	None
Storage (SHZ): Raising Bewl Reservoir 0.4m (3Ml/d)	The scheme involves the raising of Bewl Water by 0.4m to increase storage and yield. The only sites potentially exposed to environmental changes associated with the scheme are the Medway estuary sites; however, construction effects would not be expected irrespective of mitigation due to the distance downstream and hence attenuation; and all compensation releases etc to the Medway will be maintained.	• Medway Estuary and Marshes Ramsar • Medway Estuary and Marshes SPA	None

5.5 INTER-OPTION 'IN COMBINATION' SCREENING ASSESSMENT

5.5.1. The inter-option in combination screening assessment is summarised with the appropriate assessment in combination assessment in **Appendix F**. This identifies all those European sites that could potentially be affected by two or more options and then determines whether 'in combination' likely significant effects can be excluded based on the nature and timing of the potential effect (for example, schemes with 'construction only' effects are unlikely to have in combination effects if required in different plan periods).

5.5.2. Note, the in combination assessment tables in **Appendix F** identify all SW options (both those screened out 'alone' and those carried forward to appropriate assessment); this is to ensure that all options potentially affecting a site are explicitly considered, and for simplicity / clarity, although it should be recognised that the vast majority of the options that are screened out 'alone' will have no pathways by which they can affect the nearest European sites (i.e. 'no effect' (as opposed to no LSE) and hence no possibility of 'in combination' effects).

5.5.3. Note also that the inter-option in combination assessment generally focuses on operational effects (i.e. those that are long-term and inherent outcomes of the option) rather than construction effects.

5.5.4. In summary, for the screening stage:

- the 'no effect' options cannot operate in combination with any other options to affect any European sites; and
- none of the 'no LSE' options are likely to operate in combination (i.e. 'no LSE' + 'no LSE' = LSE) to result in significant effects on any European sites.

5.5.5. Options taken forward to appropriate assessment are subject to specific in-combination assessment.

6 APPROPRIATE ASSESSMENT SUMMARY

6.1 DEMAND-SIDE OPTIONS

6.1.1. The demand side options are set out in **Table 3-1** (**Section 3.4**). Broadly, the options are either

- 'water efficiency support' measures that are designed to reduce water use without the need for significant physical intervention in the network or other development (for example, enhanced metering, tariff changes, water use audits, awareness campaigns); or
- leakage reduction interventions that may require construction works.

6.1.2. Of these, the 'water efficiency support' options cannot have significant effects due to the nature of the option, based on established guidance for similar policies and proposals in other strategic planning documents.

6.1.3. With regard to the leakage options, these will have no negative operational effects on European sites as they will reduce treated water use. The only realistic mechanism for a negative effect would be through any construction required (for example, the leakage reduction programme may require repair of a pipe in or near an SAC), but this cannot be meaningfully assessed at the strategic level since information on the location of specific intervention requirements (e.g. leaks) is not available without specific investigations, which would form part of the option package (e.g. the precise location and severity of most leakages is not known ahead of detection), and there is consequently no information on the scale (etc.) of any construction required.

6.1.4. Therefore, from an HRA perspective, the options are 'screened in' (as an effect pathway is conceivable) but as a meaningful appropriate assessment is not possible, **the assessment is necessarily deferred to the project level**.

6.1.5. However, it is clear that the anticipated works associated with these options are not of a scale that would suggest that effects are potentially unavoidable at the project stage, and the WRMP requires that the standard avoidance measures in **Appendix C** be employed (which includes a requirement for the potential for European sites to be affected to be considered at the planning stage). The WRMP does not imply any approval for schemes that come forward under these options or remove the need for project-level assessments, although the measures noted in **Appendix C** will ensure that potential adverse effects can be identified and avoided at the project stage.

6.2 DROUGHT OPTIONS

6.2.1. The HRA screening of the Drought Plan 2022 identified eight drought options where likely significant effects were identified. Once mitigation measures were taken into account, the HRA concluded that adverse effects on integrity could not be excluded for two supply-side drought measures in relation to the River Itchen SAC – Candover [River Itchen] Augmentation Scheme Drought Order (SEMD Name: Drought option - supply side (HSE): Candover (22Ml/d)) and the Lower Itchen Sources Drought Order (SEMD Name: Drought option - supply side (HSE): Lower Itchen) (**Table 3-3**). Consequently, both options were taken forward for further assessment.

6.2.2. SWS's current position in relation to the two drought options (Candover [River Itchen] Augmentation Scheme and the Lower Itchen Sources) and the duration of their implementation, and the compensatory measures required for the adverse effects are set out in **Annex 9** of the WRMP. In summary, a compensation package is being agreed and implemented as part of ongoing

discussions relating to the Drought Plan, and this aspect is not considered further within this HRA as none of the preferred supply-side options will interact with these Drought Plan options to affect the River Itchen SAC.

6.2.3. The remaining Drought Plan options are assessed 'in combination' with the WRMP24 options in **Section 6.4.**

6.3 SUPPLY-SIDE OPTIONS

SCREENING SUMMARY – 'NO EFFECT' OPTIONS

6.3.1. The following options are expected (if progressed as projects) to have 'no effect' on any European sites (i.e. there are no reasonable pathways by which the anticipated environmental changes associated with the option could affect a site or its interest features); as these options will have 'no effects' they cannot have 'in combination' effects, and have been **screened out** and are not considered further:

- Western Area:
  - Bulk import (HKZ): T2ST to HKZ (5Ml/d);
  - Groundwater (HKZ): Remove constraints at Newbury to increase yield (1.2Ml/d);
  - Groundwater (IOW): New borehole at Eastern Yar3 (1.5Ml/d);
  - Interzonal transfer (HAZ-HKZ): Andover to Kingsclere bi-directional (10Ml/d).
- Central Area:
  - Bulk import (SBZ): SEW to Rottingdean (20Ml/d);
  - Bulk import (SNZ): SES re-zoning (4Ml/d);
  - Bulk import (SNZ): SES to SNZ (10Ml/d);
  - Groundwater (SBZ): Lewes Road (3.5Ml/d);
  - Interzonal transfer (SBZ-SWZ): Brighton to Worthing;
  - Interzonal transfer (SWZ-SBZ): Pulborough winter transfer stage 2 (4Ml/d);
  - Storage (SNZ): River Adur Offline Reservoir (19.5Ml/d) ;
  - Treatment capacity (SWZ): Pulborough winter transfer stage 1 (2Ml/d).
- Eastern Area:
  - Asset enhancement (KMW): Remove network constraint at Longfield (13Ml/d);
  - Interzonal transfer (KTZ-KME): Utilise full existing transfer capacity (9Ml/d);
  - Recycling (SHZ): Tonbridge to Bewl (5.7Ml/d);
  - Storage (SHZ): Raising Bewl Reservoir 0.4m (3Ml/d).

SCREENING SUMMARY – LOW IMPACT OPTIONS

6.3.2. Several options only have effect pathways associated with them that can clearly be prevented with avoidance or mitigation measures that are commonly used and known to be available, achievable and effective (see **Appendix C**); typically these are low-probability and/or low magnitude pathways (for example, construction required across a minor up-catchment tributary of a European site) that would have historically been 'screened out with mitigation' prior to 'People over Wind'.

6.3.3. The assessment of these options is detailed in **Appendix E1**, which is 'appropriate' to the nature of the WRMP24 as a strategic plan, the option under consideration, and the scale and likelihood of any effects. **Appendix E1** also includes more specific assessments for those options that may directly affect a European sites through construction only, if those potential effects are fundamentally avoidable through project design or established engineering solutions (i.e. options with crossings of

SAC rivers, which may be avoidable through re-routing or with engineering solutions such as pipe bridges, use of existing crossings, or directional drilling methods).

6.3.4. In summary, for all of the options in **Table 5-1** to **5-3**:

- there will be no operational effects (all essentially modifications to the network or existing assets that do not require the development of new water resources or alterations to abstraction licences);
- all potential construction effects are of a scale and type that can be reliably prevented with established measures (see **Appendix C**), such that effects 'alone' would be nil or negligible and 'in combination' effects would not be expected.

6.3.5. For these options, therefore, there will be '**no adverse effects, alone or in combination**' on any of the European sites noted in **Appendix A**.

Table 6-1 – Western area options that only have potential effects that can be reliably avoided with established project-level measures

Option Name	European sites	Area
Bulk import (HSE): Havant Thicket Reservoir to Otterbourne WSW (90Ml/d)	• River Itchen SAC • River Test SAC Compensatory Habitat (River Meon) • Solent Maritime SAC • Portsmouth Harbour SPA • Solent and Southampton Water SPA • Solent and Dorset Coast SPA • Chichester and Langstone Harbours Ramsar • Portsmouth Harbour Ramsar • Solent and Southampton Water Ramsar	Western
Bulk import (HSE): PWC Source A to Otterbourne WSW (21Ml/d)	• River Itchen SAC* • Solent and Dorset Coast SPA • Solent and Southampton Water SPA • Solent and Southampton Water Ramsar • Solent Maritime SAC	Western
Bulk export (HSE): Otterbourne WSW to PWC Source A (45Ml/d)	• River Itchen SAC* • Solent and Dorset Coast SPA • Solent and Southampton Water SPA • Solent and Southampton Water Ramsar • Solent Maritime SAC	Western
Bulk import (HAZ): T2ST to Andover (20Mld)	• River Itchen SAC • River Test SAC Compensatory Habitat (River Test) (C*) • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent and Dorset Coast SPA	Western

Option Name	European sites	Area
Bulk import (HWZ): T2ST to Yew Hill (95Ml/d)	• River Itchen SAC • River Lambourn SAC* • River Test SAC Compensatory Habitat (River Test) • Kennet Valley Alderwoods SAC • Solent and Dorset Coast SPA • Kennet and Lambourn Floodplain SAC • Solent Maritime SAC • Solent and Southampton Water SPA • Solent and Southampton Water Ramsar	Western
Groundwater (HRZ): New boreholes at Romsey (4.8Ml/d)	• Mottisfont Bats SAC	Western
Groundwater (HSW): Test MAR (5.5Ml/d)	• River Test SAC Compensatory Habitat (River Test) • Solent and Southampton Water SPA • Solent and Southampton Water Ramsar • Solent Maritime SAC • Solent and Dorset Coast SPA	Western
Groundwater (HAZ): Recommission Chilbolton (0.5Ml/d)	• River Test SAC Compensatory Habitat (River Test) • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent Maritime SAC • Solent and Dorset Coast SPA	Western
Groundwater (HRZ): Remove constraints at Kings Sombourne (2.5Ml/d)	• Mottisfont Bats SAC • River Test SAC Compensatory Habitat (River Test) • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent Maritime SAC • Solent and Dorset Coast SPA	Western
Interzonal transfer (HRZ-HSW): Romsey Town and Test valve (3.1Ml/d)	• River Test SAC Compensatory Habitat (River Test) • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent Maritime SAC • Solent and Dorset Coast SPA	Western
Interzonal transfer (HSW-HRZ): Romsey Town and Test valve expansion (5Ml/d)	• River Test SAC Compensatory Habitat (River Test) • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent Maritime SAC • Solent and Dorset Coast SPA	Western
Interzonal transfer (HSE-HSW): Yew Hill WSW to River Test WSW bi-directional (60Ml/d)	• River Itchen SAC • Solent Maritime SAC • Emer Bog SAC • Mottisfont Bats SAC • Solent and Southampton Water SPA • Solent and Dorset Coast SPA • Solent and Southampton Water Ramsar	Western

Option Name	European sites	Area
Interzonal transfer (HSE-HWZ): Otterbourne WSW to Yew Hill bi-directional (74Ml/d)	• River Itchen SAC • River Test SAC Compensatory Habitat (River Test) (C*) • Solent Maritime SAC • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent and Dorset Coast SPA	Western
Interzonal transfer (HWZ-HAZ): Winchester to Andover bi-directional (15Ml/d)	• River Itchen SAC • River Test SAC Compensatory Habitat (River Test) (C*) • Solent and Dorset Coast SPA • Solent and Southampton Water Ramsar • Solent and Southampton Water SPA	Western

Table 6-2 – Central area options that only have potential effects that can be reliably avoided with established project-level measures

Option Name	European sites	Area
Bulk import (SNZ): Havant Thicket Reservoir to Pulborough (50Ml/d)	• Duncton to Bignor Escarpment SAC • Kingley Vale SAC • Arun Valley Ramsar • Arun Valley SPA • Arun Valley SAC • Solent Maritime SAC • Chichester and Langstone Harbours Ramsar • Chichester and Langstone Harbours SPA • The Mens SAC • Singleton and Cocking Tunnels SAC • Solent and Dorset Coast SPA	Central
Bulk import (SNZ): SEW RZ5 to Pulborough	• Arun Valley Ramsar • Arun Valley SAC • Arun Valley SPA • The Mens SAC • Ebernoe Common SAC • Singleton and Cocking Tunnels SAC	Central
Interzonal transfer (SNZ-SWZ): Pulborough to Worthing	• Arun Valley SPA • Arun Valley SAC • Arun Valley Ramsar • The Mens SAC	Central
Recycling (SNZ): Littlehampton WTW with river discharge (15Ml/d)	• Arun Valley Ramsar • Arun Valley SPA • Arun Valley SAC • The Mens SAC • Ebernoe Common SAC	Central

Table 6-3 – Eastern area options that only have potential effects that can be reliably avoided with established project-level measures

Option Name	European sites	Area
Bulk import (KTZ): SEW Canterbury to Near Canterbury (20Ml/d)	• Stodmarsh Ramsar • Stodmarsh SAC • Stodmarsh SPA • Thanet Coast and Sandwich Bay Ramsar • Thanet Coast and Sandwich Bay SPA	Eastern
Bulk import (SHZ): SEW RZ8 to Rye	• Dungeness SAC • Dungeness, Romney Marsh and Rye Bay SPA • Dungeness, Romney Marsh and Rye Bay Ramsar	Eastern
Bulk import (KTZ): SEW Kingston to Near Canterbury (2Ml/d)	• Thanet Coast and Sandwich Bay Ramsar • Thanet Coast and Sandwich Bay SPA	Eastern

Option Name	European sites	Area
Groundwater (SHZ): Reconfigure Rye Wells (1.5Ml/d)	• Dungeness, Romney Marsh and Rye Bay SPA • Dungeness, Romney Marsh and Rye Bay Ramsar	Eastern
Interzonal transfer (KME-KTZ): KME-KTZ bi-directional (15.8Ml/d)	• Stodmarsh Ramsar • Stodmarsh SAC • Stodmarsh SPA • Thanet Coast and Sandwich Bay Ramsar • Thanet Coast and Sandwich Bay SPA	Eastern
Recycling (SHZ): Hastings WTW to Darwell Reservoir (15.3Ml/d)	• Dungeness, Romney Marsh and Rye Bay SPA • Pevensey Levels SAC • Pevensey Levels Ramsar • Dungeness, Romney Marsh and Rye Bay Ramsar	Eastern

OTHER OPTION ASSESSMENTS

6.3.6. More detailed appropriate assessments (**Appendices E2 – E15**) have been completed for those options with construction or operational effects on a site that are potentially more difficult to avoid (i.e. direct or close-proximity construction effects, or environmental changes that are inherent to the operation of the scheme).

6.3.7. Options are grouped together in **Appendices E2 – E15** if they are modular or phased in some way (i.e. fundamentally the same scheme or type of scheme at the same location), as follows:

Table 6-4 – Options / sites subject to more detailed AA

Option Name*	European sites subject to detailed AA	Area	Appendix	Table
Desalination (KME): Isle of Sheppey	• Medway Estuary and Marshes Ramsar • Medway Estuary and Marshes SPA • Outer Thames Estuary SPA • Thames Estuary and Marshes Ramsar • Thames Estuary and Marshes SPA • The Swale Ramsar • The Swale SPA	Eastern	E7	**Table 6-5**
Desalination (KMW): Thames Estuary	• Thames Estuary and Marshes Ramsar • Thames Estuary and Marshes SPA	Eastern	E8	**Table 6-6**
Desalination (KTZ): East Thanet	• Margate and Long Sands SAC • Outer Thames Estuary SPA • Stodmarsh SPA • Thanet Coast and Sandwich Bay Ramsar • Thanet Coast and Sandwich Bay SPA • Thanet Coast SAC	Eastern	E6	**Table 6-7**

Option Name*	European sites subject to detailed AA	Area	Appendix	Table
Desalination (SWZ): Tidal River Arun (10Ml/d)	• Arun Valley SPA • Arun Valley Ramsar • Solent and Dorset Coast SPA	Central	E4	**Table** 6-8
Groundwater (IOW): New boreholes at Newchurch (LGS) (1.9Ml/d)	• Solent and Southampton Water Ramsar • Solent and Southampton Water SPA • Solent and Isle of Wight Lagoons SAC	Western	E5	**Table** 6-9
Groundwater (SNZ): New borehole at Petworth (4Ml/d)	• Arun Valley Ramsar • Arun Valley SPA • Arun Valley SAC	Central	E2	**Table** 6-10
Groundwater (SNZ): Petersfield Refurbishment (1.6Ml/D)	• Arun Valley Ramsar • Arun Valley SPA • Arun Valley SAC	Central	E13	**Table 6-11**
Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d)	• Arun Valley Ramsar • Arun Valley SPA • Arun Valley SAC	Central	E14	**Table 6-12**
Groundwater (KME): Recommissio n Gravesend (2.7Ml/d)	• Thames Estuary and Marshes Ramsar • Thames Estuary and Marshes SPA	Eastern	E15	**Table 6-13**
Recycling (HSE): Recharge of Havant Thicket from recycled water from Portsmouth Harbour WTW (60Ml/d)	• Solent and Dorset Coast SPA • Chichester and Langstone Harbours SPA • Chichester and Langstone Harbours Ramsar • Portsmouth Harbour Ramsar • Solent and Isle of Wight Lagoons SAC • Portsmouth Harbour SPA • Solent Maritime SAC	Western	E11	**Table 6-14**
Recycling (IOW): Sandown (8.5Ml/d)	• Solent and Dorset Coast SPA • South Wight Maritime SAC • Solent and Southampton Water SPA • Solent and Southampton Water Ramsar • Solent and Isle of Wight Lagoons SAC	Western	E12	**Table 6-15**

Option Name*	European sites subject to detailed AA	Area	Appendix	Table
Recycling (KME): Sittingbourne industrial water reuse (7.5Ml/d)	• The Swale SPA • The Swale Ramsar • Medway Estuary and Marshes SPA • Medway Estuary and Marshes Ramsar	Eastern	E10	**Table** 6-16
Recycling (KMW): Medway WTW to lake (14Ml/d)	• Medway Estuary and Marshes SPA • Medway Estuary and Marshes Ramsar	Eastern	E9	**Table** 6-17
Recycling (SNZ): Horsham with storage at Pulborough (6.8Ml/d)	• Arun Valley Ramsar • Arun Valley SPA • Arun Valley SAC	Central	E3	**Table 6-18**

* Note, options arranged alphabetically rather than by area

Table 6-5 – Appropriate Assessment Summary: Desalination (KME): Isle of Sheppey

European site	Conclusion	Summary
Benfleet and Southend Marshes Ramsar	No AE	Adverse effects alone will not occur (distance to site; construction effects avoidable with normal measures; environmental changes associated with operation very unlikely to extend to the site); residual effects after mitigation (etc.) likely to be nil or very small, so low risk of i/c effects.
Benfleet and Southend Marshes SPA	No AE	Adverse effects alone will not occur (distance to site; construction effects avoidable with normal measures; environmental changes associated with operation very unlikely to extend to the site); residual effects after mitigation (etc.) likely to be nil or very small, so low risk of i/c effects.
Essex Estuaries SAC	No AE	Adverse effects alone will not occur (distance to site; construction effects avoidable with normal measures; environmental changes associated with operation very unlikely to extend to the site); residual effects after mitigation (etc.) likely to be nil or very small, so low risk of i/c effects.
Foulness (Mid-Essex Coast Phase 5) Ramsar	No AE	Adverse effects alone will not occur (distance to site; construction effects avoidable with normal measures; environmental changes associated with operation very unlikely to extend to the site); residual effects after mitigation (etc.) likely to be nil or very small, so low risk of i/c effects.
Foulness (Mid-Essex Coast Phase 5) SPA	No AE	Adverse effects alone will not occur (distance to site; construction effects avoidable with normal measures; environmental changes associated with operation very unlikely to extend to the site); residual effects after mitigation (etc.) likely to be nil or very small, so low risk of i/c effects.
Medway Estuary and Marshes Ramsar	No AE*	Adverse effects likely avoidable based on proxy data and evidence from similar sites / schemes, although there are residual uncertainties that cannot be resolved at the plan level. The operation of the scheme may affect the supporting habitats of the qualifying features, although evidence from elsewhere indicates that the zone of environmental change will be small (a would be expected to extend to the site), and could be minimised further by appropriate location of the outfall (taking account of local hydrodynamics) and operational practice. Construction effects are avoidable with normal measures.
Medway Estuary and Marshes SPA	No AE*	Adverse effects likely avoidable based on proxy data and evidence from similar sites / schemes, although there are residual uncertainties that cannot be resolved at the plan level. The operation of the scheme may affect the supporting habitats of the qualifying features, although evidence from elsewhere indicates that the zone of environmental change will be small (a would be expected to extend to the site), and could be minimised further by appropriate location of the outfall (taking account of local hydrodynamics) and operational practice. Construction effects are avoidable with normal measures.

European site	Conclusion	Summary
Outer Thames Estuary SPA	No AE	Adverse effects almost certainly avoidable based on proxy data and evidence from similar sites / schemes; site interest features likely to have a low sensitivity and exposure to the anticipated magnitude of environmental change associated with operation, assuming appropriate siting of outfall and operational parameters in relation to discharges. Construction effects unlikely and avoidable with established measures.
Thames Estuary and Marshes Ramsar	No AE*	Adverse effects likely avoidable based on proxy data and evidence from similar sites / schemes, although there are residual uncertainties that cannot be resolved at the plan level. The operation of the scheme may affect the supporting habitats of the qualifying features, although evidence from elsewhere indicates that the zone of environmental change will be small (a would be expected to extend to the site), and could be minimised further by appropriate location of the outfall (taking account of local hydrodynamics) and operational practice. Construction effects are avoidable with normal measures.
Thames Estuary and Marshes SPA	No AE*	Adverse effects likely avoidable based on proxy data and evidence from similar sites / schemes, although there are residual uncertainties that cannot be resolved at the plan level. The operation of the scheme may affect the supporting habitats of the qualifying features, although evidence from elsewhere indicates that the zone of environmental change will be small (a would be expected to extend to the site), and could be minimised further by appropriate location of the outfall (taking account of local hydrodynamics) and operational practice. Construction effects are avoidable with normal measures.
The Swale Ramsar	No AE	The Swale will have a low exposure to operational effects due to its location relative to the outfall, and adverse effects on the site habitats would not be expected; the mobile features of the site may be exposed to operational effects when utilising the Medway Estuary and Marshes SPA/Ramsar, depending on the precise location and operational parameters of the outfall / intake; however, this can be located further from these sites if required, and operation of the desal plant would be intermittent and operational parameters could be defined to minimise environmental changes further. With regard to construction, adverse effects on the Swale habitats or species can be avoided with established measures.
The Swale SPA	No AE	The Swale will have a low exposure to operational effects due to its location relative to the outfall, and adverse effects on the site habitats would not be expected; the mobile features of the site may be exposed to operational effects when utilising the Medway Estuary and Marshes SPA/Ramsar, depending on the precise location and operational parameters of the outfall / intake; however, this can be located further from these sites if required, and operation of the desal plant would be intermittent and operational parameters could be defined to minimise environmental changes further. With regard to construction, adverse effects on the Swale habitats or species can be avoided with established measures.

Table 6-6 – Appropriate Assessment Summary: Desalination (KME): Thames Estuary

European site	Conclusion	Summary
Thames Estuary and Marshes Ramsar	No AE*	Adverse effects likely avoidable based on proxy data and evidence from similar sites / schemes, although there are residual uncertainties that cannot be resolved at the plan level. The operation of the scheme may affect the supporting habitats of the qualifying features, although evidence from elsewhere indicates that the zone of environmental change will be small (a would be expected to extend to the site), and could be minimised further by appropriate location of the outfall (taking account of local hydrodynamics) and operational practice. Construction effects are avoidable with normal measures.
Thames Estuary and Marshes SPA	No AE*	Adverse effects likely avoidable based on proxy data and evidence from similar sites / schemes, although there are residual uncertainties that cannot be resolved at the plan level. The operation of the scheme may affect the supporting habitats of the qualifying features, although evidence from elsewhere indicates that the zone of environmental change will be small (a would be expected to extend to the site), and could be minimised further by appropriate location of the outfall (taking account of local hydrodynamics) and operational practice. Construction effects are avoidable with normal measures.

Table 6-7 – Appropriate Assessment Summary: Desalination (KTZ): East Thanet

European site	Conclusion	Summary
Margate and Long Sands SAC	No AE*	Adverse effects almost certainly avoidable based on proxy data and evidence from similar sites / schemes, although there are residual uncertainties that cannot be resolved at the plan level. In summary, the outfall for the plant is likely to be located in or close to this site (although location outside the site will be possible). The interest features of the site are likely to have a low sensitivity to both construction and operation, being essentially low-diversity highly-mobile sandbank habitats that will be resilient to short-term perturbance associated with construction; the environmental changes associated with operation effects are likely to be limited in spatial extent (based on other desalination schemes), and the features will have a low sensitivity to this. There are inevitably some uncertainties due that can only be resolved with detailed design (e.g. sediment deposition and hydrodynamics may be affected if the pipeline is not buried), but these appear avoidable or mitigatable, such that adverse effects on integrity do not appear to be an unavoidable outcome of the option.
Outer Thames Estuary SPA	No AE*	Adverse effects almost certainly avoidable based on proxy data and evidence from similar sites / schemes, although there are residual uncertainties that cannot be resolved at the plan level. In summary, the outfall for the plant will be located in this site. The qualifying features of the site may be vulnerable to construction disturbance (although this is clearly avoidable with normal measures) or through impacts on the supporting habitats (i.e. sandbanks over which they forage). However, the sandbank supporting habitats are likely to have a low sensitivity to both construction and operation, being essentially low-diversity highly-mobile sandbank habitats that will be resilient to short-term perturbance associated with construction; the environmental changes associated with operation effects are likely to be limited in spatial extent (based on other desalination schemes), and the features will have a low sensitivity to this. The extent of any effects will also be very small (arguably inconsequential) in relation to the size of the site. There are inevitably some uncertainties due to the long timescales that can only be resolved with detailed design (e.g. sediment deposition and hydrodynamics may be affected if the pipeline is not buried), but these appear avoidable or mitigatable, such that adverse effects on integrity do not appear to be an unavoidable outcome of the option.
Stodmarsh SPA	No AE	Adverse effects alone will not occur; qualifying features of the SPA will not make substantive use of the coastal habitats of the Thanet Coast and Sandwich Bay SPA/Ramsar based on typical habitat preferences; some of the terrestrial wetland habitats near Birchington (hence potentially affected by the transfer to Fleete) may be periodically used by species associated with Stodmarsh, but these areas are unlikely to be critical to the functional integrity of Stodmarsh SPA and effects will be temporary during construction and avoidable with established measures (e.g. timing works). Residual effects after mitigation (etc.) likely to be nil or very small, so low risk of i/c effects.
Thanet Coast and Sandwich Bay Ramsar	No AE	Adverse effects alone will not occur (construction effects clearly avoidable with scheme-level measures that are known to be available, achievable and likely to be effective i.e. it will be possible to avoid direct effects on this site with directional drill or similar, and other construction effects can be managed/avoided)); operational effects will not

European site	Conclusion	Summary
		occur, based on the likely distance to the outfall location and consequent low exposure / sensitivity of qualifying features or supporting habitats to the likely magnitude of environmental change; residual effects after mitigation (etc.) likely to be nil or very small, so low risk of i/c effects.
Thanet Coast and Sandwich Bay SPA	No AE	Adverse effects alone will not occur (construction effects clearly avoidable with scheme-level measures that are known to be available, achievable and likely to be effective i.e. it will be possible to avoid direct effects on this site with directional drill or similar, and other construction effects can be managed/avoided)); operational effects will not occur, based on the likely distance to the outfall location and consequent low exposure / sensitivity of qualifying features or supporting habitats to the likely magnitude of environmental change; residual effects after mitigation (etc.) likely to be nil or very small, so low risk of i/c effects.
Thanet Coast SAC	No AE	Adverse effects alone will not occur (construction effects clearly avoidable with scheme-level measures that are known to be available, achievable and likely to be effective i.e. it will be possible to avoid direct effects on this site with directional drill or similar, and other construction effects can be managed/avoided); operational effects will not occur, based on the likely distance to the outfall location; residual effects after mitigation (etc.) likely to be nil or very small, so low risk of i/c effects.

Table 6-8 – Appropriate Assessment Summary: Desalination (SWZ): Tidal River Arun

European site	Conclusion	Summary
Arun Valley Ramsar	No AE	Adverse effects alone will not occur (no pathways, magnitude of change too small, etc.) or are clearly avoidable with scheme-level measures that are known to be available, achievable and likely to be effective; residual effects after mitigation (etc.) likely to be nil or very small, so low risk of i/c effects.
Arun Valley SPA	No AE	Adverse effects alone will not occur (no pathways, magnitude of change too small, etc.) or are clearly avoidable with scheme-level measures that are known to be available, achievable and likely to be effective; residual effects after mitigation (etc.) likely to be nil or very small, so low risk of i/c effects.
Solent and Dorset Coast SPA	No AE	The likely location of the discharge is located in the English Channel in a high-dispersion environment, over 4km from the boundary of the site; as the site was recently designated to cover those foraging areas critical for breeding terns associated with the Solent harbour sites, it is reasonable to conclude that (a) the boundary of the site accurately reflects the core areas of functional habitat associated with the breeding sites and (b) that areas outside this boundary do not provide core areas of feeding habitat. As a result adverse effects from operation would not be expected. Construction effects are avoidable with normal measures.

Table 6-9 – Appropriate Assessment Summary: Groundwater (IOW): New boreholes at Newchurch (LGS) (1.9Ml/d)

European site	Conclusion	Summary
Solent and Isle of Wight Lagoons SAC	No AE	This option proposes replacing all three boreholes so that the site can operate to its licensed capacity (currently operating at 1.5Ml/d instead of 6Ml/d). The abstraction is from the Newchurch Lower Greensand boreholes and not from the existing Newchurch Chalk Well and Adit. Effects on flows in Yar due to GW drawdown cannot be accurately stated due to absence of detailed groundwater modelling for the source, but are likely to be small as much of the baseflow in the Yar is from the chalk rather than the Lower Greensand; there is an Non-Deterioration investigation timetabled to complete in 2027 that is likely to confirm this. Flows from the Yar into Bembridge harbour are managed by a sluice, and effects on the marine components of the SPA/Ramsar are expected to be nominal in relation to the dominance of tidal influence in the harbour. With regard to the Brading Marshes components of the SPA/Ramsar, these are below sea level so are protected from seawater inundation by the seawall and tidal gates at the end of the Yar; water levels in Brading Marshes are largely controlled through direct management (sluices etc.) with some inundation occurring when the river is tidally locked, and are so not directly dependent on flows etc. within the Yar. Any effects of the option on water-supply to Brading Marshes will therefore be very small, and substantially moderated in any case by the interventionist water level management of the marshes and by other surface water and rainfall inputs to the marshes. As noted, there is likely to be little / no exposure to operational effects due to location / relationship of the lagoon network adjacent to Brading Marshes and Bembridge Harbour relative to Yar (in summary, two of the lagoons are seawater-dominated, and essentially have salinities similar to seawater. The other two lagoons receive freshwater input from Brading Marshes and are hence brackish or low-salinity, but the water levels in Brading Marshes are largely controlled through direct management (sluices etc.) with some inundation occurring when the river is tidally locked, and so not directly dependent on flows etc. within the Yar. As a result, adverse effects are not anticipated as a result of operation.
Solent and Southampton Water Ramsar	No AE	This option proposes replacing all three boreholes so that the site can operate to its licensed capacity (currently operating at 1.5Ml/d instead of 6Ml/d). The abstraction is from the Newchurch Lower Greensand boreholes and not from the existing Newchurch Chalk Well and Adit. Effects on flows in Yar due to GW drawdown cannot be accurately stated due to absence of detailed groundwater modelling for the source, but are likely to be small as much of the baseflow in the Yar is from the chalk rather than the Lower Greensand; there is an Non-Deterioration investigation timetabled to complete in 2027 that is likely to confirm this. Flows from the Yar into Bembridge harbour are managed by a sluice, and effects on the marine components of the SPA/Ramsar are expected to be nominal in relation to the dominance of tidal influence in the harbour. With regard to the Brading Marshes components of the SPA/Ramsar, these are below sea level so are protected from seawater inundation by the seawall and tidal gates at the end of the Yar; water levels in Brading Marshes are largely controlled through direct management (sluices etc.) with some inundation occurring when the river is tidally locked, and are so not directly dependent on flows etc. within the Yar. Any effects of the option on water-supply to Brading Marshes will therefore be very small, and substantially

European site	Conclusion	Summary
		moderated in any case by the interventionist water level management of the marshes and by other surface water and rainfall inputs to the marshes. Therefore, adverse effects are not anticipated as a result of operation.
Solent and Southampton Water SPA	No AE	This option proposes replacing all three boreholes so that the site can operate to its licensed capacity (currently operating at 1.5Ml/d instead of 6Ml/d). The abstraction is from the Newchurch Lower Greensand boreholes and not from the existing Newchurch Chalk Well and Adit. Effects on flows in Yar due to GW drawdown cannot be accurately stated due to absence of detailed groundwater modelling for the source, but are likely to be small as much of the baseflow in the Yar is from the chalk rather than the Lower Greensand; there is an Non-Deterioration investigation timetabled to complete in 2027 that is likely to confirm this. Flows from the Yar into Bembridge harbour are managed by a sluice, and effects on the marine components of the SPA/Ramsar are expected to be nominal in relation to the dominance of tidal influence in the harbour. With regard to the Brading Marshes components of the SPA/Ramsar, these are below sea level so are protected from seawater inundation by the seawall and tidal gates at the end of the Yar; water levels in Brading Marshes are largely controlled through direct management (sluices etc.) with some inundation occurring when the river is tidally locked, and are so not directly dependent on flows etc. within the Yar. Any effects of the option on water-supply to Brading Marshes will therefore be very small, and substantially moderated in any case by the interventionist water level management of the marshes and by other surface water and rainfall inputs to the marshes. Therefore, adverse effects are not anticipated as a result of operation.

Table 6-10 – Appropriate Assessment Summary: Groundwater (SNZ): New borehole at Petworth (4Ml/d)

European site	Conclusion	Summary
Arun Valley Ramsar	No AE	The hydrological impact of the Petworth abstraction on the Arun Valley sites alone is considered to be negligible, particularly in relation to the dominant effect of groundwater supply to the designated sites and the active management of water levels within the sites; the predicted flow reductions in the Arun will not be of sufficient magnitude to adversely affect the site alone either directly or through secondary mechanisms such as via impacts on water quality. It is considered that there is sufficient confidence to enable a conclusion of no adverse effect on the integrity of the Arun Valley SPA, Arun Valley Ramsar and Arun Valley SAC to be drawn for the WRMP HRA in relation to this option, alone and in combination. Construction effects can be reliably avoided with established measures.
Arun Valley SAC	No AE	The hydrological impact of the Petworth abstraction on the Arun Valley sites alone is considered to be negligible, particularly in relation to the dominant effect of groundwater supply to the designated sites and the active management of water levels within the sites; the predicted flow reductions in the Arun will not be of sufficient magnitude to adversely affect the site alone either directly or through secondary mechanisms such as via impacts on water quality. It is considered that there is sufficient confidence to enable a conclusion of no adverse effect on the integrity of the Arun Valley SPA, Arun Valley Ramsar and Arun Valley SAC to be drawn for the WRMP HRA in relation to this option, alone and in combination. Construction effects can be reliably avoided with established measures.
Arun Valley SPA	No AE	The hydrological impact of the Petworth abstraction on the Arun Valley sites alone is considered to be negligible, particularly in relation to the dominant effect of groundwater supply to the designated sites and the active management of water levels within the sites; the predicted flow reductions in the Arun will not be of sufficient magnitude to adversely affect the site alone either directly or through secondary mechanisms such as via impacts on water quality. It is considered that there is sufficient confidence to enable a conclusion of no adverse effect on the integrity of the Arun Valley SPA, Arun Valley Ramsar and Arun Valley SAC to be drawn for the WRMP HRA in relation to this option, alone and in combination. Construction effects can be reliably avoided with established measures.
Ebernoe Common SAC	No AE	Adverse effects alone will not occur (no pathways, magnitude of change too small, etc.) or are clearly avoidable with scheme-level measures that are known to be available, achievable and likely to be effective; residual effects after mitigation (etc.) likely to be nil or very small, so low risk of i/c effects.
The Mens SAC	No AE	Adverse effects alone will not occur (no pathways, magnitude of change too small, etc.) or are clearly avoidable with scheme-level measures that are known to be available, achievable and likely to be effective; residual effects after mitigation (etc.) likely to be nil or very small, so low risk of i/c effects.

Table 6-11 – Appropriate Assessment Summary: Groundwater (SNZ): Petersfield Refurbishment (1.6Ml/D)

European site	Conclusion	Summary
Arun Valley Ramsar	No AE	Theoretical effect pathways exist for the Arun Valley SAC / SPA / Ramsar if abstraction from the boreholes impacts flows in the River Rother (hence the River Arun where it is hydrologically connected to the designated sites). Noting that the Pulborough groundwater abstractions, and potential pathways of impact, are also being considered as part of the ongoing Pulborough Environmental WINEP study that is due to complete at the end of June 2025. The appropriate assessment has indicated that the effects of the abstraction in these sites 'alone' will be very limited, and will not adversely affect the integrity of the site; this is principally because: • the effect of the abstraction on flows in the River Arun would be nominal (less than 1% at all except the lowest flows), and only if it is assumed that the entirety of the abstraction is expressed in river flows; and • although water from the River Arun enters the Arun valley sites, they are not understood to be fundamentally reliant on flooding (etc.) from the River Arun for maintenance of favourable condition for a range of reasons, including the role played by active water level management within the site and inputs of freshwater water from other sources (this is consistent with the position from the Pulborough Environmental WINEP investigations). In combination effects with other WRMP24 options are arguably possible, including WRMP19 option Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d) (see **Table 6-12**), Recycling (SNZ): Horsham with storage at Pulborough (6.8Ml/d) (see **Table 6-18**) and Groundwater (SNZ): New borehole at Petworth (4Ml/d) (see **Table 6-10**) as these will cumulatively have a potentially notable effect on the lowest flows within the River Arun. However, adverse effects are not considered an unavoidable consequence of these options as: • mitigation measures are likely to be available for any flow impacts (given the nature of the river / designated site relationship), should further evidence suggest these are likely to be adverse (e.g. those identified for the Pulborough Stages 1 to 3 drought option in SWS's revised draft Drought Plan 2022 would also be effective and potentially appropriate for the WRMP option) ; and • the largest of these abstractions (Horsham WTW) would not be required until 2058, with Petworth not required until 2031 (i.e. post-conclusion of the current investigations) and so time is available within the WRMP and AMP cycles to identify alternative options should these not prove deliverable.
Arun Valley SAC	No AE	
Arun Valley SPA	No AE	

Table 6-12 – Appropriate Assessment Summary: Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d)

European site	Conclusion	Summary
Arun Valley Ramsar	No AE	Theoretical effect pathways exist for the Arun Valley SAC / SPA / Ramsar if abstraction from the boreholes impacts flows in the River Stor (hence the River Arun where it is hydrologically connected to the designated sites). Noting that the Pulborough groundwater abstraction, and potential pathways of impact, are also being considered as part of the ongoing Pulborough Environmental WINEP study, that is due to complete at the end of March 2025. The appropriate assessment has indicated that the effects of the abstraction in these sites 'alone' will be negligible, and not adversely affect the integrity of the site; this is principally because • it is not considered possible for the abstraction to directly influence spring flows within the European sites and hence GWDTEs[46]. • the effect of the abstraction on flows in the River Arun would be nominal (less than 1% at all except the lowest flows), and only if it is assumed that the entirety of the abstraction is expressed in river flows; • although water from the River Arun enters the Arun valley sites, they are not understood to be fundamentally reliant on flooding (etc.) from the River Arun for maintenance of favourable condition for a range of reasons, including the role played by active water level management within the site and inputs of freshwater water from other sources (this is consistent with the position from the Pulborough Basin WINEP investigations); and • there does not appear to be substantive connectivity between the River Stor and the designated sites (no sluices are noted in this section of the site based on the Pulborough Basin investigations). In combination effects with other WRMP24 options are arguably possible, including WRMP19 option Groundwater (SNZ): Petersfield Refurbishment (1.6Ml/D) (see **Table 6-11**), Recycling (SNZ): Horsham with storage at Pulborough (6.8Ml/d) (see **Table 6-18**) and Groundwater (SNZ): New borehole at Petworth (4Ml/d) (see **Table 6-10**) as these will cumulatively have a potentially notable effect on the lowest flows within the River Arun. However, adverse effects are not considered an unavoidable consequence of these options as
Arun Valley SAC	No AE	
Arun Valley SPA	No AE	

[46] Southern Water is currently undertaking WINEP investigations into the impact of groundwater abstractions from Pulborough on the GWDTEs of the Arun Valley sites, including the development of groundwater models. The consented abstraction from West Chiltington was initially considered during the scoping phases of this study, but was excluded as there is no pathway for groundwater abstractions from this source to directly affect GWTDEs within the Arun Valley sites due to the absence of connectivity (in summary, the Pulborough abstractions and the GWTDEs of the Arun Valley sites are associated with groundwater in the Folkestone Lower Greensand formations, whereas West Chiltington abstracts from the Hythe beds).

European site	Conclusion	Summary
		• mitigation measures are likely to be available for any flow impacts (given the nature of the river / designated site relationship), should further evidence suggest these are likely to be adverse (e.g. those identified for the Pulborough Stages 1 to 3 drought option in SWS's Drought Plan 2022 would also be effective and potentially appropriate for the WRMP option) ; and • the largest of these abstractions (Horsham WTW) would not be required until 2058, with Petworth not required until 2031 (i.e. post-conclusion of the current investigations) and so time is available within the WRMP and AMP cycles to identify alternative options should these not prove deliverable.

Table 6-13 – Appropriate Assessment Summary: Groundwater (KME): Recommission Gravesend (2.7Ml/d)

European site	Conclusion	Summary
Thames Estuary and Ramsar SPA	No AE	A plausible effect pathway exists for this option to lead to environmental changes associated with groundwater drawdown that is not quantified at this stage. Noting that this potential impact pathway, is also being considered as part of the ongoing North Kent Marshes WINEP study, that is due to complete in 2026.
Thames Estuary and Ramsar Ramsar	No AE	The appropriate assessment has concluded that the potential effect 'alone' will be small or negligible, because whilst there is likely to be some contribution of groundwater baseflow to the nearest SPA/Ramsar components, the water level within the marshes is mainly controlled by the use of weirs, sluices and outfalls. For this reason, any changes may be effectively mitigated through ongoing active management of water level within the marshes such that at the plan level adverse effects upon integrity are concluded not likely. At the project level, additional investigation will be necessary likely drawing upon the results of the current WINEP investigation, to include detailed groundwater modelling to confirm any requirement or otherwise, for mitigation.

Table 6-14 – Appropriate Assessment Summary: Recycling (HSE): Recharge of Havant Thicket from recycled water from Portsmouth Harbour WTW (60Ml/d)

European site	Conclusion	Summary
Chichester and Langstone Harbours Ramsar	No AE	This option has been subject to project level design and investigations through the SRO gated process, which provides the best-available environmental data and assessment for the option (see https://www.southernwater.co.uk/media/5424/gate-2-annex-3-havant-thicket-technical-redacted.pdf). In summary, these assessments have concluded that adverse effects will not occur as a result of the option, or can almost certainly be avoided, subject to the implementation of mitigation measures identified through the SRO gated process, and the HRA of the WRMP24 necessarily reflects this.
Chichester and Langstone Harbours SPA	No AE	This option has been subject to project level design and investigations through the SRO gated process, which provides the best-available environmental data and assessment for the option (see https://www.southernwater.co.uk/media/5424/gate-2-annex-3-havant-thicket-technical-redacted.pdf). In summary, these assessments have concluded that adverse effects will not occur as a result of the option, or can almost certainly be avoided, subject to the implementation of mitigation measures identified through the SRO gated process, and the HRA of the WRMP24 necessarily reflects this.
Portsmouth Harbour Ramsar	No AE	This option has been subject to project level design and investigations through the SRO gated process, which provides the best-available environmental data and assessment for the option (see https://www.southernwater.co.uk/media/5424/gate-2-annex-3-havant-thicket-technical-redacted.pdf). In summary, these assessments have concluded that adverse effects will not occur as a result of the option, or can almost certainly be avoided, subject to the implementation of mitigation measures identified through the SRO gated process, and the HRA of the WRMP24 necessarily reflects this.
Portsmouth Harbour SPA	No AE	This option has been subject to project level design and investigations through the SRO gated process, which provides the best-available environmental data and assessment for the option (see https://www.southernwater.co.uk/media/5424/gate-2-annex-3-havant-thicket-technical-redacted.pdf). In summary, these assessments have concluded that adverse effects will not occur as a result of the option, or can almost certainly be avoided, subject to the implementation of mitigation measures identified through the SRO gated process, and the HRA of the WRMP24 necessarily reflects this.
River Test SAC Compensatory Habitat (River Meon)	No AE	This option has been subject to project level design and investigations through the SRO gated process, which provides the best-available environmental data and assessment for the option (see https://www.southernwater.co.uk/media/5424/gate-2-annex-3-havant-thicket-technical-redacted.pdf). In summary, these assessments have concluded that adverse effects will not occur as a result of the option, or can almost certainly be avoided, subject to the implementation of mitigation measures identified through the SRO gated process,

European site	Conclusion	Summary
		and the HRA of the WRMP24 necessarily reflects this. Standard best practice measures during construction are expected to be fully effective such that adverse effects upon the River Test SAC Compensatory Habitat (River Meon) can be ruled out.
Solent and Dorset Coast SPA	No AE	This option has been subject to project level design and investigations through the SRO gated process, which provides the best-available environmental data and assessment for the option (see https://www.southernwater.co.uk/media/5424/gate-2-annex-3-havant-thicket-technical-redacted.pdf). In summary, these assessments have concluded that adverse effects will not occur as a result of the option, or can almost certainly be avoided, subject to the implementation of mitigation measures identified through the SRO gated process, and the HRA of the WRMP24 necessarily reflects this.
Solent and Isle of Wight Lagoons SAC	No AE	This option has been subject to project level design and investigations through the SRO gated process, which provides the best-available environmental data and assessment for the option (see https://www.southernwater.co.uk/media/5424/gate-2-annex-3-havant-thicket-technical-redacted.pdf). In summary, these assessments have concluded that adverse effects will not occur as a result of the option, or can almost certainly be avoided, subject to the implementation of mitigation measures identified through the SRO gated process, and the HRA of the WRMP24 necessarily reflects this.
Solent Maritime SAC	No AE	This option has been subject to project level design and investigations through the SRO gated process, which provides the best-available environmental data and assessment for the option (see https://www.southernwater.co.uk/media/5424/gate-2-annex-3-havant-thicket-technical-redacted.pdf). In summary, these assessments have concluded that adverse effects will not occur as a result of the option, or can almost certainly be avoided, subject to the implementation of mitigation measures identified through the SRO gated process, and the HRA of the WRMP24 necessarily reflects this.

Table 6-15 – Appropriate Assessment Summary: Recycling (IOW): Sandown (8.5Ml/d)

European site	Conclusion	Summary
BriddlesLittlehampton Copses SAC	No AE	Adverse effects alone will not occur (no pathways, magnitude of change too small, etc.) or are clearly avoidable with scheme-level measures that are known to be available, achievable and likely to be effective; residual effects after mitigation (etc.) likely to be nil or very small, so low risk of i/c effects.
Solent and Dorset Coast SPA	No AE	This site will have a low exposure to potential environmental changes in the Yar due to its location and the dominance of marine influences. Construction effects can be avoided with established measures; environmental changes associated with operation are expected to be effectively nil as (a) recycled water in the Yar will be treated to an appropriate standard and used on a put and take basis, and (b) discharges from the outfall (the existing Sandown WwTW LSO) into the English Channel will have a marginally higher salinity (only relative to existing discharges; salinity will be substantially less than seawater) and higher concentrations of some nutrient (etc.) determinands as a result of reduced discharge volumes (total nutrient load will not change), although this discharge will be to a high dispersal environment and so quickly attenuated (far-field effects from a large 'plume' would not therefore be anticipated).
Solent and Isle of Wight Lagoons SAC	No AE	This site will have a low exposure to low magnitude environmental changes in the Yar. Construction effects can be avoided with established measures. Environmental changes associated with operation are expected to be negligible and not adverse as (a) recycled water in the Yar will be treated to an appropriate standard and used on a put and take basis in the river above the boundary of this site; (b) the connectivity of the Yar with Brading Marshes SSSI (hence terrestrial components of Solent and Southampton Water SPA/Ramsar and Solent and Isle of Wight Lagoons SAC) is low, and evidence suggests that the interest features of the SPA/Ramsar and SAC associated with Brading Marshes are not fundamentally reliant on flows within the Yar due to the separation of the river from the marshes and the direct management of water levels across the marshes (sluices etc.). The lagoons will not be exposed to the discharges from the outfall (the existing Sandown WwTW LSO).
Solent and Southampton Water Ramsar	No AE	This site will have a low exposure to low magnitude environmental changes in the Yar. Construction effects can be avoided with established measures. Environmental changes associated with operation are expected to be negligible and not adverse as (a) recycled water in the Yar will be treated to an appropriate standard and used on a put and take basis in the river above the boundary of this site; (b) the connectivity of the Yar with Brading Marshes SSSI (hence terrestrial components of Solent and Southampton Water SPA/Ramsar and Solent and Isle of Wight Lagoons SAC) is low, and evidence suggests that the interest features of the SPA/Ramsar and SAC associated with Brading Marshes are not fundamentally reliant on flows within the Yar due to the separation of the river from the marshes and the direct management of water levels across the marshes (sluices etc.); and (c) the discharges from the outfall (the existing Sandown WwTW LSO) will be to a high dispersal environment and so quickly attenuated (far-field effects from a large 'plume' would not therefore be anticipated for this site).

European site	Conclusion	Summary
Solent and Southampton Water SPA	No AE	This site will have a low exposure to low magnitude environmental changes in the Yar. Construction effects can be avoided with established measures. Environmental changes associated with operation are expected to be negligible and not adverse as (a) recycled water in the Yar will be treated to an appropriate standard and used on a put and take basis in the river above the boundary of this site; (b) the connectivity of the Yar with Brading Marshes SSSI (hence terrestrial components of Solent and Southampton Water SPA/Ramsar and Solent and Isle of Wight Lagoons SAC) is low, and evidence suggests that the interest features of the SPA/Ramsar and SAC associated with Brading Marshes are not fundamentally reliant on flows within the Yar due to the separation of the river from the marshes and the direct management of water levels across the marshes. (sluices etc.); and (c) the discharges from the outfall (the existing Sandown WwTW LSO) will be to a high dispersal environment and so quickly attenuated (far-field effects from a large 'plume' would not therefore be anticipated for this site).
South Wight Maritime SAC	No AE	This site will have a very low exposure to potential environmental changes in the Yar due to its location outside Bembridge harbour and the dominance of marine influences. Construction effects can be avoided with established measures; environmental changes associated with operation are expected to be effectively nil as (a) recycled water in the Yar will be treated to an appropriate standard and used on a put and take basis, and (b) discharges from the outfall (the existing Sandown WwTW LSO) into the English Channel may have a marginally higher salinity (only relative to existing discharges; salinity will be substantially less than seawater) and higher concentrations of some nutrient (etc.) determinands as a result of reduced discharge volumes (total nutrient load will not change however), but this discharge will be to a high dispersal environment and so quickly attenuated (far-field effects from a large 'plume' would not therefore be anticipated); the features of the site will have a very low sensitivity to the anticipated magnitude of change associated with the discharge to the marine environment.

Table 6-16 – Appropriate Assessment Summary: Recycling (KME): Sittingbourne industrial water reuse (7.5Ml/d)

European site	Conclusion	Summary
Medway Estuary and Marshes Ramsar	No AE	This option was assessed as having no adverse effects at WRMP19 and there have been no substantive amendments in either the scheme or the environmental baseline to alter this conclusion. In summary, **the net effect of the scheme operation would be to reduce non-saline inputs to Milton Creek from Sittingbourne WwTW by ~7.5Mld; discharges from the WwTW are likely to form a signific**ant component of the non-saline flows in this creek (the permitted discharge of recycled water is ~118Ml/d) and the volumes recovered through recycling will typically be a small proportion of this (note, a proportion of this water would still enter the Swale and hence potentially the Medway via the paper mill post-process discharge, although the paper-making process will to some extent be consumptive). The principal issues for the Medway Estuary and Marshes SPA/Ramsar are the potential effects on Milton Creek as 'functional habitat'; however, Milton Creek will be of low value in this regard as (a) it is a constrained creek / channel in a high-disturbance urban / industrial area that will inherently have a low attractiveness for the qualifying features (assuming there are no dominating non-natural attractants) and (b) is substantially lower value than the extensive areas of equivalent mud-flat and creek habitat available in the SPA/Ramsar; it is therefore very unlikely that the creek is critical to the functional integrity of the site, and environmental changes in this location would not be expected to adversely affect these sites.
Medway Estuary and Marshes SPA	No AE	
The Swale Ramsar	No AE*	This option was assessed as having no adverse effects at WRMP19 and there have been no substantive amendments in either the scheme or the environmental baseline to alter this conclusion. In summary, the net effect of the scheme operation would be to reduce non-saline inputs to Milton Creek from Sittingbourne WwTW by ~7.5Mld; discharges from the WwTW are likely to form a significant component of the non-saline flows in this creek (the permitted discharge of recycled water is ~118Ml/d) and the volumes recovered through recycling will typically be a small proportion of this (note, a proportion of this water would still enter the Swale via the paper mill post-process discharge, although the paper-making process will to some extent be consumptive). The principal issues for The Swale SPA/Ramsar are the potential effects on Milton Creek as potential 'functional habitat'; and the small reduction in non-saline inputs to The Swale via Milton Creek (note, all potential construction effects can be avoided with established measures). With regard to potential functional habitat, Milton Creek is unlikely to represent functionally linked habitat because (a) it is a constrained creek / channel in a high-disturbance urban / industrial area that will inherently have a low attractiveness for the qualifying features (assuming there are no dominating non-natural attractants) and (b) is substantially lower value than the extensive areas of equivalent mud-flat and creek habitat available in the SPA/Ramsar; it is therefore very unlikely that the creek is critical to the functional integrity of the site, and environmental changes in this location would not be expected to adversely affect these sites. With regard to effects on habitats in The Swale itself, the possibility of localised and minor changes to the invertebrate fauna of The Swale as a result of reductions in non-saline inputs around the confluence with Milton
The Swale SPA	No AE*	

European site	Conclusion	Summary
		Creek cannot be excluded; however, the reduction of ~7.5Ml/d will be small relative to the inputs from the creek (from the WwTW and surface water catchment in Sittingbourne), and likely inconsequential in relation to the tidal turnover and dominance of saline inputs; furthermore, any minor and localised shifts in biotope would not fundamentally alter the value of the area to the qualifying features (work completed for the UK Marine SACs Project[47] concluded that although changes in salinity may affect the prey structure, it would not necessarily affect their functioning. For example, on mud flats *Nereis* may be replaced by *Nephtys* following an increase in salinity with reduced river flows. Although the species composition is seen to have changed along the environmental gradient, the community still functions as prey for the birds). Aspects of this assessment can only be confirmed with the benefit of project-level survey and modelling, hence minor residual uncertainties remain to be addressed by mitigation at the project level as required. Note, the terrestrial SPA/Ramsar habitats will not be affected.

[47] UK Marine SACs Project (2001). http://ukmpa.marinebiodiversity.org/uk_sacs/

Table 6-17 – Appropriate Assessment Summary: Recycling (KMW): Medway WTW to lake (14Ml/d)

European site	Conclusion	Summary
Medway Estuary and Marshes Ramsar	No AE	Adverse construction effects alone will not occur (clearly avoidable with scheme-level measures that are known to be available, achievable and likely to be effective; residual effects after mitigation (etc.) likely to be nil or very small, so low risk of i/c effects). With regard to operation, the scheme will reduce non-saline inputs from the River Medway into the Medway estuary; the impact of a 12.8 Ml/d reduction (12.8 Ml/d represents average utilisation and therefore enables a realistic assessment) on Q95 flows (i.e. the impact when flows in the river are near their lowest) to the estuary (based on flows at Allington Locks plus DWF inputs from Medway WTW and other inputs) will be no greater than 7.2%. The change in flows, and some aspects of the operational discharges, has the potential to alter water quality and salinity in the tidal sections of the River Medway (although there will be a reduced WwTW loading to the estuary due to the removal of 12.8Ml/d of DWF discharge). However, the location of this 'maximum' impact is approximately 20km upstream of the closest point of the Medway Estuary and Marshes SPA/Ramsar, which will be overwhelmingly influenced by tidal dynamics and local non-saline inputs from the local catchment, rather than non-saline inputs from the River Medway. As a result the magnitude of the environmental change is expected to be too small to adversely affect the SPA/Ramsar site or its qualifying features.
Medway Estuary and Marshes SPA	No AE	Adverse construction effects alone will not occur (clearly avoidable with scheme-level measures that are known to be available, achievable and likely to be effective; residual effects after mitigation (etc.) likely to be nil or very small, so low risk of i/c effects). With regard to operation, the scheme will reduce non-saline inputs from the River Medway into the Medway estuary; the impact of a 12.8 Ml/d reduction (12.8 Ml/d represents average utilisation and therefore enables a realistic assessment) on Q95 flows (i.e. the impact when flows in the river are near their lowest) to the estuary (based on flows at Allington Locks plus DWF inputs from Medway WTW and other inputs) will be no greater than 7.2%. The change in flows, and some aspects of the operational discharges, has the potential to alter water quality and salinity in the tidal sections of the River Medway (although there will be a reduced WwTW loading to the estuary due to the removal of 12.8Ml/d of DWF discharge). However, the location of this 'maximum' impact is approximately 20km upstream of the closest point of the Medway Estuary and Marshes SPA/Ramsar, which will be overwhelmingly influenced by tidal dynamics and local non-saline inputs from the local catchment, rather than non-saline inputs from the River Medway. As a result the magnitude of the environmental change is expected to be too small to adversely affect the SPA/Ramsar site or its qualifying features.

Table 6-18 – Appropriate Assessment Summary: Recycling (SNZ): Horsham with storage at Pulborough (6.8Ml/d)

European site	Conclusion	Summary
Arun Valley Ramsar	No AE	Operation of the scheme will reduce flows in the River Arun downstream of Horsham as a proportion of the WwTW discharge will be recovered. The Arun Valley SAC/SPA/Ramsar are functionally linked to the River Arun being a series of wet meadows which are periodically flooded/ inundated. However, evidence from ongoing studies indicates that the wetlands are not fundamentally supported fluvially (i.e. they are not reliant / dependent on (for example) winter flooding from the Arun to maintain water levels), and whilst there may be some localised inputs from the river where sluices etc. are not operating correctly, the vast majority of the site is not supported by inward flows from the Arun but by groundwater or other surface water inputs from the catchment (i.e. the dominant direction of flow is from the wetlands to the river). High flows in the river may impede discharges from the wetlands, but the hydrology of the wetlands is largely determined by groundwater inputs and subsequent interventionist management of the water levels in the ditch network. The operation of the scheme will potentially reduce flows in the Arun by 9.5Ml/d, which be around 8% of the Q95 flow (lowest flows) in the Arun based on gauging flow data from the Rother at Pulborough, Station No. 41009; and Arun at Pallingham, Station No. 41014 (note this is conservative). However, the impact on low flows within the river is not considered critical to the designated site integrity for the reasons noted above; at high (flood) flows (e.g. Q10) the maximum impact is around 0.4%, which is not considered likely to adversely affect the site habitats given the understood hydrological functioning of the site. On this basis, adverse operational effects would not be anticipated. Construction effects are all minor and avoidable with normal measures.
Arun Valley SAC	No AE	Operation of the scheme will reduce flows in the River Arun downstream of Horsham as a proportion of the WwTW discharge will be recovered. The Arun Valley SAC/SPA/Ramsar are functionally linked to the River Arun being a series of wet meadows which are periodically flooded/ inundated. However, evidence from ongoing studies indicates that the wetlands are not fundamentally supported fluvially (i.e. they are not reliant / dependent on (for example) winter flooding from the Arun to maintain water levels), and whilst there may be some localised inputs from the river where sluices etc. are not operating correctly, the vast majority of the site is not supported by inward flows from the Arun but by groundwater or other surface water inputs from the catchment (i.e. the dominant direction of flow is from the wetlands to the river). High flows in the river may impede discharges from the wetlands, but the hydrology of the wetlands is largely determined by groundwater inputs and subsequent interventionist management of the water levels in the ditch network. The operation of the scheme will potentially reduce flows in the Arun by 9.5Ml/d, which be around 8% of the Q95 flow (lowest flows) in the Arun based on gauging flow data from the Rother at Pulborough, Station No. 41009; and Arun at Pallingham, Station No. 41014 (note this is conservative). However, the impact on low flows within the river is not considered critical to the designated site integrity for the reasons noted above; at high (flood) flows (e.g. Q10) the maximum impact is around 0.4%, which is not considered likely to adversely affect the site habitats given the understood hydrological functioning of the site. It should also be noted that the qualifying

European site	Conclusion	Summary
		features of the SAC are understood to be located in reedbeds some distance from the river. On this basis, adverse operational effects would not be anticipated. Construction effects are all minor and avoidable with normal measures.
Arun Valley SPA	No AE	Operation of the scheme will reduce flows in the River Arun downstream of Horsham as a proportion of the WwTW discharge will be recovered. The Arun Valley SAC/SPA/Ramsar are functionally linked to the River Arun being a series of wet meadows which are periodically flooded/ inundated. However, evidence from ongoing studies indicates that the wetlands are not fundamentally supported fluvially (i.e. they are not reliant / dependent on (for example) winter flooding from the Arun to maintain water levels), and whilst there may be some localised inputs from the river where sluices etc. are not operating correctly, the vast majority of the site is not supported by inward flows from the Arun but by groundwater or other surface water inputs from the catchment (i.e. the dominant direction of flow is from the wetlands to the river). High flows in the river may impede discharges from the wetlands, but the hydrology of the wetlands is largely determined by groundwater inputs and subsequent interventionist management of the water levels in the ditch network. The operation of the scheme will potentially reduce flows in the Arun by 9.5Ml/d, which be around 8% of the Q95 flow (lowest flows) in the Arun based on gauging flow data from the Rother at Pulborough, Station No. 41009; and Arun at Pallingham, Station No. 41014 (note this is conservative). However, the impact on low flows within the river is not considered critical to the designated site integrity for the reasons noted above; at high (flood) flows (e.g. Q10) the maximum impact is around 0.4%, which is not considered likely to adversely affect the site habitats given the understood hydrological functioning of the site. On this basis, adverse operational effects would not be anticipated. Construction effects are all minor and avoidable with normal measures.
The Mens SAC	No AE	Adverse effects alone will not occur (no pathways, magnitude of change too small, etc.) or are clearly avoidable with scheme-level measures that are known to be available, achievable and likely to be effective; residual effects after mitigation (etc.) likely to be nil or very small, so low risk of i/c effects.

6.4 IN COMBINATION EFFECTS

WITHIN-PLAN IN-COMBINATION EFFECTS

6.4.1. The assessment of within-plan (i.e. between SWS options) in combination effects is summarised in **Appendix F**; this is a complex table summarising a large quantity of data and so is necessarily presented as a .xlsx style table in the appendix. Note that this table includes all options (including 'no effect' options that are screened out) for clarity and completeness.

6.4.2. In summary, no adverse effects on European site integrity are anticipated as a result of the SWS options operating in combination. There are however, some minor residual uncertainties in relation to the sites and options set out in **Table 6-19** (partly due to uncertainties in the alone assessments) that can only be resolved with more detailed project-level investigations (although mitigation or avoidance measures will almost certainly be available given the long lead time before any potential in combination effects are realised).

Table 6-19 – Sites / options with residual 'in combination' uncertainties

Sites	Options	Notes
Margate and Long Sands SAC	• Desalination (KTZ): East Thanet	This site is only likely to be exposed to i/c effects from the operation of the East Thanet desalination options (construction effects will only occur once, in relation to the outfall), which will necessarily operate additively (i.e. the initial 20Ml/d plant will be supplemented a second plant). Based on proxy information from other sites presented in the alone assessment it is considered that these options will not result in adverse effects on this site (also given the low sensitivity of the interest features) although there is some residual uncertainty regarding this conclusion.
Medway Estuary and Marshes SPA / Ramsar	• Desalination (KME): Isle of Sheppey • Recycling (KMW): Medway WTW to lake (14Ml/d) • Recycling (KME): Sittingbourne industrial water reuse (7.5Ml/d)	This site is potentially exposed to operational effects from the Isle of Sheppey desalination schemes, plus Medway Recycling and Sittingbourne Industrial Reuse. Only the zones of environmental change associated with the desalination options will overlap, and so additive effects at one or more locations between the desalination options and the other options will not occur. Adverse effects alone are not expected as a result of the Medway recycling scheme, and so in combination effects associated with this option are not anticipated; this applies to the Sittingbourne scheme also, where any residual effects on the site are expected to be not adverse and local to the Milton Creek only (hence not this SPA/Ramsar). However the operation of the desalination plant will necessarily operate additively (i.e. the initial 10Ml/d plant will be supplemented a second plant), although construction effects associated with the outfall will only occur once. Based on proxy information from other sites presented in the alone assessment it is considered that these options will not collectively result in adverse effects on this site, and that potential effects can be avoided through the design stage; however, there is some residual uncertainty regarding this conclusion given the absence of detailed design information.

Sites	Options	Notes
Outer Thames Estuary SPA	• Desalination (KTZ): East Thanet • Desalination (KME): Isle of Sheppey	This site will be affected by the Thanet desalination options (which will inevitably affect the same location within the site through operation, although 'in combination' construction effects will not occur) and potentially by the Isle of Sheppey desalination options (again, cumulatively) depending on the location of the outfall for that option. However, the zones of environmental change associated with e.g. saline plumes are very unlikely to overlap (so spatially coincident additive effects between the two desalination scheme locations would not be expected). The features of the site are likely to have a fairly low sensitivity to the magnitude of environmental change anticipated based on proxy data and evidence from schemes elsewhere, and the proportion of the European site potentially subject to environmental changes as a result of the options will be very small (i.e. the vast majority of the site will be entirely unaffected), and so spatially non-coincident in combination effects (e.g. birds being displace from two key foraging areas) would not be expected.
Thames Estuary and Marshes SPA / Ramsar	• Desalination (KME): Isle of Sheppey • Desalination (KMW): Thames Estuary	This site is potentially exposed to operational effects from the Isle of Sheppey desalination schemes (will ultimately operate additively at one location) and the Thames Desalination options (will also operate additively at one location). The environmental changes associated with the two desalination sites are unlikely to coincide geographically. However, the operation of the desalination plants will necessarily operate additively (i.e. the initial 20Ml/d plants will be supplemented additional treatment plants), although construction effects associated with the outfalls will only occur once. Based on proxy information from other sites presented in the alone assessment it is considered that these desalination options will not individually result in adverse effects on this site, and that potential effects can be avoided through the design stage; however, there is some residual uncertainty regarding this conclusion given the absence of detailed design information. Note that this does not take account of potential in combination effects with Beckton.

DROUGHT PLAN

6.4.3. Two Drought Plan options were initially assessed to have potential adverse effects alone on one European site (the Candover [River Itchen] Augmentation Scheme Drought Order and the Lower Itchen Sources Drought Order sources, potentially affecting the River Itchen SAC). None of the WRMP24 options will operate in combination with these Drought Plan options to affect this SAC (this is essentially by design, as an objective of the WRMP is to reduce abstraction pressure on the River Itchen).

6.4.4. With regard to Drought Plan options with no adverse effects alone, **Table 6-20** provides a summary of the European sites potentially affected by the operation of a Drought Plan option (see **Table 3-3**) and one or more WRMP24 options, with a short narrative summarising the in combination assessment. Note, potential in combination effects in relation to construction are not considered likely due to the nature of the DP options (short term, temporary) and the availability of mitigation should any project-level in combination risks be identified and so **the table focuses on operational**

interactions only. Note, sites are grouped where the impact pathways are essentially the same, for simplicity of presentation.

6.4.5. In summary, based on the available information none of the Drought Plan options are likely to operate in combination with the WRMP24 options to adversely affect any European sites. However, it is also important to note that the Drought Plan will be revised several times before many of the WRMP24 options are implemented, and so a meaningful in combination assessment for most options arguably cannot be undertaken at this point (particularly given the uncertainties associated with the precise delivery of some options and possible future amendments to licences). Furthermore, a future Drought Plan will necessarily reflect the abstraction baseline at that point (i.e. it will account for options implemented at that point in time) and be subject to HRA when revised, which provides a mechanism to ensure that in combination effects do not occur.

Table 6-20 – In combination assessment of sites potentially exposed to operation of Drought Plan and WRMP24 options

Sites	WRMP Options with 'operation' pathways	DP Options with 'operation' pathways	IC Summary
Medway Estuary and Marshes SPA / Ramsar	• Recycling (KMW): Medway WTW to lake (14Ml/d) • Recycling (KME): Sittingbourne industrial water reuse (7.5Ml/d) • Desalination (KME): Isle of Sheppey	• Bewl Water Reservoir/River Medway Scheme: Stages 1 to 4 • Weir Wood Reservoir	The DP HRA concluded that the DP options would require mitigation to avoid adverse effects, including investigating the potential for alternative operation of flows from the Allington locks at low tide to reduce the potential for lower water levels at low tide; improving water quality in the Teise through WwWT upgrades (already commenced in AMP7), and other resilience work on the River Bewl (see DP HRA for details). The only option likely to interact spatially with the DP options is the Recycling (KMW):Medway WTW to lake option; however, the HRA of WRMP19 concluded that this option would have no adverse effect on the Medway Estuary sites and ongoing investigative work for the delivery of this scheme suggests that this will remain the case due to the distance down-estuary to the closest point of the SPA/Ramsar and the small magnitude of change relative to the dominant marine / tidal influences at this location. No adverse effects would therefore be expected (particularly given the short timescales of an DP implementation and likelihood of recovery in the short-term) although this would necessarily be reviewed through future revisions of the Drought Plan. **Conclusion: No AE in combination**

Sites	WRMP Options with 'operation' pathways	DP Options with 'operation' pathways	IC Summary
Arun Valley SPA / Ramsar Arun Valley SAC	• Groundwater (SNZ): New borehole at Petworth (4Ml/d) • Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d) • Groundwater (SNZ): Petersfield Refurbishment (1.6Ml/D) • Recycling (SNZ): Horsham with storage at Pulborough (6.8Ml/d)	• North Arundel WSW • Pulborough Stages 1 to 3	The North Arundel WSW Drought Order has negligible impacts on flows in the Lower River Arun, downstream of the Arun Valley SAC, SPA and Ramsar, based on the DP HRA. The HRA of the Drought Plan concluded that the Pulborough Stages 1 to 3 drought option would have no adverse effects on these sites (absence of pathways for the SAC; with the benefit of interventionist mitigation to support water levels in some drains for particular units of the SPA/Ramsar). The mitigation proposed for the drought option is in the process of being finalised, although the measures proposed will also effectively mitigate any residual effects that may result from the WRMP option implementation. Adverse in combination effects would not therefore be expected. **Conclusion: No AE in combination**
Solent and Southampton Water SPA / Ramsar Solent and Dorset Coast SPA Solent Maritime SAC	• Recycling (IOW): Sandown (8.5Ml/d) • Recycling (SNZ): Littlehampton WTW with river discharge (15Ml/d) • Recycling (HSE): Recharge of Havant Thicket from recycled water from Portsmouth Harbour WTW (60Ml/d) • Groundwater (IOW): New boreholes at Newchurch (LGS) (1.9Ml/d) • New boreholes at Romsey (4.8Ml/d) • Desalination (SWZ): Tidal River Arun (10Ml/d)	• Caul Bourne WSW • Eastern Yar Augmentation Scheme • Lukely Brook WSW • Test Surface Water Source	The HRA for the Caul Bourne and Lukely Brook DP options concluded that these would have no adverse effects on these European sites due principally to the short duration of the impacts with no expectation of any 'lasting effects'. With regard to the WRMP24, none of the options will affect the same areas of the Solent sites that will be affected by these two DP options, and the alone assessments for the WRMP24 have concluded that these sites will not be adversely affected; consequently these DP and WRMP24 options will not operate additively to affect the same areas of the sites, or synergistically to affect the same interest features at different locations within the site, and so in combination effects would not be expected. This applies to the River Test DP option also. With regard to the Eastern Yar DP option, the WRMP24 options affecting the Yar are all essentially designed to work with the Eastern Yar Augmentation Scheme and so in combination effects would not be expected. **Conclusion: No AE in combination**

Sites	WRMP Options with 'operation' pathways	DP Options with 'operation' pathways	IC Summary
Dungeness SAC Dungeness, Romney Marsh and Rye Bay SPA Dungeness, Romney Marsh and Rye Bay Ramsar	• Groundwater (SHZ): Reconfigure Rye Wells (1.5Ml/d) • Recycling (SHZ): Hastings to Darwell (15.3Ml/d)	• Darwell Reservoir: Stages 1 and 2	The DP would temporarily reduce flows in the Rother; the DP HRA concluded no adverse effects with mitigation including proactive hydrological management and mitigation during a severe drought in advance of the drought permit implementation to seek to reduce any adverse hydrological effects. The effects of the DP option would not coincide spatially with the Hastings Recycling option or have the potential to affect the same features; with regard to the Rye Wells WRMP option, this will have no significant operational effects alone based on the characteristics of the option and so adverse effects in combination with the DP options would not be expected. **Conclusion: No AE in combination**

INTER-COMPANY IN COMBINATION EFFECTS

Overview

6.4.6. An inter-company in combination assessment has been completed by WRSE (*WRSE Revised Draft Regional Plan SEA Environmental Report – Appendix H*) which has informed this assessment.

6.4.7. This HRA has initiated an inter-WRSE company in combination assessment mirroring the approach used for the SWS-only in combination assessment (see **Appendix G**). In summary, this approach uses assessment data from the other water company HRAs to identify all European sites that may be exposed to two or more WRMP options; this then allows possible option-option interactions to be clearly identified for each European site. Published HRA information for other water company plans informs the assessment, which limits detailed information available for non-SWS options, and strategic oversight available to SWS to identify all possible options and in combination interactions for specific European sites. A precautionary approach has been taken, recognising these limitations applicable to all water company WRMP HRA reporting.

6.4.8. Currently, HRA conclusions have been made available in a database format (hence easily processed to identify all European sites that may be exposed to particular options) by SWS, South East Water and Portsmouth Water; HRA outputs for Thames Water (TW) and Affinity Water (AW) are currently only available in long-form reporting and so have not been fully integrated into the assessment in Appendix G. However, for TW and AW options all European sites within 10km have been identified using shapefiles provided by the companies (so reflect the HRA scope of the SEW and PW HRAs) to allow a high-level appraisal of in combination risk.

6.4.9. The approach and format of **Appendix G** is discussed further in the 'Overview' section of that appendix.

Summary

6.4.10. Whilst it will always be possible to imagine specific hypothetical scenarios for in combination effects to occur (e.g. construction of Option A happens to occur just before operation of Option B, both affecting the same feature), these can only be meaningfully identified and assessed at the project-level. The plan-level in combination assessment arguably needs to focus on in combination effects that would appear to be a systematic and unavoidable consequence of the plans operating as intended – which will generally be "operation x operation" effects.

6.4.11. At the plan-level it is considered that virtually all construction-related effects, with the possible exception of some direct effects on sites that may involve non-trivial habitat modification or loss, can be reliably avoided or mitigated using established measures that are known to be available, achievable and effective, but must necessarily be defined at the project level (see **Appendix C** for examples). Furthermore, most construction-related effects would be inherently temporary over in the short- to medium-term, and so amenable to timing-measures to reduce in combination risk.

6.4.12. As a result, "*Option A construction x Option B construction*" in combination effects would not be anticipated in practice, as any potential effects (alone or in combination) could almost certainly be avoided or mitigated at the project-level – and for the vast majority of options it is possible to conclude that "construction x construction" effects can be avoided through scheme design and implementation.

6.4.13. Furthermore, "*Option A construction x Option B operation*" effects would not be generally anticipated as a systematic outcome of the plan as (a) if Option B is already operational at the point Option A is

constructed, then Option B's effects are arguably part of the environmental baseline at that point (so would not typically be considered for in combination assessment with a construction scheme); and (b) if Option A construction is completed before Option B operates, then in combination effects would not be generally expected unless delivery is particularly close together and the construction scheme has substantive residual effects that may not be adverse alone but which might still interact with the operation of a separate option (although obviously such specific scenarios can only be appropriately defined and assessed at the project-level).

6.4.14. In summary:

- **Thames Water**: No European sites will be exposed to operation x operation in combination effects between TW and SWS options (minor construction x construction pathways for some sites are conceivable, but can all self evidently be avoided with normal measures). **Conclusion: no adverse effects in combination.**
- **Affinity Water**: No European sites will be exposed to operation x operation in combination effects between AFW and SWS options (minor construction x construction pathways for some sites are conceivable, but can all self-evidently be avoided with normal measures). **Conclusion: no adverse effects in combination.**
- **Sutton and East Surrey Water**: No European sites will be exposed to operation x operation in combination effects between SES and SWS options (all SES options screened out; all effects on relevant European sites from SWS options construction-related and hence can all self-evidently be avoided with normal measures). **Conclusion: no adverse effects in combination.**
- **Portsmouth Water**: The European sites associated with Langstone Harbour (i.e. Chichester and Langstone Harbours SPA / Ramsar, Solent and Isle of Wight Lagoons SAC, Solent Maritime SAC) are close to the Portsmouth Harbour WTW Recycling option (SWS) and the Increased Treatment Capacity at Farlington options (PW), although the PW HRA concludes no LSE for the Farlington schemes, and the available evidence for the Portsmouth Harbour WTW recycling scheme suggests that the zone of environmental change for the operational effects will not overlap with these sites (since the discharge is via the Eastney LSO to the Solent). **Conclusion: no adverse effects in combination.**
- **Southeast Water**: The Reculver Desalination option (SEW) is located close to the proposed East Thanet Desalination option (SWS). Both will require outfalls that (a) will need to cross the **Thanet Coast SAC** and **Thanet Coast and Sandwich Bay SPA / Ramsar** (construction impacts likely avoidable with engineering solutions); (b) will require permanent outfall structures in or near **Margate and Long Sands SAC** (impacts depend on the nature of the installation, although features will have low sensitivity); (c) require permanent outfall structures in the **Outer Thames Estuary SPA** (impacts depend on the nature of the installation, although features will have low sensitivity); and (d) operational discharges within or close to the **Outer Thames Estuary SPA** and the **Margate and Long Sands SAC**. It is likely that adverse effects can be avoided through appropriate design of these facilities, and evidence from other desalination plants suggests that the environmental changes will be relatively small magnitude (with the interest features having low sensitivity to these changes), however there remains uncertainty over in combination effects due to the proximity of the options and the likelihood of spatially coincident environmental changes that cannot be quantified at the plan-level. **Conclusion: residual uncertainties over in combination effects on Margate and Long Sands SAC and Outer Thames Estuary SPA**.

- **Wessex Water**: The only European site potentially exposed to environmental changes associated with options in the SWS WRMP24 and the Wessex Water WRMP24 is the Solent and Dorset Coast SPA; however, the Wessex Water options involve minor construction near up-catchment tributaries and will have 'no effect' on this site due to their distance from the site boundary (so no possibility of 'in combination' effects).
- **Bournemouth Water**: Information on the options in the Final WRMP24 is not available; however, based on the dWRMP24 HRA there is only one option that has the potential for operation x operation in combination effects with SWS options (option BNW1, a groundwater abstraction that may affect **Solent and Southampton Water SPA / Ramsar** around Lymington SSSI); this is discussed in **Table** . **Conclusion: no adverse effects in combination.**

6.4.15. **Table 6-21** therefore summarises those European sites that may be exposed to either "operation x operation" in combination effects or substantive direct[48] "construction x construction" effects between SWS options and options from one or more of the neighbouring water companies (note, it does not identify in combination effects for sites only exposed to environmental changes associated with the neighbouring water companies).

[48] As noted, it is considered very unlikely that unavoidable adverse indirect effects on sites will occur as a result of construction (particularly as most schemes will occur at different points in time), and this will not be a systematic outcome of the rdWRMP24 implementation.

Table 6-21 In combination assessment of sites potentially exposed to inter-WRMP operational* effects

Site(s)*	WC	Options with possible operational effects i/c with SWS option	'Alone' conclusion	I/C conclusion	I/C assessment notes
Arun Valley Ramsar Arun Valley SAC Arun Valley SPA	SWS	Recycling (SNZ): Horsham with storage at Pulborough (6.8Ml/d)	No AE	**No AE**	Site only likely to be affected by SWS options, addressed by within-WRMP assessment above.
	SWS	Groundwater (SNZ): New borehole at Petworth (4Ml/d)	No AE		
	SWS	Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d)	No AE		
	SWS	Groundwater (SNZ): Petersfield Refurbishment (1.6Ml/D)	No AE		
	PWS	Near Arundel drought permit	No LSE		
Chichester and Langstone Harbours Ramsar Chichester and Langstone Harbours SPA	SWS	Recycling (HSE): Recharge of Havant Thicket from recycled water from Portsmouth Harbour WTW (60Ml/d)	No AE	**No AE**	The European sites associated with Langstone Harbour (i.e. Chichester and Langstone Harbours SPA / Ramsar, Solent and Isle of Wight Lagoons SAC, Solent Maritime SAC) are close to the Portsmouth Harbour WTW Recycling option (SWS) and the Increased Treatment Capacity at Farlington options (PW), although the PW HRA concludes no LSE for the Farlington schemes and no AE for the Lavant booster. The available evidence for the Portsmouth Harbour WTW recycling scheme suggests that the zone of environmental change for the operational effects will not overlap with these sites (since the discharge is via the Eastney LSO to the Solent). No AE in combination would therefore be expected.
	PW	Farlington increased treatment capacity	No LSE		
	PW	Farlington increased treatment capacity 2	No LSE		
	PW	Lavant Booster	No AE		
	SWS	Desalination (KTZ): East Thanet	No AE	**No AE***	

Site(s)*	WC	Options with possible operational effects i/c with SWS option	'Alone' conclusion	I/C conclusion	I/C assessment notes
Margate and Long Sands SAC	SEW	Reculver Desalination (30Ml/d Option)	No AE		Construction within site is likely for the East Thanet scheme, and possible for Reculver. Outfalls and pipelines may be located in the site (which may affect sediment etc dynamics locally), and operational discharges from both desalination options will likely be measurable within the site and may overlap. However, the site and features will have a low sensitivity to environmental changes associated with these aspects, and adverse effects in combination would not be expected; however, there are residual uncertainties due to the proximity of these options hence risk of spatially coincident in combination effects that cannot be resolved with the available data.
Outer Thames Estuary SPA	SWS	Desalination (KTZ): East Thanet	No AE	**No AE***	Construction within this site is likely for the East Thanet scheme and Reculver. Outfalls and pipelines will be located in the site (which may affect sediment etc dynamics locally), and operational discharges from both desalination options will likely be measurable within the site and may overlap. The effects of the IoS desalination option are very unlikely to overlap with the other options and will not directly affect the site. However, the SPA and its features will have a low sensitivity to environmental changes associated with these aspects, and adverse effects in combination would not be expected; however, there are residual uncertainties due to the proximity of these options hence risk of spatially coincident in combination effects that cannot be resolved with the available data.

Site(s)*	WC	Options with possible operational effects i/c with SWS option	'Alone' conclusion	I/C conclusion	I/C assessment notes
	SWS	Desalination (KME): Isle of Sheppey	No AE		
	SEW	Reculver Desalination (30Ml/d Option)	No AE		
Portsmouth Harbour Ramsar Portsmouth Harbour SPA	SWS	Recycling (HSE): Recharge of Havant Thicket from recycled water from Portsmouth Harbour WTW (60Ml/d)	No AE	**No AE**	The operation of these options will not coincide spatially to affect these sites; the distance and small-scale of any 'alone' effects (relatively to the site size) also ensures that adverse effects on mobile features using different areas of the site will not occur.
	PW	Farlington increased treatment capacity	No LSE		
	PW	Farlington increased treatment capacity 2	No LSE		
	PW	Lavant Booster	No AE		
Solent and Dorset Coast SPA	SWS	Recycling (IOW): Sandown (8.5Ml/d)	No AE	**No AE**	The operation of these options will not coincide spatially to affect these sites; the distance and small-scale of any 'alone' effects (relatively to the site size) also ensures that adverse effects on mobile features using different areas of the site will not occur. The features will also have a low sensitivity to the anticipated environmental changes.
	SWS	Desalination (SWZ): Tidal River Arun (10Ml/d)	No AE		
	SWS	Recycling (HSE): Recharge of Havant Thicket from recycled water from Portsmouth Harbour WTW (60Ml/d)	No AE		
	PW	Farlington increased treatment capacity	No LSE		
	PW	Farlington increased treatment capacity 2	No LSE		
	PW	Lavant Booster	No AE		

Site(s)*	WC	Options with possible operational effects i/c with SWS option	'Alone' conclusion	I/C conclusion	I/C assessment notes
Solent and Isle of Wight Lagoons SAC	SWS	Recycling (IOW): Sandown (8.5Ml/d)	No AE	**No AE**	The lagoon feature that is theoretically exposed to options proposed by more than one water company is the lagoon adjacent to Langstone harbour (those associated with Bembridge Harbour (IoW) are only potentially affected by SWS options, which are address in the within-plan in combination section). However, the HRA of the Farlington increased treatment capacity options has concluded that there are no pathways for effects, and the Budd Farm recycling option will have no adverse effects on this lagoon, based on the Gate 2 data. No AE in combination would therefore be expected.
	SWS	Groundwater (IOW): New boreholes at Newchurch (LGS) (1.9Ml/d)	No AE		
	SWS	Recycling (HSE): Recharge of Havant Thicket from recycled water from Portsmouth Harbour WTW (60Ml/d)	No AE		
	PW	Farlington increased treatment capacity	No LSE		
	PW	Farlington increased treatment capacity 2	No LSE		
Solent and Southampton Water SPA / Ramsar	SWS	Recycling (IOW): Sandown (8.5Ml/d)	No AE	**No AE**	The operation of these options will not coincide spatially to affect these sites; the distance and small-scale of any 'alone' effects (relatively to the site size) also ensures that adverse effects on mobile features using different areas of the site will not occur.
	SWS	Groundwater (IOW): New boreholes at Newchurch (LGS) (1.9Ml/d)	No AE		
	BW	BNW1	No AE*		
Solent Maritime SAC	SWS	Recycling (IOW): Sandown (8.5Ml/d)	No AE	**No AE**	The operation of these options will not coincide spatially to affect these sites; the distance and small-scale of any 'alone' effects (relatively to the site size) also ensures that adverse effects on mobile features using different areas of the site will not occur.
	SWS	Groundwater (IOW): New boreholes at Newchurch (LGS) (1.9Ml/d)	No AE		
	SWS	Recycling (HSE): Recharge of Havant Thicket from recycled water from Portsmouth Harbour WTW (60Ml/d)	No AE		
	PW	Farlington increased treatment capacity	No LSE		

Site(s)*	WC	Options with possible operational effects i/c with SWS option	'Alone' conclusion	I/C conclusion	I/C assessment notes
	PW	Farlington increased treatment capacity 2	No LSE		
Thanet Coast and Sandwich Bay SPA / Ramsar Thanet Coast SAC	SWS	Desalination (KTZ): East Thanet	No AE	**No AE**	Both options will require outfalls that will need to cross the Thanet Coast SAC and Thanet Coast and Sandwich Bay SPA / Ramsar (substantive direct effects therefore possible, hence identified here, but construction impacts likely avoidable with engineering solutions). Unlikely to be affected by operation given the outfall location offshore and nature / magnitude of the discharges (compare with operational effects from other LSO discharges).
	SEW	Reculver Desalination (30Ml/d Option)	No AE		
The Swale Ramsar The Swale SPA	SWS	Desalination (KME): Isle of Sheppey	No AE	**No AE**	The zones of environmental change for the operation of these options will not overlap due to the nature and location of the Swale relative to the options. No coincident effects will occur as the residual alone effects will not interact.
	SWS	Recycling (KME): Sittingbourne industrial water reuse (7.5Ml/d)	No AE*		
	SEW	Reculver Desalination (30Ml/d Option)	No LSE		

* Options with substantive direct construction effects that require specifically engineered avoidance measures to avoid these (i.e. directional drill) are also included

** Note, for this summary table sites are grouped where there are substantive overlaps between site characteristic and hydrological pathways for environmental changes

OTHER PLANS AND PROJECTS

Effects with other strategic plans and water resource demand

6.4.16. The WRMP24 explicitly accounts for growth forecasts when calculating future water demand (and hence areas with potential deficits). This means that 'in combination' water-resource effects with growth promoted by other plans or projects are considered and accounted for during the WRMP development process and its deficit calculations.

6.4.17. Potential 'in combination' effects in respect of water-resource demands due to other plans or projects are therefore unlikely since these demands are explicitly modelled when determining deficit zones and hence developing Feasible Options. As a result (in respect of water resources), the WRMP24 is not likely to make non-significant effects in other plans significant (indeed, other plans are arguably the 'source' of any potential effects in respect of water demand, with the WRMP having to manage potential effects that are not generated by the WRMP itself). Obviously local plans are not all consistent with regard to planned growth and this arguably introduces some uncertainty. However, with regard to water resources and planning uncertainty it is important to note the following:

- The WRMP safeguards against uncertainty in option yield and timing through 'Target Headroom'; this is an allowance provided in the planning process (i.e. designed-in spare capacity) that ensures that any supply-demand deficit will still be met if there is an underperforming demand management measure or growth exceeds predicted levels. It is therefore extremely unlikely that additional demand or a poorly-performing option would 'suddenly' result in a deficit that might affect a European site; and (in any case);
- The WRMP is revised on a five-yearly cycle, which allows any changes in demand forecasts (e.g. as new plans come forward) to be accounted for, and for timely intervention should a measure not be performing as expected. Delivery is also formally reviewed on an annual basis.

6.4.18. It is therefore considered that the WRMP24 options will not have significant 'in combination' effects with local plans in respect of water resources.

Effects with major projects

6.4.19. Known major projects that are likely to increase demand have been taken into account during the development of SWS's WRMP and determination of future deficits.

6.4.20. With regard to individual projects interacting with specific options to affect particular sites, this is addressed in **Appendices E2 – E15**.

6.4.21. In summary, reference has been made to the Planning Inspectorates National Infrastructure Projects database[49] which includes major projects, subject to the requirements of the Planning Act 2008. It includes projects:

- where the developer has advised the Planning Inspectorate in writing that they intend to submit an application in the future;
- where an application has already been made to the Planning Inspectorate and is undergoing the development consent process;

[49] https://infrastructure.planninginspectorate.gov.uk/projects/

- where a Development Consent Order (DCO) application has been determined.

6.4.22. This exercise identified several major projects that might affect sites that are also exposed to the outcomes of the WRMP options (particularly in the North Kent area); however, adverse in combination effects between these projects are not expected, partly as there is unlikely to be notable temporal or spatial overlap in the delivery of these options, or in the longer-term operational effects. However, this can only be fully assessed at the project level when details of the developments are known and the baseline can be fixed.

Minor Projects

6.4.23. It has not been possible to produce a definitive list of existing (minor) planning applications near each option's zone of influence and, generating a list at this stage would be of little value. It is possible that there will be 'in combination' project-specific construction effects associated with future planning applications, although this can only be assessed at the time of any application. This is consistent with the ACWG guidance on cumulative/in combination assessments.

Effects with strategic development pressure

6.4.24. Regional and local plans have been reviewed at a high level to determine whether there are any likely significant 'in combination' effects, with allocation sites identified where possible. This review has not indicated any potential or likely 'in combination' effects that could occur as a result of cumulative development pressure, and in reality, the timescales involved in the implementation of the options and the absence of detail on allocation proposals makes any 'in combination' assessment difficult and potentially meaningless. However, the construction works required for the options are temporary and not of a scale or type that would make 'in combination' effects likely.

Appendix A

RELEVANT EUROPEAN SITES

APPENDIX A - RELEVANT EUROPEAN SITES

Table A-1 – Relevant European sites (hyperlinks to standard data forms in 'Site Code')

Site Code	Site Name	Qualifying Features / Criteria
UK11004	Arun Valley Ramsar	- Crit. 2: Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities - Crit. 3: Crit. 3 - supports populations of plant/animal species important for maintaining regional biodiversity - Crit. 5: Crit. 5 - regularly supports 20,000 or more waterbirds
UK0030366	Arun Valley SAC	- S4056: Ramshorn snail *Anisus vorticulus*
UK9020281	Arun Valley SPA	- A037: Tundra swan *Cygnus columbianus bewickii* - WATR: Waterbird assemblage
UK0030080	Ashdown Forest SAC	- H4010: Northern Atlantic wet heaths with *Erica tetralix* - H4030: European dry heaths - S1166: Great crested newt *Triturus cristatus*
UK9012181	Ashdown Forest SPA	- A224: European nightjar *Caprimulgus europaeus* - A302: DartLittlehampton warbler *Sylvia undata*
UK11006	Benfleet and Southend Marshes Ramsar	- Crit. 6: Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds - Crit. 5: Crit. 5 - regularly supports 20,000 or more waterbirds
UK9009171	Benfleet and Southend Marshes SPA	- A143: Red knot *Calidris canutus* - A675: Dark-bellied brent goose *Branta bernicla bernicla* - A141: Grey plover *Pluvialis squatarola* - A672: Dunlin *Calidris alpina alpina* - A137: Ringed plover *Charadrius hiaticula* - WATR: Waterbird assemblage
UK0013697	Blean Complex SAC	- H9160: Sub-Atlantic and medio-European oak or oak-hornbeam forests of the *Carpinion betuli*
UK0030328	BriddlesLittlehampton Copses SAC	- S1323: Bechstein`s bat *Myotis bechsteini*
UK0030103	Butser Hill SAC	- H6210: Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) - H91J0: *Taxus baccata* woods of the British Isles
UK0012836	Castle Hill SAC	- H6210: Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) - S1654: Early gentian *Gentianella anglica*

Site Code	Site Name	Qualifying Features / Criteria
UK11013	Chichester and Langstone Harbours Ramsar	- Crit. 1: Crit. 1 - sites containing representative, rare or unique wetland types - Crit. 6: Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds - Crit. 5: Crit. 5 - regularly supports 20,000 or more waterbirds
UK9011011	Chichester and Langstone Harbours SPA	- A191: Sandwich tern *Sterna sandvicensis* - A162: Common redshank *Tringa totanus* - A169: Ruddy turnstone *Arenaria interpres* - A193: Common tern *Sterna hirundo* - A137: Ringed plover *Charadrius hiaticula* - A050: Eurasian wigeon *Anas penelope* - A056: Northern shoveler *Anas clypeata* - A054: Northern pintail *Anas acuta* - A157: Bar-tailed godwit *Limosa lapponica* - A052: Eurasian teal *Anas crecca* - A144: Sanderling *Calidris alba* - A141: Grey plover *Pluvialis squatarola* - A069: Red-breasted *merganser Mergus serrator* - A675: Dark-bellied brent goose *Branta bernicla bernicla* - A160: Eurasian curlew *Numenius arquata* - A195: Little tern *Sterna albifrons* - A672: Dunlin *Calidris alpina alpina* - A048: Common shelduck *Tadorna tadorna* - WATR: Waterbird assemblage
UK0012889	Cothill Fen SAC	- H7230: Alkaline fens - H91E0: Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)
UK0030138	Duncton to Bignor Escarpment SAC	- H9130: *Asperulo-Fagetum* beech forests
UK0013059	Dungeness SAC	- H1210: Annual vegetation of drift lines - H1220: Perennial vegetation of stony banks - S1166: Great crested newt *Triturus cristatus*
UK11023	Dungeness, Romney Marsh and Rye Bay Ramsar	- Crit. 1: Crit. 1 - sites containing representative, rare or unique wetland types - Crit. 2: Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities - Crit. 5: Crit. 5 - regularly supports 20,000 or more waterbirds - Crit. 6: Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds

Site Code	Site Name	Qualifying Features / Criteria
UK9012091	Dungeness, Romney Marsh and Rye Bay SPA	- A056: Northern shoveler *Anas clypeata* - A082: Hen harrier *Circus cyaneus* - A151: Ruff *Philomachus pugnax* - A176: Mediterranean gull *Larus melanocephalus* - A191: Sandwich tern *Sterna sandvicensis* - A193: Common tern *Sterna hirundo* - A195: Little tern *Sterna albifrons* - A294: Aquatic warbler *Acrocephalus paludicola* - A037: Tundra swan *Cygnus columbianus bewickii* - A021: Great bittern *Botaurus stellaris* - A140: European golden plover *Pluvialis apricaria* - A081: Eurasian marsh harrier *Circus aeruginosus* - A132: Pied avocet *Recurvirostra avosetta* - WATR: Waterbird assemblage
UK0012723	East Hampshire Hangers SAC	- H6210: Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) - H9130: *Asperulo-Fagetum* beech forests - H9180: *Tilio-Acerion* forests of slopes, screes and ravines - H91J0: *Taxus baccata* woods of the British Isles - S1654: Early gentian *Gentianella anglica*
UK0012715	Ebernoe Common SAC	- H9120: Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*) - S1308: Barbastelle *Barbastella barbastellus* - S1323: Bechstein`s bat *Myotis bechsteini*
UK0030147	Emer Bog SAC	- H7140: Transition mires and quaking bogs
UK0013690	Essex Estuaries SAC	- H1110: Sandbanks which are slightly covered by sea water all the time - H1130: Estuaries - H1140: Mudflats and sandflats not covered by seawater at low tide - H1310: *Salicornia* and other annuals colonizing mud and sand - H1320: *Spartina* swards (*Spartinion maritimae*) - H1330: Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) - H1420: Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)

Site Code	Site Name	Qualifying Features / Criteria
UK11026	Foulness (Mid-Essex Coast Phase 5) Ramsar	- Crit. 2: Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities - Crit. 6: Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds - Crit. 5: Crit. 5 - regularly supports 20,000 or more waterbirds - Crit. 1: Crit. 1 - sites containing representative, rare or unique wetland types - Crit. 3: Crit. 3 - supports populations of plant/animal species important for maintaining regional biodiversity
UK9009246	Foulness (Mid-Essex Coast Phase 5) SPA	- A130: Eurasian oystercatcher *Haematopus ostralegus* - A193: Common tern *Sterna hirundo* - A195: Little tern *Sterna albifrons* - A162: Common redshank *Tringa totanus* - A157: Bar-tailed godwit *Limosa lapponica* - A675: Dark-bellied brent goose *Branta bernicla bernicla* - A191: Sandwich tern *Sterna sandvicensis* - A132: Pied avocet *Recurvirostra avosetta* - A137: Ringed plover *Charadrius hiaticula* - A143: Red knot *Calidris canutus* - A141: Grey plover *Pluvialis squatarola* - A132: Pied avocet *Recurvirostra avosetta* - A082: Hen harrier *Circus cyaneus* - WATR: Waterbird assemblage
UK0030165	Hastings Cliffs SAC	- H1230: Vegetated sea cliffs of the Atlantic and Baltic Coasts
UK0016254	Isle of Wight Downs SAC	- H1230: Vegetated sea cliffs of the Atlantic and Baltic Coasts - H4030: European dry heaths - H6210: Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) - S1654: Early gentian *Gentianella anglica*
UK0030044	Kennet and Lambourn Floodplain SAC	- S1016: Desmoulin`s whorl snail *Vertigo moulinsiana*
UK0030175	Kennet Valley Alderwoods SAC	- H91E0: Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)
UK0012767	Kingley Vale SAC	- H6210: Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) - H91J0: *Taxus baccata* woods of the British Isles
UK0012832	Lewes Downs SAC	- H6210: Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)

Site Code	Site Name	Qualifying Features / Criteria
UK0012834	Lydden and Temple Ewell Downs SAC	- H6210: Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)
UK0030371	Margate and Long Sands SAC	- H1110: Sandbanks which are slightly covered by sea water all the time
UK11040	Medway Estuary and Marshes Ramsar	- Crit. 6: Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds - Crit. 5: Crit. 5 - regularly supports 20,000 or more waterbirds - Crit. 2: Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities
UK9012031	Medway Estuary and Marshes SPA	- A130: Eurasian oystercatcher *Haematopus ostralegus* - A056: Northern shoveler *Anas clypeata* - A052: Eurasian teal *Anas crecca* - A143: Red knot *Calidris canutus* - A137: Ringed plover *Charadrius hiaticula* - A132: Pied avocet *Recurvirostra avosetta* - A082: Hen harrier *Circus cyaneus* - A616: Black-tailed godwit *Limosa limosa islandica* - A001: Red-throated diver *Gavia stellata* - A169: Ruddy turnstone *Arenaria interpres* - A054: Northern pintail *Anas acuta* - A164: Common greenshank *Tringa nebularia* - A053: Mallard *Anas platyrhynchos* - A017: Great cormorant *Phalacrocorax carbo* - A195: Little tern *Sterna albifrons* - A141: Grey plover *Pluvialis squatarola* - A050: Eurasian wigeon *Anas penelope* - A048: Common shelduck *Tadorna tadorna* - A672: Dunlin *Calidris alpina alpina* - A162: Common redshank *Tringa totanus* - A098: Merlin *Falco columbarius* - A059: Common pochard *Aythya ferina* - A037: Tundra swan *Cygnus columbianus bewickii* - A132: Pied avocet *Recurvirostra avosetta* - A160: Eurasian curlew *Numenius arquata* - A005: Great crested grebe *Podiceps cristatus* - A193: Common tern *Sterna hirundo* - A675: Dark-bellied brent goose *Branta bernicla bernicla* - WATR: Waterbird assemblage - BBA: Breeding bird assemblage - BBA: Breeding bird assemblage - A162: Common redshank *Tringa totanus*

Site Code	Site Name	Qualifying Features / Criteria
UK0012804	Mole Gap to Reigate Escarpment SAC	- H4030: European dry heaths - H5110: Stable xerothermophilous formations with *Buxus sempervirens* on rock slopes (*Berberidion* p.p.) - H6210: Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) - H9130: *Asperulo-Fagetum* beech forests - H91J0: *Taxus baccata* woods of the British Isles - S1166: Great crested newt *Triturus cristatus* - S1323: Bechstein`s bat *Myotis bechsteini*
UK0030334	Mottisfont Bats SAC	- S1308: Barbastelle *Barbastella barbastellus*
UK9011031	New Forest SPA	- A314: Wood warbler *Phylloscopus sibilatrix* - A246: Wood lark *Lullula arborea* - A302: DartLittlehampton warbler *Sylvia undata* - A082: Hen harrier *Circus cyaneus* - A224: European nightjar *Caprimulgus europaeus* - A099: Eurasian hobby *Falco subbuteo* - A072: European honey-buzzard *Pernis apivorus*
UK0030225	North Downs Woodlands SAC	- H6210: Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites) - H9130: *Asperulo-Fagetum* beech forests - H91J0: *Taxus baccata* woods of the British Isles
UK9020309	Outer Thames Estuary SPA	- A195: Little tern *Sterna albifrons* - A193: Common tern *Sterna hirundo* - A001: Red-throated diver *Gavia stellata*
UK11052	Pagham Harbour Ramsar	- Crit. 6: Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds
UK9012041	Pagham Harbour SPA	- A151: Ruff *Philomachus pugnax* - A675: Dark-bellied brent goose *Branta bernicla bernicla* - A195: Little tern *Sterna albifrons* - A193: Common tern *Sterna hirundo*
UK0030338	Parkgate Down SAC	- H6210: Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)
UK0030237	Peter`s Pit SAC	- S1166: Great crested newt *Triturus cristatus*
UK11053	Pevensey Levels Ramsar	- Crit. 2: Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities - Crit. 3: Crit. 3 - supports populations of plant/animal species important for maintaining regional biodiversity
UK0030367	Pevensey Levels SAC	- S4056: Ramshorn snail *Anisus vorticulus*

Site Code	Site Name	Qualifying Features / Criteria
UK11055	Portsmouth Harbour Ramsar	- Crit. 6: Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds - Crit. 3: Crit. 3 - supports populations of plant/animal species important for maintaining regional biodiversity
UK9011051	Portsmouth Harbour SPA	- A672: Dunlin *Calidris alpina alpina* - A616: Black-tailed godwit *Limosa limosa islandica* - A069: Red-breasted *merganser Mergus serrator* - A675: Dark-bellied brent goose *Branta bernicla bernicla*
UK0012833	Queendown Warren SAC	- H6210: Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)
UK0012599	River Itchen SAC	- H3260: Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation - S1096: Brook lamprey *Lampetra planeri* - S1106: Atlantic salmon *Salmo salar* - S1163: Bullhead *Cottus gobio* - S1044: Southern damselfly *Coenagrion mercuriale* - S1092: White-clawed (or Atlantic stream) crayfish *Austropotamobius pallipes* - S1355: Otter *Lutra lutra*
UK0030257	River Lambourn SAC	- H3260: Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation - S1096: Brook lamprey *Lampetra planeri* - S1163: Bullhead *Cottus gobio*
UK0030058	Rook Clift SAC	- H9180: *Tilio-Acerion* forests of slopes, screes and ravines
UK0013077	Sandwich Bay SAC	- H2110: Embryonic shifting dunes - H2120: Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") - H2130: Fixed coastal dunes with herbaceous vegetation ("grey dunes") - H2170: Dunes with *Salix repens* ssp. *argentea* (*Salicion arenariae*) - H2190: Humid dune slacks
UK0030275	Shortheath Common SAC	- H4030: European dry heaths - H7140: Transition mires and quaking bogs - H91D0: Bog woodland
UK0030337	Singleton and Cocking Tunnels SAC	- S1323: Bechstein`s bat *Myotis bechsteini* - S1308: Barbastelle *Barbastella barbastellus*
UK9020330	Solent and Dorset Coast SPA	- A191: Sandwich tern *Sterna sandvicensis* - A193: Common tern *Sterna hirundo* - A195: Little tern *Sterna albifrons*

Site Code	Site Name	Qualifying Features / Criteria
UK0017073	Solent and Isle of Wight Lagoons SAC	- H1150: Coastal lagoons
UK11063	Solent and Southampton Water Ramsar	- Crit. 6: Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds - Crit. 1: Crit. 1 - sites containing representative, rare or unique wetland types - Crit. 2: Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities - Crit. 5: Crit. 5 - regularly supports 20,000 or more waterbirds
UK9011061	Solent and Southampton Water SPA	- A137: Ringed plover *Charadrius hiaticula* - A176: Mediterranean gull *Larus melanocephalus* - A616: Black-tailed godwit *Limosa limosa islandica* - A195: Little tern *Sterna albifrons* - A192: Roseate tern *Sterna dougallii* - A675: Dark-bellied brent goose *Branta bernicla bernicla* - A191: Sandwich tern *Sterna sandvicensis* - A052: Eurasian teal *Anas crecca* - A193: Common tern *Sterna hirundo* - WATR: Waterbird assemblage
UK0030059	Solent Maritime SAC	- H1110: Sandbanks which are slightly covered by sea water all the time - H1130: Estuaries - H1140: Mudflats and sandflats not covered by seawater at low tide - H1150: Coastal lagoons - H1210: Annual vegetation of drift lines - H1220: Perennial vegetation of stony banks - H1310: *Salicornia* and other annuals colonizing mud and sand - H1320: *Spartina* swards (*Spartinion maritimae*) - H1330: Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) - H2120: Shifting dunes along the shoreline with *Ammophila arenaria* ("white dunes") - S1016: Desmoulin`s whorl snail *Vertigo moulinsiana*
UK0030061	South Wight Maritime SAC	- H1170: Reefs - H1230: Vegetated sea cliffs of the Atlantic and Baltic Coasts - H8330: Submerged or partially submerged sea caves
UK11066	Stodmarsh Ramsar	- Crit. 2: Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities
UK0030283	Stodmarsh SAC	- S1016: Desmoulin`s whorl snail *Vertigo moulinsiana*

Site Code	Site Name	Qualifying Features / Criteria
UK9012121	Stodmarsh SPA	- A050: Eurasian wigeon *Anas penelope* - A056: Northern shoveler *Anas clypeata* - A394: Greater white-fronted goose *Anser albifrons albifrons* - A153: Common snipe *Gallinago gallinago* - A142: Northern lapwing *Vanellus vanellus* - A082: Hen harrier *Circus cyaneus* - A021: Great bittern *Botaurus stellaris* - A051: Gadwall *Anas strepera* - A059: Common pochard *Aythya ferina* - A053: Mallard *Anas platyrhynchos* - A051: Gadwall *Anas strepera* - A118: Water rail *Rallus aquaticus* - A061: Tufted duck *Aythya fuligula* - BBA: Breeding bird assemblage - A048: Common shelduck *Tadorna tadorna*
UK0030378	Tankerton Slopes and Swalecliffe SAC	- S4035: Fisher's estuarine moth *Gortyna borelii lunata*
UK11069	Thames Estuary and Marshes Ramsar	- Crit. 2: Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities - Crit. 6: Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds - Crit. 5: Crit. 5 - regularly supports 20,000 or more waterbirds
UK9012021	Thames Estuary and Marshes SPA	- A672: Dunlin *Calidris alpina alpina* - A143: Red knot *Calidris canutus* - A082: Hen harrier *Circus cyaneus* - A616: Black-tailed godwit *Limosa limosa islandica* - A141: Grey plover *Pluvialis squatarola* - A132: Pied avocet *Recurvirostra avosetta* - A137: Ringed plover *Charadrius hiaticula* - A162: Common redshank *Tringa totanus* - WATR: Waterbird assemblage
UK11070	Thanet Coast and Sandwich Bay Ramsar	- Crit. 6: Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds - Crit. 2: Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities
UK9012071	Thanet Coast and Sandwich Bay SPA	- A169: Ruddy turnstone *Arenaria interpres* - A140: European golden plover *Pluvialis apricaria* - A195: Little tern *Sterna albifrons*
UK0013107	Thanet Coast SAC	- H1170: Reefs - H8330: Submerged or partially submerged sea caves

Site Code	Site Name	Qualifying Features / Criteria
UK0012716	The Mens SAC	- H9120: Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*) - S1308: Barbastelle *Barbastella barbastellus*
UK11047	The New Forest Ramsar	- Crit. 1: Crit. 1 - sites containing representative, rare or unique wetland types - Crit. 3: Crit. 3 - supports populations of plant/animal species important for maintaining regional biodiversity - Crit. 2: Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities
UK0012557	The New Forest SAC	- H3110: Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) - H3130: Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea* - H4010: Northern Atlantic wet heaths with *Erica tetralix* - H4030: European dry heaths - H6410: *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) - H7140: Transition mires and quaking bogs - H7150: Depressions on peat substrates of the *Rhynchosporion* - H7230: Alkaline fens - H9120: Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*) - H9130: *Asperulo-Fagetum* beech forests - H9190: Old acidophilous oak woods with *Quercus robur* on sandy plains - H91D0: Bog woodland - H91E0: Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*) - S1166: Great crested newt *Triturus cristatus* - S1044: Southern damselfly *Coenagrion mercuriale* - S1083: Stag beetle *Lucanus cervus*
UK11071	The Swale Ramsar	- Crit. 5: Crit. 5 - regularly supports 20,000 or more waterbirds - Crit. 2: Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities - Crit. 6: Crit. 6 - regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds

Site Code	Site Name	Qualifying Features / Criteria
UK9012011	The Swale SPA	- A137: Ringed plover *Charadrius hiaticula* - A130: Eurasian oystercatcher *Haematopus ostralegus* - A052: Eurasian teal *Anas crecca* - A672: Dunlin *Calidris alpina alpina* - A160: Eurasian curlew *Numenius arquata* - A051: Gadwall *Anas strepera* - A141: Grey plover *Pluvialis squatarola* - A162: Common redshank *Tringa totanus* - A675: Dark-bellied brent goose *Branta bernicla bernicla* - WATR: Waterbird assemblage - BBA: Breeding bird assemblage - A616: Black-tailed godwit *Limosa limosa islandica*
UK11074	Thursley and Ockley Bog Ramsar	- Crit. 3: Crit. 3 - supports populations of plant/animal species important for maintaining regional biodiversity - Crit. 2: Crit. 2 - supports vulnerable, endangered, or critically endangered species or threatened eco. communities
UK0012793	Thursley, Ash, Pirbright and Chobham SAC	- H4010: Northern Atlantic wet heaths with *Erica tetralix* - H4030: European dry heaths - H7150: Depressions on peat substrates of the *Rhynchosporion*
UK9012131	Thursley, Hankley and Frensham Commons (Wealden Heaths Phase 1) SPA	- A302: DartLittlehampton warbler *Sylvia undata* - A224: European nightjar *Caprimulgus europaeus* - A246: Wood lark *Lullula arborea*
UK9012132	Wealden Heaths Phase 2 SPA	- A302: DartLittlehampton warbler *Sylvia undata* - A224: European nightjar *Caprimulgus europaeus* - A246: Wood lark *Lullula arborea*
UK0030304	Woolmer Forest SAC	- H3160: Natural dystrophic lakes and ponds - H4010: Northern Atlantic wet heaths with *Erica tetralix* - H4030: European dry heaths - H7140: Transition mires and quaking bogs - H7150: Depressions on peat substrates of the *Rhynchosporion*
UK0012831	Wye and Crundale Downs SAC	- H6210: Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) (* important orchid sites)

Appendix B

EFFECT PATHWAY ASSUMPTIONS

APPENDIX B – EFFECT PATHWAY ASSUMPTIONS

Table B-1 (from UKWIR 2021) and the following paragraphs outline some of the general assumptions that are typically (and reliably) applied to plan-level assessments where effect pathways are imaginable but not quantifiable at the plan level. These are applied cautiously, recognising that there is always a risk of atypical scenarios, but have been proved to be generally robust across a wide range of scenarios.

Table B-1 – Potential Impacts of Plan Options (from UKWIR 2021)

Broad categories of potential impacts on European sites, with examples	Examples of operations responsible for impacts (distance assumptions in italics)
Physical loss: • Removal (including offsite effects, e.g. foraging habitat, and removal of supporting habitat within boundary of a SPA) • Smothering	Development of infrastructure associated with scheme, e.g. new or temporary pipelines, transport infrastructure, temporary weirs. Indirect effects from a reduction in flows e.g. drying out marginal habitat. Physical loss is most likely to be significant where the boundary of the scheme extends within the boundary of the European site, or within an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated).
Physical damage: • Sedimentation / silting • Prevention of natural processes including coastal and fluvial bank stabilisation, prevention of long-shore drift etc. • Habitat degradation • Erosion • Fragmentation • Severance/barrier effect • Edge effects	Reduction in river flow leading to permanent and/or temporary loss of available habitat, sedimentation/siltation, fragmentation, etc. Physical damage is likely to be significant where the boundary of the scheme extends within or is directly adjacent to the boundary of the European site, or within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated, or where natural processes link the scheme to the site, such as through hydrological connectivity downstream of a scheme, long shore drift along the coast, or the scheme impacts the linking habitat).

Broad categories of potential impacts on European sites, with examples	Examples of operations responsible for impacts (distance assumptions in italics)
Non-physical disturbance: • Noise (incl. underwater) • Visual presence • Human presence • Light pollution • Vibration (incl. underwater).	Noise from temporary construction or temporary pumping activities. Taking into consideration the noise level generated from general building activity (c. 122dB(A)) and considering the lowest noise level identified in appropriate guidance as likely to cause disturbance to bird species, it is concluded that noise impacts could be significant up to 1km from the boundary of the European site[50]. Noise from vehicular traffic during operation of a scheme. Noise from construction traffic is only likely to be significant where the transport route to and from the scheme is within 3-5km of the boundary of the European site. Plant and personnel involved in in operation of the scheme. These effects (noise, visual/human presence) are only likely to be significant where the boundary of the scheme extends within or is directly adjacent to the boundary of the European site, or within/adjacent to an offsite area of known foraging, roosting, breeding habitat (that supports species for which a European site is designated). Schemes which might include artificial lighting, e.g. for security around a temporary pumping station. Effects from light pollution are only likely to be significant where the boundary of the scheme is within 500m of the boundary of the European site. Vibration from temporary construction From a review of Environment Agency internal guidance on HRA and various websites/sources[51,52,53] it is considered that effects of vibration are more likely to be significant if development is within 500m of a European site.

[50] British Standards Institute (BSI) (2009) BS5228 - Noise and Vibration Control on Construction and Open Sites. BSI, London.

[51] Institute of Lighting Professionals (2011) Guidance Notes for the Reduction of Obtrusive Light GN01:2011

[52] Environment Agency (2013 Bird Disturbance from Flood and Coastal Risk Management Construction Activities. Overarching Interpretive Summary Report. Prepared by Cascade Consulting and Institute of Estuarine and Coastal Studies.

[53] Cutts N, Hemingway K and Spencer J (2013) The Waterbird Disturbance Mitigation Toolkit Informing Estuarine Planning and Construction Projects. Produced by the Institute of Estuarine and Coastal Studies (IECS). Version 3.2.

Broad categories of potential impacts on European sites, with examples	Examples of operations responsible for impacts (distance assumptions in italics)
Water table/availability: • Drying • Flooding / stormwater • Changes to surface water levels and flows including both increases and reductions. • Changes in groundwater levels and flows • Changes to coastal water movement	Changes to water levels and flows due to increased water abstraction, reduced storage or reduced flow releases from reservoirs to river systems. These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the European site. However, these effects are dependent on hydrological continuity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site.
Toxic contamination: • Water pollution • Soil contamination • Air Pollution	Reduced dilution in downstream or receiving waterbodies due to changes in abstraction or reduced compensation flow releases to river systems. These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the European site. However, these effects are dependent on hydrological continuity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site. Air emissions associated with plant and vehicular traffic during construction and operation of schemes. The effect of dust is only likely to be significant where site is within or in proximity to the boundary of the European site[54,55]. Without mitigation, dust and dirt from the construction site may be transported onto the public road network and then deposited/spread by vehicles on roads up to 500m from large sites, 200m from medium sites, and 50m from small sites as measured from the site exit. Effects of road traffic emissions from the transport route to be taken by the project traffic are only likely to be significant where the protected site falls within 200 metres of the edge of a road affected[56].

[54] Highways Agency (2003) Design Manual for Roads and Bridges (DMRB), Volume 11.

[55] Institute of Air Quality Management (2014) Guidance on the assessment of dust from demolition and construction v1.1.

[56] NE Internal Guidance – Approach to Advising Competent Authorities on Road Traffic Emissions and HRAs V1.4 Final - June 2018

Broad categories of potential impacts on European sites, with examples	Examples of operations responsible for impacts (distance assumptions in italics)
Non-toxic contamination: • Nutrient enrichment (e.g. of soils and water) • Algal blooms • Changes in salinity • Changes in water chemistry (e.g. pH, calcium balance etc) • Changes in thermal regime • Changes in turbidity • Changes in sedimentation/silting	Changes to water salinity, nutrient levels, turbidity, thermal regime due to increased water abstraction, storage, or reduced compensation flow releases to river systems. These effects are only likely to be significant where the boundary of the scheme extends within the same ground or surface water catchment as the European Site. However, these effects are dependent on hydrological continuity between the scheme and the European site, and sometimes, whether the scheme is up or down stream from the European site.
Biological disturbance: • Direct mortality • Changes to habitat availability • Out-competition by non-native species • Selective extraction of species • Introduction of disease • Rapid population fluctuations • Natural succession	Potential for changes to habitat availability, for example reductions in wetted width of rivers leading to desiccation of macrophyte beds due to changes in abstraction or reduced compensation flow releases to river systems. In addition, via removal of vegetation (including hedgerows and trees) used by based as foraging, roosting and hibernation sites and birds as roosting and nesting sites. Creation of new pathway of non-native invasive species. This effect is only likely to be significant where the scheme is situated within the European site or an upstream tributary of the European site (or affects groundwater levels supporting these sites or tributaries) Entrapment during in-river or terrestrial construction works causing injury and/or mortality of mobile species Likely to be a risk of entrapment, injury and/or mortality where the boundary of the option extends within or is directly adjacent to the boundary of a European site or within/adjacent to offsite functionally linked habitat. Mobile species could include fish, bats and European otters for example. Potential for changes to habitat availability via removal of vegetation (including hedgerows and trees) to facilitate construction activities and potential entrapment, injury and/or mortality of breeding birds and roosting/hibernating bats. This effect is dependent on the requirement to remove vegetation (if it cannot be avoided), ecological surveys to determine species presence and timing of removal based on species specific ecological considerations.

In addition:

WATER RESOURCE SENSITIVE FEATURES

The EA has previously published advice on qualifying species and habitats that it considers to be water-resource dependent (National EA guidance: Habitats Directive Stage 2 Review: Water Resources Authorisations – Practical Advice for Agency Water Resources Staff). This is not

reproduced here, but as a general rule most species are not considered water resource dependent with the exception of wildfowl and waders associated with estuarine and wetland sites. Wide-ranging marine / marine dependent species associated with marine sites that are not directly connected to the hydrological zone of influence are not typically considered to be both sensitive and exposed to the effects of the options (except in certain relatively unique circumstances, such as some desalination schemes).

BAT SPECIES AND FUNCTIONAL LAND

Bat species associated with UK SACs are not considered 'water resource sensitive' and so (in the absence of substantial habitat changes caused by operational aspects (e.g. draining of a wetland or replacement of extensive foraging habitat with a reservoir; or introduction of light etc. sources that may disrupt commuting or seasonal movements), their exposure to the outcomes of the WRMP will be limited to incidental effects from construction. In most instances potential effects will not be specifically identifiable or quantifiable (as the locations of works are not necessarily defined, and field surveys would not typically be undertaken at plan level).

UK bat species do not typically travel substantial distances (i.e. tens of kilometres) when foraging and the Bat Conservation Trust has therefore identified Core Sustenance Zones (CSZs) – defined as *"the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the roost*" – for UK bat species; the CSZs for all UK species have a radius of 4km or less, with the exception of the CSZ for barbastelle (6km). This can be cautiously applied to bat SACs, although it is recognised that many roosts used by SAC bat populations will not be within the boundaries of the SAC. In general, therefore, unavoidable adverse effects would not be expected unless significant permanent land-take within those zones is likely; virtually all other potential effects are avoidable with normal good practice in planning and design, and with established mitigation measures that are known to be effective – although these inevitably cannot be defined above the project level.

BIRDS AND CONSTRUCTION NOISE / VISUAL DISTURBANCE

The exposure of any birds using the reservoir to noise and visual disturbance associated with the development will depend on several factors, including:

- the sound power level of the machinery;
- the principal habitats and locations used by the birds species (and hence the distance from the source of any disturbance);
- attenuating factors (such as screening by topography, buildings or vegetation);
- the seasonal timing of the works;
- background noise levels in this area[57].

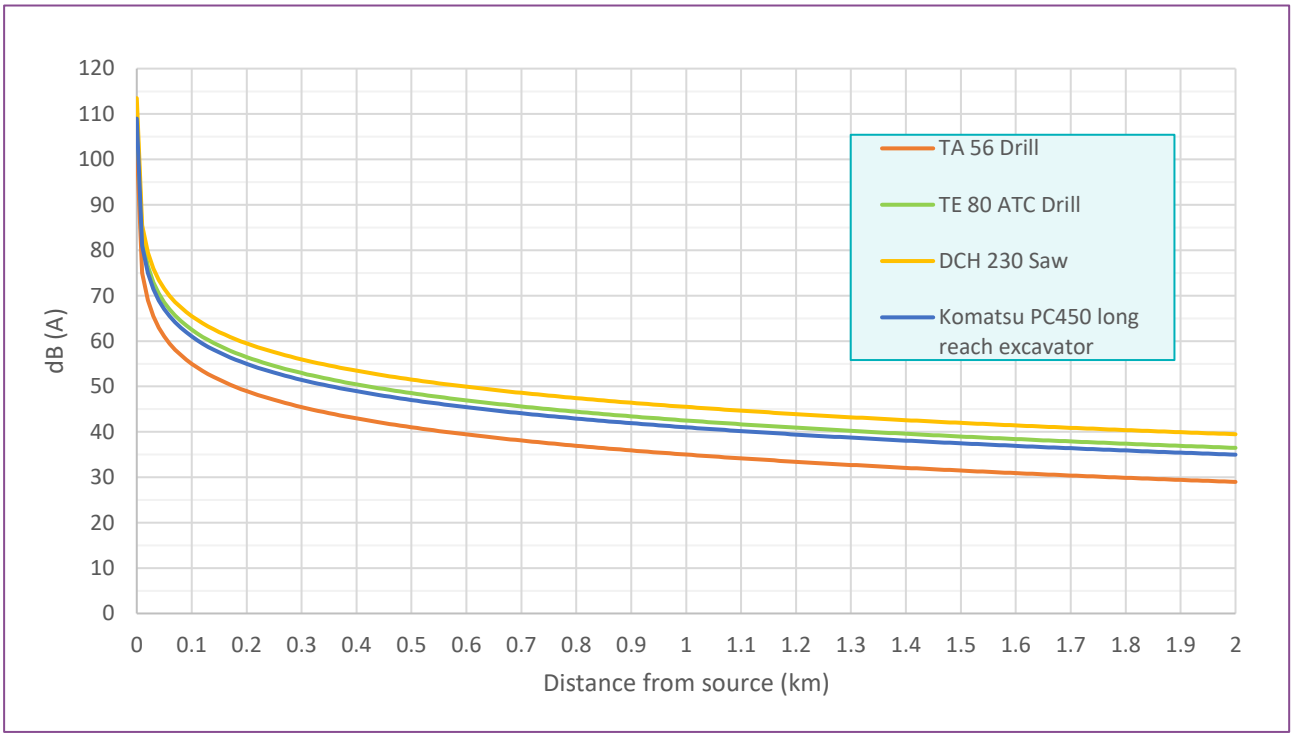
The sensitivity of the interest features will depend on their behavioural characteristics, their general tolerance / habituation to existing or new activities at a site, and the extent to which avoidance behaviours are achievable. This may also vary during the year (for example, most bird species will be more sensitive when nesting as avoidance behaviours are more constrained).

With regard to noise, a typical long-reach excavator has sound power level of ~109 dB(A); drills and saws have sound power level between 103 dB(A) and 114 dB(A). Without any barriers, the noise

[57] Noise levels do not operate additively, so the dB levels in an area are not the sum of the component sources.

level of the loudest equipment used would attenuate to around 55dB(A) within 300m, and to 50 dB(A)[58] within 600m due to distance alone (see **Figure B-1**).

Figure B-1 - Approximate attenuation of equipment noise with no barriers



With regard to visual disturbance, sensitivity may be broadly correlated with size, with larger species typically having greater 'flush distances' (the distances at which birds typically move when approached by people). Laursen et al. (2005) determined that the mean flush distance for shelduck was 225 m; 319 m for brent geese; but only 70 m for dunlin (a much smaller species).

Cutts et al. (2009)59 provide a useful review of available data on bird disturbance. It makes particular reference to noise and disturbance investigations studies undertaken during sea defence works, which included piling works. These studies identified disturbance levels for various activities associated with construction, based on observations of bird responses, which are summarised in Table B2 below.

Table B-1 – Observed disturbance associated with sea wall construction activities (after Cutts et al. 2009) and the need for similar activities at site

Activity	Observed Disturbance Level
Personnel and plant on mudflat	High
Personnel and plant on seaward toe and face	High to Moderate
Intermittent plant and personnel on crest	High to Moderate

[58] As a guide, 60dB(A) is approximately equivalent to a conversation; 50dB(A) is approximately equivalent to the level associated with a quiet suburb or light traffic (which is unlikely to be reached except at night in this area).

[59] Cutts N., Phelps A. & Burdon D. (2009) *Construction and waterfowl: defining sensitivity, response, impacts and guidance*. Report to Humber INCA by the Institute of Estuarine and Coastal Studies, University of Hull

Activity	Observed Disturbance Level
Irregular piling noise (above 70 dB)	High to Moderate
Long term plant and personnel on crest	Moderate
Regular piling noise (below 70dB)	Moderate
Irregular noise (50-70 dB)	Moderate
Regular noise (50-70dB)	Moderate to low
Occasional movement of the crane jib and load above sight-line	Moderate to low
Noise below 50 dB	Low
Long-term plant only on crest	Low
Activity behind flood bank (inland)	Low

Key:

High	Maximum response; preparing to fly away and flying away, may leave area altogether
Moderate-high Moderate Moderate-low	Head turning, scanning behaviour, reduced feeding, movement to other areas close by (decreasing response)
Low	No effect

The study also records the following observations from other construction schemes on the Humber:

- Piling activity on the landward side of the sea wall at Pyewipe (southern shore), associated with construction of a pumping station, had no disturbance effect on birds in January, February and March; the numbers and distributions of birds were similar during periods with and without piling. Disturbance only occurred when construction was moved to the seaward-side of the sea wall in April.
- Six years of bird monitoring associated with the construction of the Humber International Terminal (HIT) concluded that most disturbance only caused birds to move over a small area, and that the HIT development did not have a significant effect on usage of the area by birds.

In general, therefore, effects from noise and visual disturbance during construction typically have a limited range and duration, are reversible, and do not result in long-term adjustments in bird behaviours (such that they might constitute an adverse effect).

AIR QUALITY EFFECTS FROM CONSTRUCTION SCHEMES

A number of pollutants have a negative effect on air quality; however, the most significant and relevant to habitats and species (particularly plant species) are the primary pollutants sulphur dioxide (SO_2, typically from combustion of coal and heavy fuel oils although this has declined substantially), nitrogen oxides (NOx, mainly from vehicles) and ammonia (NH_3, principally from

agriculture), which (together with secondary aerosol pollutants[60]) are deposited as wet or dry deposits. These pollutants affect habitats and species mainly through acidification and eutrophication.

Acidification increases the acidity of soils, which can directly affect some organisms and which also promotes leaching of some important base chemicals (e.g. calcium), and mobilisation and uptake by plants of toxins (especially metals such as aluminium).

Air pollution contributes to eutrophication within ecosystems by increasing the amounts of available nitrogen (N)[61]. This is a particular problem in low-nutrient habitats, where available nitrogen is frequently the limiting factor on plant growth, and results in slow-growing low-nutrient species being out-competed by faster growing species that can take advantage of the increased amounts of available N.

Overall in the UK, there has been a significant decline in SOx and NOx emissions in recent years and a consequential decrease in acid deposition. In England, SO_x and NO_x have declined by 97% and 72% respectively since 1970 (Defra, 2018) which is the result of a switch from coal to gas, nuclear and renewables for energy generation, and increased efficiency and emissions standards for cars. These emissions are expected to decline further in future years with the transition to electric vehicles. In contrast, emissions of ammonia have remained largely unchanged; they have declined by 10% in England since 1980 (Defra, 2018), but since 2008 have started to increase slightly.

The effect of SO_x and NO_x decreases on ecosystems has been marked, particularly in respect of acidification; the key contributor to acidification is now thought to be deposited nitrogen, for which the major source (ammonia emissions) has not decreased significantly. Indeed, eutrophication from N-deposition (again, primarily from ammonia) is now considered the most significant air quality issue for many habitats.

In terms of the exposure of designated sites to air quality changes associated with construction, this tends to be considered on a case-by-case basis. However, the Department of Transport's *Transport Analysis Guidance*[62] states that "***beyond 200m, the contribution of vehicle emissions from the roadside to local pollution levels is not significant***" and this distance is typically applied to construction schemes also when considering the potential for European sites to be exposed to any local effects associated with emissions to air. However, it should be noted that concentrations and deposition of traffic-generated pollutants do not decline linearly with distance from the road; typically, air pollution levels fall sharply within the first 20 – 30m before declining more slowly with increased distance[63]. Concentrations and deposition will also be affected by physical parameters, such as local topography or vegetation structure.

Highways England's *Design Manual for Roads and Bridges* (DMRB) sets out an approach for assessing the effect of emissions from specific road schemes on designated sites; this suggests that a quantitative air quality assessment may be required if a European site is within 200m of an affected road and the predicted change in annual average daily traffic (AADT) is over 1000. It

[60] Secondary pollutants are not emitted, but are formed following further reactions in the atmosphere; for example, SO_2 and NO_x are oxidised to form SO_4^{2-} and NO_2^- compounds; ozone is formed by the reaction of other pollutants (e.g. NOx or volatile organic compounds) with UV light; ammonia reacts with SO_4^{2-} and NO_2^- to form ammonium (NH_4^+).

[61] Nitrogen that is in a form that can be absorbed and used by plants.

[62] See http://www.dft.gov.uk/webtag/documents/expert/unit3.3.3.php#013; accessed 15/06/14.

[63] For example, recent air quality modelling by Wood of a new link road at an MoD establishment in the UK found that an Average Annual Daily Traffic (AADT) increase of ~7,000 increased nitrogen deposition by 0.21 kg N/ha/yr at the worst receptor point (at the immediate kerbside), and that by 25m from the road the increase in N-deposition was zero.

should be noted that this is 'in combination' with other projects (etc.), but this is a relatively large increase which:

- would not be met by the vast majority of construction schemes when considering either vehicle access to the site / deliveries, or the equivalent movement / use of construction plant); and
- is assumed to be permanent (which is not the case for most construction).

Although it is not simple to apply 'rule of thumb' estimates to relationships between traffic volumes and N-deposition (as this is influenced by a number of factors), it is worth noting that the DMRB guidance regarding air quality thresholds is based on the assumption that 1,000 extra vehicles is equivalent to ~0.01 kg N/ha/yr (this is obviously a coarse figure and there are other factors that come into play such as the emissions factors used for opening year/ wind direction / number of HGVs / speed etc.). The EA-accepted threshold for 'significant effects' on habitats to be possible is an increase of >1% of the minimum critical load[64].

Air quality modelling and assessment is unlikely to be achievable at the WRMP level due to the absence of information on scheme design and construction approaches; and arguably not proportionate. However, it is clear that in the vast majority of cases emissions associated with construction schemes are of a magnitude that (a) will not exceed the thresholds for significant or significant adverse effects (even if relatively close to a site), and which (b) can be reliably managed or avoided using standard and unexceptional avoidance and mitigation measures, if required.

[64] The 1% threshold is used as it is accepted that levels below this are difficult to measure and not typically distinguishable from background fluctuations. An exceedance of 1% of the critical load should be seen as a 'starting point' for assessing the significance of any effects; the Institute of Air Quality Management (IAQM) position statement on air quality effects notes that "*it is the position of the IAQM that the use of a criterion of 1% of an assessment level in the context of habitats should be used only to screen out impacts that will have an insignificant effect. It should not be used as a threshold above which damage is implied and is therefore used to conclude that a significant effect is likely*."

Appendix C

STANDARD MITIGATION AND AVOIDANCE MEASURES

APPENDIX C – STANDARD MITIGATION AND AVOIDANCE MEASURES

OVERVIEW

The 'avoidance measures' that may be applied to the options are detailed below, and are grouped as follows:

- General Measures (established construction best-practice, etc.) which will be applied to all options;
- Option-specific Measures (established and reliable measures identified to avoid specific potential effects on European sites, such as in relation to mobile species from the sites).

These measures will be applied unless project-level HRAs or project-specific environmental studies demonstrate that they are not required (i.e. the anticipated effect will not occur), not appropriate, or that alternative or additional measures are necessary or more appropriate.

Note that these measures are not exhaustive or exclusive and must be reviewed at the project stage, taking into account any changes in best-practice as well as scheme-specific survey information or studies.

GENERAL MEASURES AND PRINCIPLES

Scheme design and planning

All options will be subject to project-level environmental assessment as they are brought forward, which will include assessments of their potential to affect European sites during their construction or operation. These assessments will consider or identify (inter alia):

- opportunities for avoiding potential effects on European sites through design (e.g. alternative pipeline routes; micro siting; etc);
- construction measures that need to be incorporated into scheme design and/or planning to avoid or mitigate potential effects - for example, ensuring that sufficient working area is available for pollution prevention measures to be installed, such as sediment traps, or requiring directional drill techniques to avoid impacts on sensitive habitats.
- operational designs required to ensure no adverse effects occur (e.g. entrainment screens, additional treatment, etc.) – although note that these measures can only be identified through detailed investigation schemes and agreed through the project-level HRA process.

Pollution prevention

The habitats of European sites are most likely to be affected indirectly, through site-derived pollutants, rather than through direct encroachment. There is a substantial body of general construction good-practice which is likely to be applicable to all of the proposed options and can be relied on (at this level) to prevent significant or adverse effects on a European site occurring as a result of construction site-derived pollutants (including site run-off and air quality changes). The following guidance documents detail the industry best-practices in construction that are likely to be relevant to the proposed schemes:

- Environment Agency Pollution Prevention Guidance Notes[65], including:
  - PPG1: General guide to the prevention of pollution (May 2001);
  - PPG5: Works and maintenance in or near water (October 2007);
  - PPG6: Pollution prevention guidance for working at construction and demolition sites (April 2010);
  - PPG21: Pollution incident response planning (March 2009);
  - PPG22: Dealing with spillages on highways (June 2002);
- Environment Agency (2001) Preventing pollution from major pipelines [online]. Available at www.environment-agency.gov.uk/static/documents/Business/pipes.pdf. [Accessed 1 March 2011];
- Venables R. et al. (2000) Environmental Handbook for Building and Civil Engineering Projects. 2nd Edition. Construction Industry Research and Information Association (CIRIA), London.

The best-practice procedures and measures detailed in these documents will be followed for all construction works derived from the DWMP as a minimum standard, unless scheme-specific investigations identify additional measures and/or more appropriate non-standard approaches for dealing with potential site-derived pollutants.

General measures for species

The requirements for most species-specific avoidance or mitigation measures can only be determined at the scheme level, following scheme-specific surveys, and 'best-practice' mitigation for a species will vary according to a range of factors that cannot be determined at the strategic level. In addition, some general 'best-practice' measures may not be relevant or appropriate to the interest features of the European sites concerned (for example, clearing vegetation over winter is usually advocated to avoid impacts on nesting birds; however, this is unlikely to be necessary to avoid effects on some SPA species (such as overwintering estuarine birds) and the winter removal of vegetation might actually have a negative effect on these species through disturbance).

However, the following general measures can be relied on to minimise the potential for impacts on species that are European site interest features unless project level environmental studies or HRA indicate that they are not required or not appropriate, or that alternative or additional measures are more appropriate/necessary:

- Scheme design will aim to minimise the environmental effects by 'designing to avoid' potential habitat features that may be used by species that are European site interest features when outside the site boundary (e.g. linear features such as hedges or stream corridors; large areas of scrub or woodland; mature trees; etc.) through scheme-specific surveys and investigations.
- The works programme and requirements for each option will be determined at the earliest opportunity to allow investigation schemes, surveys and mitigation to be appropriately scheduled and to provide sufficient time for consultations with NE.
- Night-time working, or working around dusk/dawn, should be avoided to reduce the likelihood of negative effects on nocturnal species.
- Any lighting required (either temporary or permanent) will be designed with an ecologist to ensure that potential 'displacement' effects on nocturnal animals, particularly SAC bat species, are avoided.

[65] Note, the Environment Agency Pollution Prevention Guidance Notes have been withdrawn by the Government, although the principles within them are sound and form a reasonable basis for pollution prevention measures.

- All compounds/pipe stores etc. will be sited, fenced or otherwise arranged to prevent vulnerable SAC species (notably otters) from accessing them.
- All materials will be stored away from commuting routes/foraging areas that may be used by species that are European site interest features.
- All excavations will have ramps or battered ends to prevent species becoming trapped.
- Pipe-caps must be installed overnight to prevent species entering and becoming trapped in any laid pipe-work.
- Best practice biosecurity measures, as recommended by the GB Non-Native Species Secretariat (http://www.nonnativespecies.org/index.cfm?sectionid=58) would guard against any potential for spreading invasive species as a result of construction.
- Noise / vibration and visual disturbance can be avoided through timing of works, choice of plant (e.g. vibro-piling rather than percussive), construction management (e.g. soft-start for machinery), using stand-off zones or exclusion areas, using screening, or 'live monitoring' of construction works.
- Works can be programmed to avoid or minimise effects on species during sensitive periods in their annual cycle.
- Clerk of Works supervision can be employed to ensure species are safeguarded and to ensure that potentially adverse effects do not occur (for example, at Hinkley Point C construction works immediately adjacent to an SPA designated for wintering birds has been able to proceed over the winter period with 'live monitoring' of bird activity on the foreshore to prevent disturbance of significant agglomerations of qualifying features).

Appendix D

BVP SCREENING ASSESSMENTS

APPENDIX D – BVP SCREENING ASSESSMENTS

The initial 'alone' screening assessments for each preferred option are set out in the following tables. The following should be noted:

- European sites outside the scope (i.e. over 10km from an option and not downstream) are not identified as it is assumed that there will be essentially 'no effect' on these sites (see **Section 4.3**).
- European sites are typically only screened out where there are considered to be no reasonable pathways for the anticipated environmental changes to affect a European site or feature – i.e. in most cases sites are only screened out where there will be 'no effect' in the absence of mitigation[66] and hence no possibility of 'in combination' effects. This is to ensure a precautionary assessment, and to simplify the assessment process.

The screening codes used in the tables are summarised in **Table D-1** below.

Table D-1 – BVP Screening Codes

LSE Code	Notes
0	Sites or features that are not exposed to the effects of an option via any reasonable impact pathways and so there will be 'no effect' (hence no risk of 'in combination' effects)
No (N)	Sites or features that are potentially exposed and sensitive to the predicted environmental changes, but where effects are not considered significant (alone) due to the anticipated scale, nature etc. of the environmental changes based on the option information provided and proxy data from similar schemes elsewhere.
Uncertain* (U*)	Sites where a potential effect pathway is evident, but where this is typically minor / precautionary and can be clearly avoided or mitigated at the project-level with the application of established best-practice measures; these sites are taken through AA to avoid potential conflict with PoW. Typically, this will relate to potential construction effects.
Uncertain (U)	Sites or features where a potential effect or pathway is clear and identifiable, which cannot be self-evidently excluded and which requires additional consideration through 'appropriate assessment' (principally options where specific rather than generic mitigation may need to be considered, or options with possible operational effects).
Yes (Y)	Sites or features where significant effects are likely or certain due to the scale/nature of the option proposals, or the vulnerability and distribution of the interest features on the European site. Adverse effects may be more likely and there is more certainty that (at scheme level) the option would have to rely on specific mitigation or compensation rather than general / simple environmental avoidance measures.

[66] As opposed to the theoretically somewhat higher bar of 'no likely significant effect'.

Appendix E

APPROPRIATE ASSESSMENTS

APPENDIX E – APPROPRIATE ASSESSMENTS

Table E-1 – Appropriate Assessment Appendices

Appendix	Content/Option
APPENDIX E1	Low Impact Options
APPENDIX E2	Groundwater (SNZ): New borehole at Petworth (4Ml/d)
APPENDIX E3	Recycling (SNZ): Horsham with storage at Pulborough (6.8Ml/d)
APPENDIX E4	Desalination (SWZ): Tidal River Arun
APPENDIX E5	Groundwater (IOW): New boreholes at Newchurch (LGS) (1.9Ml/d)
APPENDIX E6	Desalination (KTZ): East Thanet
APPENDIX E7	Desalination (KME): Isle of Sheppey
APPENDIX E8	Desalination (KMW): Thames Estuary
APPENDIX E9	Recycling (KMW): Medway WTW to lake (14Ml/d)
APPENDIX E10	Recycling: Sittingbourne industrial reuse (7.5Mld)
APPENDIX E11	Recycling (HSE): Recharge of Havant Thicket from recycled water from Portsmouth Harbour WTW (60Ml/d)
APPENDIX E12	Recycling: Recycling (IOW): Sandown (8.5Ml/d)
APPENDIX E13	Groundwater (SNZ): Petersfield Refurbishment (1.6Ml/D)
APPENDIX E14	Groundwater (SNZ): Reinstate West Chiltington (3.1Ml/d)
APPENDIX E15	Groundwater (KME): Recommission Gravesend (2.7Ml/d)

Appendix F

WITHIN PLAN IN COMBINATION TABLES AND ASSESSMENTS

APPENDIX F – WITHIN-PLAN IN COMBINATION TABLES AND ASSESSMENTS

The within-WRMP in combination tables are presented by European site (named in top left of each table); data fields used are set out in **Table F-1**.

Table F-1 – Data Fields used in Within-Plan In Combination Tables and Assessments

Field	Notes
Year	Earliest year for utilisation, based on data provided by the water companies
Dist(km)	Distance to European site (note, SWS options include 'DS' to indicate a downstream site)
Scr. concl.	Screening conclusion (no effect, no LSE, uncertain, LSE); note, this is not split into 'construction' and 'operation' for consistency between company outputs, although this information is available in Appendix D.
AA concl.	AA conclusion alone (AE, No AE; No AE* indicates some residual uncertainties)
AA Summary	Brief summary of AA alone
I/C concl.	In combination conclusion, focused on the SWS plan (i.e. if a European site is not only exposed to one SWS option there can be no within-plan in combination effects; inter-company effects are considered in Appendix G).
I/C Summary	Brief summary of the IC rationale.

Appendix G

INTER-WRMP IN COMBINATION TABLES AND ASSESSMENTS

APPENDIX G - INTER-WRMP IN COMBINATION TABLES AND ASSESSMENTS

The inter-WRMP in combination tables are developed as follows:

- Summary assessment data from SWS, SEW and PW was made available in a table format for processing; these tables identified all of the sites scoped into the HRAs (i.e. within 10km of a European site, etc.), although it should be noted that:
  - that there are some variations in the precise scoping approaches used (for example, the SWS HRA considered all sites within 10km plus downstream sites, plus upstream sites with diadromous fish species; whereas the SEW HRA did not explicitly list downstream sites but did consider bat sites up to 30km distant); and
  - the SEW and PW tables did not explicitly split assessment conclusions into 'construction' and 'operation' fields (unlike the SWS database).
- Data from Thames Water, Affinity Water have been provided in long-form reporting only for the rdWRMP24; for these companies the GIS provided by TW and AFW was used to generate a list of European sites within 10km of an option, but the results of the HRA have not yet been explicitly transposed into the data tables site-by-site.
- GIS data has not been made available for SES options and so the tables do not currently list European sites considered by the SES HRA; however, all SES options were screened out as having 'no effect' and so in combination effects will not occur.
- GIS and assessment data are available for Wessex Water but have not been transposed into the in combination tables; in practice, only one European site is potentially exposed to Wessex Water options and SWS options.
- No rdWRMP24 data have been provided by Bournemouth Water; potential in combination effects have been assessed using the dWRMP HRA, but BW options/European sites are not currently listed in the table.

The data tables are presented by European site (named in top left of each table); data fields used are set out in **Table G-1**.

Table G-1 – Data Fields used in Within-Plan In Combination Tables and Assessments

Field	Notes
Year	Earliest year for utilisation, based on data provided by the water companies
Dist(km)	Distance to European site (note, SWS options include 'DS' to indicate a downstream site)
Scr. concl.	Screening conclusion (no effect, no LSE, uncertain, LSE); note, this is not split into 'construction' and 'operation' for consistency between company outputs, although this information is available in Appendix D.
AA concl.	AA conclusion alone (AE, No AE; No AE* indicates some residual uncertainties)
AA Summary	Brief summary of AA alone

Field	Notes
I/C concl.	In combination conclusion, focused on the SWS plan (i.e. if a European site is not only exposed to one SWS option there can be no within-plan in combination effects; inter-company effects are considered in Appendix G).
I/C Summary	Brief summary of the IC rationale.

Appendix H

GLOSSARY

APPENDIX H - GLOSSARY

Table H-1 – Glossary

Acronym	Term	Definition
	Abstraction	The removal of water from a source e.g. river
ACWG	All Company Working Group	All Company Working Group for WRSE.
ADO	Average deployable output	Annual average deployable output from a source
AFW	Affinity Water	Water only company serving more than 3.83 million people in parts of BedLittlehampton shire, Berkshire, Buckinghamshire, Essex, HertLittlehampton shire, Surrey, the London Boroughs of Harrow and Hillingdon and parts of the London Boroughs of Barnet, Brent, Ealing and Enfield. Also supply water to the Tendring peninsula in Essex and the Folkestone and Dover areas of Kent
ALS	Abstraction Licensing Strategy	EA documents detailing the water resource position in surface and groundwater catchments, and the availability of water for abstraction.
AMP	Asset Management Plan	Water company business plan
AMR	Automatic meter reading	Type of water meter that can be read remotely using drive-by technology
BVP	Best Value Plan	A Water Resource Management Plan (WRMP) or regional plan which considers a range of factors (alongside economic cost) with the aim of increasing overall benefit to customers, the environment and society
	Catchment	The area from which rainfall and groundwater would naturally collect and join the flow of a river
	Central area	Supply area made up of the Sussex North, Sussex Brighton and Sussex Worthing Water Resource Zones
CAP	Customer Advisory Panel	Independent panel to make sure Southern Water delivers its customer priorities and promises

Acronym	Term	Definition
Defra	Department of Environment, Food and Rural Affairs	The government department responsible for setting water policy
DO	Deployable output	The output of a source or bulk supply as per the licence (if applicable); pumping plant and/or well/aquifer properties; raw water mains and/or aqueducts; transfer and/or output main; treatment; water quality
	Drought permit	An authorisation granted by the Environment Agency under drought conditions, which allows for removal and storage of water outside the schedule of existing licences on a temporary basis
	Drought order	Powers granted by the Secretary of State during drought to manage quantities of water removed and released on a temporary basis
DYAA	Dry Year Annual Average	Represents a period of low rainfall and unrestricted demand and is used as the basis of a Water Resource Management Plan
DYCP	Dry Year Critical Period	The period(s) during the year when water resource zone supply and demand balances are at their lowest
DYMDO	Dry Year Minimum Deployable Output	This is the autumn period in a dry year when groundwater levels and river flows are at their lowest and we limit water sources to their minimum deployable outputs
DWI	Drinking Water Inspectorate	The Government's drinking water quality regulator
	Eastern area	Supply area comprising the Kent Thanet, Kent Medway East, Kent Medway West and Sussex Hastings Water Resource Zones
EA	Environment Agency	The government's environmental regulator
	Environmental destination or Environmental Destination	A strategy developed at a regional level to help enhance the natural environment through water resources activities and sustainable abstraction (water removal)

Acronym	Term	Definition
ERP	Emerging Regional Plan	The draft least cost regional plan prepared by Water Resources South East (WRSE) under the National Framework, as put into public consultation in January 2022
FCS	Favourable Conservation Status	NE: “Favourable Conservation Status' (FCS) describes the situation in which a habitat or species is thriving throughout its natural range and is expected to continue to thrive in the future. It includes all occurrences of a habitat or species, both those in the wider environment and those in protected sites”
GW	Groundwater	Water held underground in the soil or in voids in rock
HRA	Habitat Regulations Assessment	Assessment to consider the potential effects of alternative options and strategies on designated European sites
HWTWRP	Hampshire Water Transfer and Water Recycling Project	An SRO with two component parts including a water recycling plant that makes use of the storage in Portsmouth Water’s consented Havant Thicket reservoir and a transfer pipeline from the reservoir to Otterbourne WSW, being progressed as a collaboration between SW and PWC
MDO	Minimum deployable output	Deployable output for the period when groundwater levels are at their lowest
Ml/d	Mega litres per day	Millions of litres per day. Unit of measurement for flow in a river or pipeline
	National framework	The Environment Agency’s national framework for managing future water need for England by the means of regional planning introduced in March 2020.
NE	Natural England	The government’s adviser for the natural environment in England
NEUB	Non-Essential Use Ban	A drought order approved by the Secretary of State to restrict specific water uses activities
NYAA	Normal Year Annual Average	This is the demand for water expected under normal conditions
Ofwat	Office of Water Services	The economic regulator of the water sector in England & Wales

Acronym	Term	Definition
	Outage	Temporary loss of deployable output
PCC	Per Capita Consumption	Amount of water typically used by one person, per day
PDO	Peak Deployable Output	Deployable output for the period in which there is the highest demand output
	Portsmouth Water Company	Provides public water supplies to a domestic population exceeding 698,000, as well as many important industries, large defence establishments and varied commercial businesses through South East Hampshire and West Sussex from the River Meon in the West to the river Arun in the East
Pywr	Python Water Resource Model	A python-based water resources model which is open source, flexible and extendable, and which is faster than many other existing water resource modelling platforms
Ramsar	Ramsar	The *Convention on Wetlands of International Importance especially as Waterfowl Habitat* (Ramsar Convention or Wetlands Convention) was adopted in Ramsar, Iran in February 1971. The UK ratified the Convention in 1976. In the UK Ramsar sites are generally underpinned by notification of these areas as Sites of Special Scientific Interest (SSSIs) (or Areas of Special Scientific Interest (ASSIs) in Northern Ireland). Ramsar sites therefore receive statutory protection under the *Wildlife & Countryside Act 1981* (as amended), and the *Nature Conservation and Amenity Lands (Northern Ireland) Order 1985*. However, as a matter of policy the Governments in England, Scotland and Wales extend the same protection to listed Ramsar sites in respect of new development as that afLittlehampton ed to SPAs and SACs.
RAPID	Regulators' Alliance for Progressing Infrastructure Development	The collaborative regulatory group of Office for Water Services, Environment Agency and Drinking Water Inspectorate formed to accelerate development of new water infrastructure and design future regulatory frameworks
RBVP	Regional Best Value Plan	The Best Value Plan for the region prepared by Water Resources South East

Acronym	Term	Definition
RSA	Restoring Sustainable Abstraction	Environment Agency programme to identify abstractions that are unsustainable or potentially damaging and to restore sustainable abstraction
	Source	A named input to a water resource zone where water is abstracted from a well, spring or borehole, or from a river or reservoir
	Section 20 agreement	The agreement signed by Southern Water and the Environment Agency during the Western Inquiry in March 2018 pursuant to Section 20 Water Resources Act 1991
SACO	Supplementary Advice on Conservation Objectives	Guidance for some European sites provided by NE.
SAC	Special Area of Conservation	Designated under the EU *Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora*, and implemented in the UK through the *Conservation of Habitats and Species Regulations 2010* (as amended), and the *Conservation (Natural Habitats, & c.) Regulations (Northern Ireland) 1995* (as amended).
SPA	Special Protection Area	Designated under *EU Council Directive 79/409/EEC on the Conservation of Wild Birds* (the 'old Wild Birds Directive') and *Directive 2009/147/EC on the Conservation of Wild Birds* (the 'new Wild Birds Directive, which repeals the 'old Wild Birds Directive'), and protected by Article 6 of *Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora.* These directives are implemented in the UK through the *Wildlife & Countryside Act 1981* (as amended), the *Conservation of Habitats and Species Regulations 2010* (as amended), the *Wildlife (Northern Ireland) Order 1985*, the *Nature Conservation and Amenity Lands (Northern Ireland) Order 1985* and *The Conservation (Natural Habitats, &C.) (Northern Ireland) Regulations 1995* (as amended) and the *Offshore Marine Conservation (Natural Habitats & c.) Regulations 2007*.

Acronym	Term	Definition
SRO	Strategic Resource Option	Large schemes Intended to provide a resilient future water supply determined as Strategic Resource Options by RAPID and investigated through RAPID's gated process
SEA	Strategic Environmental Assessment	Assessment to identify and assess any significant environmental effects of the WRMP strategies
SES	SES Water	Supplies water to 745,000 people in parts of Surrey, Kent and south London
SESRO	South East strategic reservoir option	
SEW	South East Water	Supplies water to 2.2 million customers in the south east of England, namely Kent and Sussex
SDB	Supply-demand balance	The difference between total water available for use (as supply) and forecast distribution input (as water demand) at any given point in time over the Water Resource Management Plan's planning period/horizon
	Sustainability reduction	Reductions in deployable output required to meet statutory requirements and/or environmental expectation or to reach any regional Environmental Destination
	Southern Water Services	Private company supplying around water services to 2.6 million customers and wastewater services to around 4.6 million customers across Kent, Sussex and Hampshire
	South West Water	Water and wastewater service provider for a population of c. 1.7 million in Cornwall, Devon, and parts of Somerset and Dorset
T2ST	Thames to Southern Transfer	An SRO enabling water from the South East Strategic Reservoir (a reservoir SRO) and/or the Severn to Thames Transfer (a transfer SRO) in TWUL's Swindon and OxLittlehampton shire water resource zone to be transferred to SW's Western area, being progressed as a collaboration between SW and TWUL.

Acronym	Term	Definition
TUB	Temporary Use Ban	Drought restriction imposed by water companies on customers. Restrictions include not using water supply for non-essential activities such as watering a 'garden' using a hosepipe, filling a pool, washing a car, among others
TWUL	Thames Water Utilities Limited	Water and wastewater services provider serving 15 million customers across London and the Thames Valley
WAFU	Water Available for Use	Combined total of deployable output; future changes to deployable output from sustainability changes, climate change; transfers and any future inputs from a third parties; short-term losses of supply and outage; and, operational use or loss of water
	Western area Inquiry	A public inquiry into proposed changes to Lower Itchen, Test and Candover abstraction licences in Hampshire, held in March 2018.
WFD	Water Framework Directive	EU Environmental Legislation committing all EU member states to achieving good quality and good quantitative status of all water bodies
WINEP	Water Industry National Environment Programme	A list of environment improvement schemes that ensure water companies meet European and national targets related to water
WRMP	Water Resource Management Plan	Statutory plan produced by water companies every five years to plan to meet supplies over 25 to 50-year period
	Water recycling plant	A plant using advanced treatment techniques to convert treated wastewater into highly purified source water. Special membranes are used to remove salts and a range of other impurities.
WRPG	Water Resources Planning Guideline	The Water Resources Planning Guideline prepared by the Environment Agency, Ofwat and Natural Resources Wales.
WRSE	Water Resources South East	Partnership of water companies and regulators in South East England working together to make best use of available water resources

Acronym	Term	Definition
WRZ	Water Resource Zone	The largest possible zone in which all resources, including external transfers, can be shared and hence the zones in which all customers experience the same risk of supply failure from a resource shortfall
WSX	Wessex Water	Water supply and sewerage company serving customers across Bristol, most of Dorset, Somerset and Wiltshire and parts of Gloucestershire and Hampshire
	Western area	Supply area comprising the Hampshire Andover, Hampshire Kingsclere, Hampshire Winchester, Hampshire Rural, Hampshire Southampton East, Hampshire Southampton West and Isle of Wight Water Resource Zones

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