

Arun Valley Ramsar site
Arun Valley SPA
Bridlesford Copses SAC
Duncton to Bignor Escarpment SAC
Dungeness SAC
Dungeness to Pett Level SPA
Ebernoe Common SAC
Medway Estuary and Marshes Ramsar
site
Medway Estuary and Marshes SPA
Mottisfont Bats SAC
North Downs Woodlands SAC
Peter's Pit SAC
Pevensey Levels Ramsar site
Porton Down SPA

Queendown Warren SAC
River Itchen SAC
Salisbury Plain SAC
Solent and Southampton Water
Ramsar site
Solent and Southampton Water SPA
Solent Maritime SAC
South Wight Maritime SAC
The Mens SAC
The New Forest Ramsar site
The New Forest SAC
The New Forest SPA
The Swale Ramsar site
The Swale SPA

Southern Water Water Resources Management Plan

Appropriate assessment recorded on 1st October 2009

This is a record of the appropriate assessment required by Regulation 48 of the Conservation (Natural Habitats, &c.) Regulations 1994, undertaken by Southern Water, in respect of the above plan, in accordance with the Habitats Directive (Council Directive 92/43/EEC). Under this Regulation, Southern Water Services has been designated as a Competent Authority. Having considered that the plan would be likely to have a significant effect on the protected sites listed above, and that the plan was not directly connected with or necessary to the management of the sites, an appropriate assessment has been undertaken of the implications of the proposal in view of the sites' conservation objectives. The background, methodology and two phases of strategic assessment are set out at Appendix A.

Natural England was consulted through the plan-making process and this authority (Southern Water Services) has had regard to Natural England's officers' representations about the Habitats Regulations and appropriate assessment (see Appendix B).

The sites' conservation objectives have been taken into account, including consideration of the citation for the sites and information obtained from Natural England, the Environment Agency and the JNCC (Appendix C). The likely effects of the proposal on the international nature conservation interests for which the sites were designated can be summarised as:

- loss of habitat
- effects on water quantity, quality, flows or salinities
- habitat fragmentation
- noise, visual or human activity disturbance
- affects on breeding productivity
- reduction of feeding time or quality, especially for waterfowl.

The assessment has concluded that:

The Water Resources Management Plan as proposed, and with the mitigation measures suggested at the more detailed project level that follows, would not adversely affect the integrity of the sites.

The imposition of conditions or restrictions on the way the plan proposals are to be carried out has been considered. It is ascertained that the following conditions and restrictions that are available to licensing and consenting authorities at the project consent application stage would avoid adverse effects on the integrity of the sites;

- The competent authority dealing with the planning application to extend the Testwood WSW to allow abstraction up to the limits of the existing licence should undertake an appropriate assessment of the project's effects on the Solent and Southampton Water SPA and Ramsar site, and the Solent Maritime SAC, and should take the opportunity to impose conditions that would ensure mitigation of the project's contribution to any in-combination adverse effect on the integrity of the protected sites if found necessary.
- The competent authority dealing with the planning application to install the pipeline from Testwood to Otterbourne should undertake an appropriate assessment of construction effects at any construction location close to the River Itchen SAC and impose conditions to ensure that there are no adverse effects on the integrity of the site (eg PPGs).
- The competent authority responsible for the licensing of the Candover and Arle augmentation scheme should carry out an appropriate assessment and impose any necessary seasonal or other restrictions on the licence to protect the white-clawed crayfish in the Candover stream and in the SAC downstream, and ensure also that protection against construction damage in areas adjacent to the River Itchen SAC is conditioned and monitored through the project consenting process (eg PPGs).
- The Hardham Arun abstraction scheme must be implemented in accordance with its recent planning permission including the agreed mitigation and environmental enhancement measures. The competent authority for the abstraction licence will also have to consider the need for appropriate assessment.
- In considering the reinstatement of the Cadborough borehole abstraction, the competent authority should carry out an appropriate assessment of possible effects on the grazing marshes of the Pett Level to Dungeness SPA and their suitability for use by the qualifying waterfowl. Any seasonal restrictions or other mitigation that may be found necessary to protect the integrity of the site should be enforced.
- The competent authority responsible for consenting the variation of the River Medway abstraction licence should carry out an appropriate assessment and ensure that any necessary mitigation is included to avoid impacts on the integrity of the Medway Estuary and Marshes SPA and Ramsar site.
- The competent authority responsible for consenting the Danaway abstraction should carry out an appropriate assessment to ensure that the borehole can be operated without adverse effects on the integrity of the wetland habitats that support the qualifying waterfowl, invertebrates and plants of the Medway Estuary and Marshes SPA and Ramsar site, and impose any necessary restrictions to achieve this.
- The competent authority dealing with the planning application for the Aylesford wastewater recycling scheme should undertake an appropriate assessment to ensure that changes to the quality of the water in the river do not cause any effect to the integrity of the Medway Estuary and Marshes SPA and Ramsar site

downstream, and any necessary conditions to ensure this should be imposed on the planning consent.

Southern Water is confident that each of the proposals set out in the plan is achievable with mitigation. In the unlikely case that an individual project subsequently cannot be shown not to have a significant effect on the integrity of a designated site, such that consent could not be granted, then a further options appraisal would be undertaken using the sustainability measures set out in the SEA, and an alternative source would be put forward for consent (with appropriate assessment if relevant).

Signed:



Date: 1st October 2009

APPENDIX A

Southern Water – Water Resources Management Plan

Habitats Regulations strategic assessment of measures in the adopted plan

Background

The Water Resources Management Plan (WRMP) sets out how Southern Water proposes to ensure secure water supplies to its customers from 2010 to 2035.

The Plan was developed alongside a strategic environmental assessment to ensure that the final Plan was sustainable, and represents the best possible environmental, economic and social solution. A long list of options was assessed, and a short list drawn up for iterative evaluation, with scenarios (combinations of measures) developed and refined. For full details of the Plan proposals and option locations refer to the final Water Resources Management Plan and revised SEA Environmental Report and SEA Statement published in October 2009 alongside this record of appropriate assessment.

Some of the proposed measures (options) in the final plan have the potential to adversely affect European and Ramsar sites on implementation (European sites are Special Areas of Conservation – SAC – and Special Protection Areas – SPA). While it is as yet unclear whether WRMPs fall within the scope of the Habitats Regulations, as a precaution, Southern Water (as competent authority) has subjected the Plan to a Habitats Regulations assessment ('appropriate assessment'). At present, there is insufficient record of decisions and case law to test the applicability of the Regulations, but the Company recognises the importance of the Plan in directing the scale, location and type of future water resource developments, and therefore has made a preliminary 'high-level' strategic assessment of the possible impact of proposed new resource developments in the Plan on the integrity of European and Ramsar sites.

The decision-making process in the assessment was underpinned by the precautionary principle, especially in the assessment of potential impacts and their resolution. If it was not possible to rule out a risk of harm on the evidence available then it was assumed a risk may exist and this was addressed in the assessment process.

Given the strategic nature of the Plan and appropriate assessment, the Company has endeavoured to keep the process and presentation simple, whilst maintaining compliance with the principles of the Habitats Directive. It has also tried to ensure that the level of detail used for the

assessment is proportionate, and thus reflects the level of detail in the WRMP, whilst being sufficient to make a sound judgement on whether the plan will lead to significant impacts on the integrity of the sites. The assessment has relied on existing information, especially that gathered in the formulation of the WRMP, the water resource option investigation studies underpinning the WRMP options, and in undertaking the SEA.

In many instances the realisation of the potential impacts of the measures in the Plan are not inevitable, but will depend on how the projects are actually implemented. In undertaking this assessment, the Company has therefore recognised that appropriate assessment will generally be needed for the next round of consent, licensing and development applications for any proposal that has the potential to affect a European or Ramsar site: where applicable, this assessment therefore suggests what measures may need to be considered to avoid adverse effect on the European and Ramsar sites at that stage.

This assessment is restricted to the new water resource development measures as they are set out in the final WRMP. Existing sources are undergoing appropriate assessment through the Environment Agency's ongoing review of licences in European sites. Avoidance of adverse impacts on European and Ramsar sites has been built into the Plan through the SEA process – many potential impacts on European and Ramsar sites were highlighted early in the plan-making process, and as a result the options were either modified to reduce potential effects or were removed from the Plan altogether (see the Environmental Report and SEA Statement for details). For those potential adverse effects that remain, mitigation at the plan or subsequent project level has been considered, and where this is a tested approach and where it can be assured, it is described and included as relevant when undertaking the assessment.

Methodology

The first step was to establish the location of all European and Ramsar sites that could be affected by the Plan proposals, and to summarise the important features for which the designation was made. It was recognised that the Plan could affect sites outside its boundary: for example, a protected riverine or estuarine wetland outside the Plan area could be affected by a water resource development proposal upstream within the Plan area. In the first instance, all sites within the Plan area and a 10km buffer were considered, then the following screening criteria were used as a basis for an initial sieve:

Is the location or route corridor of the proposal:

- in or within 5km of a European or Ramsar site?
- in or adjacent to a watercourse that is a SAC downstream, and for which aquatic habitats or species are included as a qualifying feature?
- in the catchment of, and within 10km of a watercourse SAC for which aquatic habitats or species are included as a qualifying feature?
- within 10km of a European or Ramsar site with highly mobile species (eg bats and waterfowl) that are qualifying features?

Each proposed measure in the plan was tested for likely significant adverse effect on each site, and a screening table produced. Where it could not be concluded there would be no significant effect, the measure-site interaction was taken forward for an appropriate assessment. Further information was collated from SEA, Natural England, JNCC and Environment Agency sources to establish the details of the qualifying features, the condition of the site, and any relevant trends and issues. The qualifying interests and associated attributes of the European and Ramsar sites were treated as “receptors” that could be affected by the proposed water resource development measures in the Plan. Each possible impact was tested against these receptors, using expert judgement based on the best available scientific knowledge, commensurate with the high-level nature of the Plan.

In undertaking the likely effect evaluation, mitigation measures were considered that would reduce or remove any adverse impact on integrity. Mitigation can be defined as ‘measures that avoid or reduce overall potential adverse effects on the integrity of European or Ramsar sites, and should be taken into account during the appropriate assessment of the impacts’. Ideally such mitigation measures are applied at the Plan level, but the strategic nature of the Plan means that there are some circumstances where a genuine lack of detail means it is not possible to predict the actual impacts of implementing a proposal. These are highlighted, and, where applicable, tested and reasonable mitigation measures that could be applied or conditioned by competent authorities at the project consent level are suggested and taken as included in determining the conclusion of this appropriate assessment.

In specific difficult circumstances where there is insufficient plan detail, such a deferral of final decisions on assessing mitigated effects to a subsequent, more detailed stage has a precedent in the land-use planning system, notably in high level plans such as Regional Spatial Strategies.

In testing likely adverse effects on integrity and the qualifying features of the European and Ramsar sites, the criteria considered included (but were not restricted to):

- Will there be a loss of habitat?
- Will water quantity or quality be affected?
- Will habitat fragmentation occur?
- Could noise, visual or human activities cause disturbance?
- Will breeding productivity be affected?
- Will feeding time or quality be reduced?

Assessment – stage 1 sieve

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
WEST	Isle of Wight	Enhanced metering	n.a.	n.a.	Generic measure, no possible effect
		Asset improvement for groundwater sources	n.a.	n.a.	This group of groundwater asset improvements are mostly small scale, minor plant improvements within existing sites that should result in more reliable supply under extreme conditions. All the asset improvement schemes proposed will limit actual abstraction to within existing licence limits. Licences are managed and granted by the Environment Agency, who are carrying out retrospective appropriate assessments for licences as necessary. It is therefore considered reasonable to exclude AMP5 asset improvement schemes from this high level strategic appropriate assessment.
		Interzonal transfer optimisation (cross Solent main)	n.a.	n.a.	Using existing assets, no possible effect
		Water efficiency kits	n.a.	n.a.	Generic measure, no possible effect
		Leakage reduction	n.a.	n.a.	Generic measure, no possible effect
		Refurbishment of borehole L536 (Ashey)	Bridlesford Copses SAC, 4km	1323 Bechstein`s bat <i>Myotis bechsteinii</i> . Ancient broadleaved woodland	No predicted effects due to re-use of existing plant, intervening distance and also the very low susceptibility of the qualifying feature to the proposal.
			South Wight Maritime SAC, 5km	1170 Reefs Subtidal reefs that extend into the intertidal zone. This site is selected on account of its variety of reef types and associated	The reefs and caves are not susceptible to the proposed development type, and there can be no predicted effects on the vegetated sea cliffs at this distance / level of development.

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
				<p>communities, including chalk, limestone and sandstone reefs.</p> <p>1230 Vegetated sea cliffs of the Atlantic and Baltic coasts Contrasting Cretaceous hard cliffs, semi-stable soft cliffs and mobile soft cliffs. The most exposed chalk cliff tops support important assemblages of nationally rare lichens, including <i>Fulgensia fulgens</i>. Vegetation communities are a mixture of acidic and mesotrophic grasslands with some scrub and a greater element of maritime species, such as thrift <i>Armeria maritima</i>, and the Glanville fritillary butterfly <i>Melitaea cinxia</i></p> <p>8330 Submerged or partially submerged sea caves The large littoral caves in the chalk cliffs are of ecological importance, with many hosting rare algal species, which are restricted to this type of habitat. The fauna of these sea caves includes a range of mollusc species such as limpets <i>Patella</i> spp. and the horseshoe worm <i>Phoronis hippocrepia</i>.</p>	
			South Wight Maritime SAC, 3km	<p>1150 Coastal lagoons (Priority feature) Including percolation, isolated and sluiced lagoons. Support a diverse fauna including large populations of three notable species: the nationally rare foxtail stonewort <i>Lamprothamnium papulosum</i>, the nationally scarce lagoon sand shrimp <i>Gammarus insensibilis</i>, and the nationally scarce starlet sea anemone <i>Nematostella vectensis</i>. The</p>	No predicted effects due to low sensitivity of the qualifying features to this type of development, and the intervening distance from the qualifying features.

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
				lagoons at Bembridge Harbour have formed in a depression behind the sea-wall and sea water enters by percolation. Species diversity in these lagoons is high and the fauna includes very high densities of <i>N. vectensis</i> .	
			Solent and Southampton Water Ramsar site, 6km	<p>Ramsar criterion 1 The site is one of the few major sheltered channels between a substantial island and mainland in European waters, exhibiting an unusual strong double tidal flow and has long periods of slack water at high and low tide. It includes many wetland habitats characteristic of the biogeographic region: saline lagoons, saltmarshes, estuaries, intertidal flats, shallow coastal waters, grazing marshes, reedbeds, coastal woodland and rocky boulder reefs.</p> <p>Ramsar criterion 2 The site supports an important assemblage of rare plants and invertebrates. At least 33 British Red Data Book invertebrates and at least eight British Red Data Book plants are represented on site. There are also 6 nationally important breeding birds (gulls and terns), 3 waders with nationally important passage counts, and 13 waterfowl species with nationally significant winter counts.</p> <p>Ramsar criterion 5 Winter waterfowl assemblage of international importance.</p> <p>Ramsar criterion 6 Internationally important spring/autumn counts of ringed plover, and winter counts of dark-</p>	No predicted direct effects on qualifying features at this distance and scale of development. Qualifying features include mobile bird flocks, but they are not dependent on the development site and there will be no indirect effect.

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				bellied Brent goose, teal, and black-tailed godwit.	
			Solent and Southampton Water SPA, 6km	<p>Article 4.1 Site supports 5 species of breeding terns and gulls in numbers of European importance.</p> <p>Article 4.2 Over winter, the site supports migratory birds in numbers of European importance (black-tailed godwit, dark-bellied Brent goose, ringed plover and teal, and also as an assemblage of more than 20,000 waterfowl).</p>	Qualifying features include mobile bird flocks, but they are not dependent on the development site and there will be no effect.
		Refurbishment of borehole K628 (Broadfields)	Bridlesford Copses SAC, 4km	<p>1323 Bechstein`s bat <i>Myotis bechsteinii</i>. Ancient broadleaved woodland</p>	No predicted effects due to re-use of existing plant, intervening distance and also the very low susceptibility of the qualifying feature to the proposal.
			Solent Maritime SAC, 0.5km	<p>1130 Estuaries The Solent and its inlets are unique in Britain and Europe for their hydrographic regime of four tides each day, and for the complexity of the marine and estuarine habitats present within the area. Sediment habitats within the estuaries include extensive estuarine flats, often with intertidal areas supporting eelgrass <i>Zostera</i> spp. and green algae, sand and shingle spits, and natural shoreline transitions</p> <p>1320 <i>Spartina</i> swards (<i>Spartinion maritimae</i>) Solent Maritime is the only site for smooth cord-grass <i>Spartina alterniflora</i> in the UK and is one of only two sites where significant amounts of small cord-grass <i>S. maritima</i> are found. It is also one of the few remaining sites for Townsend's cord-grass <i>S. x townsendii</i></p>	This is a refurbishment of an existing urban facility so no direct effects are predicted. Although the borehole is close to the SAC designation, the nearby qualifying features are of little or no vulnerability to the nature of the proposal, and groundwater abstraction at this scale and distance from the more sensitive features is predicted to have no effect.

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				<p>and holds extensive areas of common cord-grass <i>Spartina anglica</i></p> <p>1330 Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>)</p> <p>The salt meadows at this site are notable as being representative of the ungrazed type and support a different range of communities dominated by sea-purslane <i>Atriplex portulacoides</i>, common sea-lavender <i>Limonium vulgare</i> and thrift <i>Armeria maritima</i></p> <p>1110 Sandbanks which are slightly covered by sea water all the time</p> <p>1140 Mudflats and sandflats not covered by seawater at low tide</p> <p>1150 Coastal lagoons (Priority feature)</p> <p>1210 Annual vegetation of drift lines</p> <p>1220 Perennial vegetation of stony banks</p> <p>1310 <i>Salicornia</i> and other annuals colonising mud and sand</p> <p>2120 Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ('white dunes')</p> <p>1016 Desmoulin's whorl snail <i>Vertigo moulinsiana</i></p>	
			Solent and Southampton Water Ramsar site, 0.5km	<p>Ramsar criterion 1</p> <p>The site is one of the few major sheltered channels between a substantial island and mainland in European waters, exhibiting an unusual strong double tidal flow and has long periods of slack water at high and low tide. It includes many wetland habitats characteristic of the biogeographic region: saline lagoons, saltmarshes, estuaries, intertidal flats, shallow</p>	<p>This is a refurbishment of an existing urban facility so no direct effects are predicted. Although the borehole is close to the Ramsar designation, the nearby qualifying features are of little or no vulnerability to the nature of the proposal, and groundwater abstraction at this scale and distance from the potentially more sensitive features is predicted to have no effect.</p>

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				coastal waters, grazing marshes, reedbeds, coastal woodland and rocky boulder reefs. Ramsar criterion 2 The site supports an important assemblage of rare plants and invertebrates. At least 33 British Red Data Book invertebrates and at least eight British Red Data Book plants are represented on site. There are also 6 nationally important breeding birds (gulls and terns), 3 waders with nationally important passage counts, and 13 waterfowl species with nationally significant winter counts. Ramsar criterion 5 Winter waterfowl assemblage of international importance. Ramsar criterion 6 Internationally important spring/autumn counts of ringed plover, and winter counts of dark-bellied Brent goose, teal, and black-tailed godwit.	
			Solent and Southampton Water SPA, 0.5km	Article 4.1 Site supports 5 species of breeding terns and gulls in numbers of European importance. Article 4.2 Over winter, the site supports migratory birds in numbers of European importance (black-tailed godwit, dark-bellied Brent goose, ringed plover and teal, and also as an assemblage of more than 20,000 waterfowl).	This is a refurbishment of an existing facility and no effects are predicted. Although the borehole is close to the SPA designation, the qualifying bird flocks are not directly vulnerable to the urban nature of the proposal. Groundwater abstraction at this scale and distance from the sensitive habitat features that they use is predicted to have no effect..
			Universal metering	n.a.	n.a.
Hants		Asset improvement for groundwater	n.a.	n.a.	This group of groundwater asset improvements are mostly small scale, minor

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	south	sources			plant improvements within existing sites that should result in more reliable supply under extreme conditions. All the asset improvement schemes proposed will limit actual abstraction to within existing licence limits. Licences are managed and granted by the Environment Agency, who are carrying out retrospective appropriate assessments for licences as necessary. It is therefore considered reasonable to exclude AMP5 asset improvement schemes from this high level strategic appropriate assessment
		Increase Testwood WSW to licence limit	Solent and Southampton Water Ramsar site, 1km	<p>Ramsar criterion 1 The site is one of the few major sheltered channels between a substantial island and mainland in European waters, exhibiting an unusual strong double tidal flow and has long periods of slack water at high and low tide. It includes many wetland habitats characteristic of the biogeographic region: saline lagoons, saltmarshes, estuaries, intertidal flats, shallow coastal waters, grazing marshes, reedbeds, coastal woodland and rocky boulder reefs.</p> <p>Ramsar criterion 2 The site supports an important assemblage of rare plants and invertebrates. At least 33 British Red Data Book invertebrates and at least eight British Red Data Book plants are represented on site. There are also 6 nationally important breeding birds (gulls and terns), 3 waders with nationally important passage counts, and 13 waterfowl species</p>	Possible effect on the features of the Ramsar site. Taken forward for appropriate assessment.

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				<p>with nationally significant winter counts.</p> <p>Ramsar criterion 5 Winter waterfowl assemblage of international importance.</p> <p>Ramsar criterion 6 Internationally important spring/autumn counts of ringed plover, and winter counts of dark-bellied Brent goose, teal, and black-tailed godwit.</p>	
			Solent and Southampton Water SPA, 1km	<p>Article 4.1 Site supports 5 species of breeding terns and gulls in numbers of European importance.</p> <p>Article 4.2 Over winter, the site supports migratory birds in numbers of European importance (black-tailed godwit, dark-bellied Brent goose, ringed plover and teal, and also as an assemblage of more than 20,000 waterfowl).</p>	Possible effect on the habitats within the SPA that support the qualifying species. Taken forward for appropriate assessment.
			Solent Maritime SAC, 2km	<p>1130 Estuaries The Solent and its inlets are unique in Britain and Europe for their hydrographic regime of four tides each day, and for the complexity of the marine and estuarine habitats present within the area. Sediment habitats within the estuaries include extensive estuarine flats, often with intertidal areas supporting eelgrass <i>Zostera</i> spp. and green algae, sand and shingle spits, and natural shoreline transitions</p> <p>1320 <i>Spartina</i> swards (<i>Spartinion maritimae</i>) Solent Maritime is the only site for smooth cord-grass <i>Spartina alterniflora</i> in the UK and is one of only two sites where significant</p>	Possible effect on some of the SAC habitats. Taken forward for appropriate assessment.

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				<p>amounts of small cord-grass <i>S. maritima</i> are found. It is also one of the few remaining sites for Townsend's cord-grass <i>S. x townsendii</i> and holds extensive areas of common cord-grass <i>Spartina anglica</i></p> <p>1330 Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>)</p> <p>The salt meadows at this site are notable as being representative of the ungrazed type and support a different range of communities dominated by sea-purslane <i>Atriplex portulacoides</i>, common sea-lavender <i>Limonium vulgare</i> and thrift <i>Armeria maritima</i></p> <p>1110 Sandbanks which are slightly covered by sea water all the time</p> <p>1140 Mudflats and sandflats not covered by seawater at low tide</p> <p>1150 Coastal lagoons (Priority feature)</p> <p>1210 Annual vegetation of drift lines</p> <p>1220 Perennial vegetation of stony banks</p> <p>1310 <i>Salicornia</i> and other annuals colonising mud and sand</p> <p>2120 Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ('white dunes')</p> <p>1016 Desmoulin's whorl snail <i>Vertigo moulinsiana</i></p>	
			The New Forest SAC, 3km	<p>3110 Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>)</p> <p>It contains shoreweed <i>Littorella uniflora</i> and isolated populations of northern species such as bog orchid <i>Hammarbya paludosa</i> and</p>	No predicted effects. Those features that are dependent on a freshwater input were considered but would not be affected by additional abstraction at this point on the River Test as the abstraction is downstream of all influence on the sensitive New Forest

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				<p>floating bur-reed <i>Sparganium angustifolium</i>, alongside rare southern species such as Hampshire-purslane <i>Ludwigia palustris</i></p> <p>3130 Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the <i>Isoëto-Nanojuncetea</i></p> <p>Supports a number of specialist species in a zone with toad rush <i>Juncus bufonius</i>. These include the two nationally scarce species coral-necklace <i>Illecebrum verticillatum</i> and yellow centaury <i>Cicendia filiformis</i>,</p> <p>4010 Northern Atlantic wet heaths with <i>Erica tetralix</i></p> <p>Mainly of the M16 <i>Erica tetralix</i> – <i>Sphagnum compactum</i> type. M14 <i>Schoenus nigricans</i> – <i>Narthecium ossifragum</i> mire is also found on this site. The wet heaths are important for rare plants, such as marsh gentian <i>Gentiana pneumonanthe</i> and marsh clubmoss <i>Lycopodiella inundata</i>, and a number of dragonfly species, including the scarce blue-tailed damselfly <i>Ischnura pumilio</i> and small red damselfly <i>Ceriagrion tenellum</i>.</p> <p>4030 European dry heaths</p> <p>The dry heaths of the New Forest are of the H2 <i>Calluna vulgaris</i> – <i>Ulex minor</i> heath type, and H3 <i>Ulex minor</i> – <i>Agrostis curtisii</i> heath is found on damper areas. There are a wide range of transitions between dry heath and wet heath, <i>Molinia</i> grassland, fen, acid grassland and various types of scrub and woodland.</p>	habitats.

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				<p>6410 <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) The site supports a large area of the heathy form of M24 <i>Molinia caerulea</i> – <i>Cirsium dissectum</i> fen-meadow</p> <p>6410 <i>Molinia</i> meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) Complex habitat mosaics associated primarily with the extensive valley bogs of this site. In places the habitat type is rich in brown mosses <i>Cratoneuron</i> spp. and <i>Scorpidium scorpioides</i>. The mosaics in which this habitat type occurs are an important location for bog orchid <i>Hammarbya paludosa</i></p> <p>9120 Atlantic acidophilous beech forests with <i>Ilex</i> and sometimes also <i>Taxus</i> in the shrublayer (<i>Quercion robori-petraeae</i> or <i>Illici-Fagenion</i>) The mosaic with other types of woodland and heath has allowed unique and varied assemblages of epiphytic lichens and saproxylic invertebrates to be sustained</p> <p>9130 <i>Asperulo-Fagetum</i> beech forests 9190 Old acidophilous oak woods with <i>Quercus robur</i> on sandy plains Is the most extensive area of active wood-pasture with old oak <i>Quercus</i> spp. and beech <i>Fagus sylvatica</i> in north-west Europe and has outstanding invertebrate and lichen populations</p> <p>91D0 Bog woodland (Priority feature)</p>	

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				<p>Within the New Forest, in southern England, birch – willow <i>Betula – Salix</i> stands occur over valley bog vegetation, with fringing alder <i>Alnus – Sphagnum</i> stands where there is some water movement</p> <p>91E0 Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, <i>Alnion incanae</i>, <i>Salicion albae</i>) (Priority feature)</p> <p>7140 Transition mires and quaking bogs</p> <p>7230 Alkaline fens</p> <p>1044 Southern damselfly <i>Coenagrion mercuriale</i></p> <p>1083 Stag beetle <i>Lucanus cervus</i></p> <p>1166 Great crested newt <i>Triturus cristatus</i></p>	
			New Forest SPA, 5km	Breeding season: Dartford warbler, honey buzzard, nightjar, woodlark. Over winter: hen harrier.	No predicted direct or indirect effects on bird features of the SPA due to the nature and downstream location of proposal.
			New Forest Ramsar site, 5km	Valley mires, fens and wet heath within catchments whose uncultivated and undeveloped state buffer the mires against adverse ecological change.. The suite of mires is regarded as the <i>locus classicus</i> of this type of mire in Britain. Other wetland habitats include numerous ponds of varying size and water chemistry including several ephemeral ponds and a network of small streams mainly acidic in character which have no lowland equivalent in the UK. The plant communities in the numerous valleys and seepage step mires show considerable variation, being affected especially by the	No predicted effects. The Ramsar features are dependent on a freshwater input but would not be affected by additional abstraction at this point on the River Test as the abstraction is downstream of all influence on the sensitive New Forest habitats.

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
				nutrient content of groundwater. In the most nutrient-poor zones, <i>Sphagnum</i> bog-mosses, cross-leaved heath, bog asphodel, common cottongrass and similar species predominate. In more enriched conditions the communities are more fen-like.	
		Development of the enabling Testwood to Otterbourne transfer	River Itchen SAC, 0km	<p>3260 Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation</p> <p>The Itchen is a classic example of a sub-type 1 chalk river. The river is dominated throughout by aquatic <i>Ranunculus</i> spp. The headwaters contain pond water-crowfoot <i>Ranunculus peltatus</i>, while two <i>Ranunculus</i> species occur further downstream: stream water-crowfoot <i>R. penicillatus</i> ssp. <i>pseudofluitans</i>, a species especially characteristic of calcium-rich rivers, and river water-crowfoot <i>R. fluitans</i>.</p> <p>1044 Southern damselfly <i>Coenagrion mercuriale</i></p> <p>1163 Bullhead <i>Cottus gobio</i></p> <p>1092 White-clawed (or Atlantic stream) crayfish <i>Austropotamobius pallipes</i></p> <p>1096 Brook lamprey <i>Lampetra planeri</i></p> <p>1106 Atlantic salmon <i>Salmo salar</i></p> <p>1355 Otter <i>Lutra lutra</i></p>	This proposal is likely to bring significant environmental benefits to the River Itchen SAC. There is the potential for impacts arising from pipeline construction. Taken forward for appropriate assessment.
			Solent and Southampton Water Ramsar site, 10km	<p>Ramsar criterion 1</p> <p>The site is one of the few major sheltered channels between a substantial island and mainland in European waters, exhibiting an unusual strong double tidal flow and has long</p>	Although downstream, at this distance and with the nature of the qualifying features, there are no predicted effects.

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
				<p>periods of slack water at high and low tide. It includes many wetland habitats characteristic of the biogeographic region: saline lagoons, saltmarshes, estuaries, intertidal flats, shallow coastal waters, grazing marshes, reedbeds, coastal woodland and rocky boulder reefs.</p> <p>Ramsar criterion 2 The site supports an important assemblage of rare plants and invertebrates. At least 33 British Red Data Book invertebrates and at least eight British Red Data Book plants are represented on site. There are also 6 nationally important breeding birds (gulls and terns), 3 waders with nationally important passage counts, and 13 waterfowl species with nationally significant winter counts.</p> <p>Ramsar criterion 5 Winter waterfowl assemblage of international importance.</p> <p>Ramsar criterion 6 Internationally important spring/autumn counts of ringed plover, and winter counts of dark-bellied Brent goose, teal, and black-tailed godwit.</p>	
			Solent and Southampton Water SPA, 10km	<p>Article 4.1 Site supports 5 species of breeding terns and gulls in numbers of European importance.</p> <p>Article 4.2 Over winter, the site supports migratory birds in numbers of European importance (black-tailed godwit, dark-bellied Brent goose, ringed plover and teal, and also as an assemblage of</p>	Although downstream, at this distance and with the nature of the qualifying species and their use of the site, there are no predicted effects.

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
				more than 20,000 waterfowl).	
		Interzonal transfer optimisation (cross Solent)	n.a.	n.a.	Using existing assets, no possible effect
		Candover and Arle augmentation	River Itchen SAC	<p>3260 Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitricho-Batrachion</i> vegetation The Itchen is a classic example of a sub-type 1 chalk river. The river is dominated throughout by aquatic <i>Ranunculus</i> spp. The headwaters contain pond water-crowfoot <i>Ranunculus peltatus</i>, while two <i>Ranunculus</i> species occur further downstream: stream water-crowfoot <i>R. penicillatus</i> ssp. <i>pseudofluitans</i>, a species especially characteristic of calcium-rich rivers, and river water-crowfoot <i>R. fluitans</i>.</p> <p>1044 Southern damselfly <i>Coenagrion mercuriale</i> 1163 Bullhead <i>Cottus gobio</i> 1092 White-clawed (or Atlantic stream) crayfish <i>Austropotamobius pallipes</i> 1096 Brook lamprey <i>Lampetra planeri</i> 1106 Atlantic salmon <i>Salmo salar</i> 1355 Otter <i>Lutra lutra</i></p>	At least one of the SAC features (crayfish) are thought to be vulnerable to water temperature and flow in the summer. Taken forward for appropriate assessment.
		Leakage reduction	n.a.	n.a.	Generic measure, no possible effect
		Rehabilitation of borehole R176 (West Tytherley)	Salisbury Plain SAC, 5km	<p>5130 <i>Juniperus communis</i> formations on heaths or calcareous grasslands Best remaining example in the UK of lowland juniper scrub on chalk. The juniper is juxtaposed with extensive 6210 semi-natural dry grassland and chalk heath.</p>	The qualifying features are of low sensitivity to this type of development and at this distance and scale of extraction, there are no predicted effects.

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
				<p>6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>) It supports extensive examples of CG3 <i>Bromus erectus</i> grassland. It also contains extensive areas of the rare CG7 <i>Festuca ovina – Hieracium pilosella – Thymus praecox</i> grassland, and one of the largest examples of CG6 <i>Avenula pubescens</i> grassland</p> <p>6211 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>) (important orchid sites) (Priority feature) CG3 <i>Bromus erectus</i> grassland and CG7 <i>Festuca ovina – Hieracium pilosella – Thymus praecox/ pulegioides</i> grassland, together with smaller areas of CG2 <i>Festuca ovina – Avenula pratensis</i> grassland and CG6 <i>Avenula pubescens</i> grassland. The site supports the largest UK population of the nationally scarce burnt orchid <i>Orchis ustulata</i>, together with significant populations of green-winged orchid <i>Orchis morio</i> and frog orchid <i>Coeloglossum viride</i>.</p> <p>1065 Marsh fritillary butterfly <i>Euphydryas</i> (<i>Eurodryas, Hypodryas</i>) <i>aurinia</i></p>	
			Porton Down SPA, 5km	Breeding: stone curlew <i>Burhinus oedicephalus</i>	No predicted effects at this distance on these birds or the dry vegetation needed to support them.
			Mottisfont Bats SAC, 8km	1308 Barbastelle <i>Barbastella barbastellus</i> It is one of only six known maternity sites in	No direct effect possible on woodlands at this distance. Any bats using the general area will

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
				the UK and the only one in Hampshire.	not be affected by the rehabilitation of existing borehole plant.
			New Forest SPA, 8km	Breeding season: Dartford warbler, honey buzzard, nightjar, woodlark. Over winter: hen harrier.	No predicted direct or indirect effects on these species at this distance.
		River Itchen sustainability reductions	River Itchen SAC, 0km	3260 Water courses of plain to montane levels with the <i>Ranunculus fluitantis</i> and <i>Callitriche-Batrachion</i> vegetation The Itchen is a classic example of a sub-type 1 chalk river. The river is dominated throughout by aquatic <i>Ranunculus</i> spp. The headwaters contain pond water-crowfoot <i>Ranunculus peltatus</i> , while two <i>Ranunculus</i> species occur further downstream: stream water-crowfoot <i>R. penicillatus</i> ssp. <i>pseudofluitans</i> , a species especially characteristic of calcium-rich rivers, and river water-crowfoot <i>R. fluitans</i> . 1044 Southern damselfly <i>Coenagrion mercuriale</i> 1163 Bullhead <i>Cottus gobio</i> 1092 White-clawed (or Atlantic stream) crayfish <i>Austropotamobius pallipes</i> 1096 Brook lamprey <i>Lampetra planeri</i> 1106 Atlantic salmon <i>Salmo salar</i> 1355 Otter <i>Lutra lutra</i>	This proposal is likely to bring significant environmental benefits to the River Itchen SAC. Taken forward for appropriate assessment.
		Universal metering	n.a.	n.a.	Generic measure, no possible effect
Hants Kingsclere	Asset improvement for groundwater sources	n.a.	n.a.	This group of groundwater asset improvements are mostly small scale, minor plant improvements within existing sites that should result in more reliable supply under extreme conditions. All the asset improvement	

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
					schemes proposed will limit actual abstraction to within existing licence limits. Licences are managed and granted by the Environment Agency, who are carrying out retrospective appropriate assessments for licences as necessary. It is therefore considered reasonable to exclude AMP5 asset improvement schemes from this high level strategic appropriate assessment
		Universal metering	n.a.	n.a.	Generic measure, no possible effect
	Hants Andover	Asset improvement for groundwater sources	n.a.	n.a.	This group of groundwater asset improvements are mostly small scale, minor plant improvements within existing sites that should result in more reliable supply under extreme conditions. All the asset improvement schemes proposed will limit actual abstraction to within existing licence limits. Licences are managed and granted by the Environment Agency, who are carrying out retrospective appropriate assessments for licences as necessary. It is therefore considered reasonable to exclude AMP5 asset improvement schemes from this high level strategic appropriate assessment
		Universal metering	n.a.	n.a.	Generic measure, no possible effect
CENTRAL	Sussex north	Renewal of the existing bulk supply contract from Portsmouth Water	n.a.	n.a.	Using existing assets, no possible effect
		Asset improvement for groundwater	n.a.	n.a.	This group of groundwater asset improvements are mostly small scale, minor

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
		sources			plant improvements within existing sites that should result in more reliable supply under extreme conditions. All the asset improvement schemes proposed will limit actual abstraction to within existing licence limits. Licences are managed and granted by the Environment Agency, who are carrying out retrospective appropriate assessments for licences as necessary. It is therefore considered reasonable to exclude AMP5 asset improvement schemes from this high level strategic appropriate assessment.
		Optimising of inter-zonal transfers (from Sussex Worthing)	n.a.	n.a.	Using existing assets, no possible effect
		River Arun Abstraction	Arun Valley SPA	<p>Article 4.1 Overwintering Bewick's swan (<i>Cygnus columbianus bewickii</i>)</p> <p>Article 4.2 Regularly supporting at least 20,000 wintering waterfowl.</p>	There is potential for a scheme in this location to affect the habitats used by the SPA flock. Taken forward for appropriate assessment.
			Arun Valley Ramsar site	<p>Ramsar criterion 2 Seven threatened or endangered British Red Data Book wetland invertebrate species, and four nationally rare and four nationally scarce plant species.</p> <p>Ramsar criterion 3 In addition to the Red Data Book invertebrate and plant species, the ditches intersecting the site have a particularly diverse and rich flora. All five British duckweed <i>Lemna</i> species, all</p>	There is potential for a scheme in this location to affect the Ramsar features. Taken forward for appropriate assessment.

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
				<p>five water-cress <i>Rorippa</i> species, and all three British water milfoils (<i>Myriophyllum</i> species), all but one of the seven British water dropworts (<i>Oenanthe</i> species), and two-thirds of the British pondweeds (<i>Potamogeton</i> species) can be found on site.</p> <p>Ramsar criterion 5 Assemblage of 13774 waterfowl in winter.</p>	
			Duncton to Bignor Escarpment SAC, 5km	<p>9130 Asperulo-Fagetum beech forests <i>Asperulo-Fagetum</i> beech forests occur here on steep scarp slopes and on more gently-sloping hillsides in mosaic with ash <i>Fraxinus excelsior</i> woodland, scrub and grassland. Rare plants present include the white helleborine <i>Cephalanthera damasonium</i>, yellow bird's nest <i>Monotropa hypopitys</i> and green hellebore <i>Helleborus viridis</i>. The woods also have a rich mollusc fauna</p>	SAC is upstream of the proposal. No predicted effect.
			The Mens SAC, 5km	<p>9120 Atlantic acidophilous beech forests with <i>Ilex</i> and sometimes also <i>Taxus</i> in the shrublayer (<i>Quercion robori-petraeae</i> or <i>Ilici-Fagenion</i>) 1308 Barbastelle <i>Barbastella barbastellus</i></p>	No possible direct impact as the site is upstream of the proposal, but barbastelle are known to feed at some distance from the woodland along river valleys. Taken forward for appropriate assessment.
			Ebernoe Common SAC, 7km	<p>9120 Atlantic acidophilous beech forests with <i>Ilex</i> and sometimes also <i>Taxus</i> in the shrublayer (<i>Quercion robori-petraeae</i> or <i>Ilici-Fagenion</i>) 1308 Barbastelle <i>Barbastella barbastellus</i> A maternity colony of barbastelles <i>Barbastella barbastellus</i> utilises a range of tree roosts in this area of 91A0 Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles, which</p>	No possible direct impact as the site is upstream of the proposal, but barbastelle are known to feed at some distance from the woodland along river valleys. Taken forward for appropriate assessment.

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
				<p>has a dense understorey of holly <i>Ilex aquifolium</i> as well as open glades and open water. Maternity roost sites are usually in dead tree stumps, but the species appears to be present throughout the year, with individuals utilising a range of roost sites in tree holes and under bark.</p> <p>1323 Bechstein's bat <i>Myotis bechsteinii</i> A maternity colony of Bechstein's bat <i>Myotis bechsteinii</i> is associated with this area of 91A0 Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles. Roosts are mainly in old woodpecker holes in the stems of live mature oak <i>Quercus petraea</i> trees.</p>	
		Renewal of the bulk supply of contract to South East Water	n.a.	n.a.	Using existing assets, no possible effect
		Universal metering	n.a.	n.a.	Generic measure, no possible effect
	Sussex Worthing	Asset improvement for groundwater sources	n.a.	n.a.	This group of groundwater asset improvements are mostly small scale, minor plant improvements within existing sites that should result in more reliable supply under extreme conditions. All the asset improvement schemes proposed will limit actual abstraction to within existing licence limits. Licences are managed and granted by the Environment Agency, who are carrying out retrospective appropriate assessments for licences as necessary. It is therefore considered reasonable to exclude AMP5 asset improvement schemes from this high level

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
					strategic appropriate assessment
		Optimisation of inter-zonal transfers (to Sussex North and Sussex Brighton)	n.a.	n.a.	Using existing assets, no possible effect
		Universal metering	n.a.	n.a.	Generic measure, no possible effect
	Sussex Brighton	Asset improvement for groundwater sources	n.a.	n.a.	This group of groundwater asset improvements are mostly small scale, minor plant improvements within existing sites that should result in more reliable supply under extreme conditions. All the asset improvement schemes proposed will limit actual abstraction to within existing licence limits. Licences are managed and granted by the Environment Agency, who are carrying out retrospective appropriate assessments for licences as necessary. It is therefore considered reasonable to exclude AMP5 asset improvement schemes from this high level strategic appropriate assessment
		Optimising of inter-zonal transfers (from Sussex Worthing)	n.a.	n.a.	Using existing assets, no possible effect
		Provision of a bulk supply to South East Water	n.a.	n.a.	
		Universal metering	n.a.	n.a.	Generic measure, no possible effect
	Sussex Hastings	Asset improvement for groundwater sources	n.a.	n.a.	This group of groundwater asset improvements are mostly small scale, minor plant improvements within existing sites that

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
					should result in more reliable supply under extreme conditions. All the asset improvement schemes proposed will limit actual abstraction to within existing licence limits. Licences are managed and granted by the Environment Agency, who are carrying out retrospective appropriate assessments for licences as necessary. It is therefore considered reasonable to exclude AMP5 asset improvement schemes from this high level strategic appropriate assessment.
		Optimisation of inter-zonal transfers (Bewl – Darwell transfer)	n.a.	n.a.	Using existing assets, no possible effect
		Renewal of the bulk supply of contract to South East Water	n.a.	n.a.	Using existing assets, no possible effect
		Licence variation at Darwell reservoir	Pevensey Levels Ramsar site, 10km	<p>Ramsar criterion 2 The site supports an outstanding assemblage of wetland plants and invertebrates including many British Red Data Book species.</p> <p>Ramsar criterion 3 The site supports 68% of vascular plant species in Great Britain that can be described as aquatic. It is probably the best site in Britain for freshwater molluscs, one of the five best sites for aquatic beetles and supports an outstanding assemblage of dragonflies.</p>	There is no link between the site and the proposal and no significant effects are predicted at this distance.
		Re-introduction of the S556 source	Dungeness to Pett Level SPA,	<p>Article 4.1 Internationally important populations of</p>	The infrastructure is urban and existing so no direct effects are predicted, but there would be

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
		(Cadborough)	1km	<p>common tern, little tern and Mediterranean gull during the breeding season, of aquatic warbler on passage, and of Bewick's swan in winter.</p> <p>Article 4.2 Overwintering population of European importance of Shoveler.</p>	possible indirect effects during operation on the habitats used by the SPA flock. Taken forward for appropriate assessment.
			Dungeness SAC, 3km	<p>1210 Annual vegetation of drift lines The Dungeness foreland has a very extensive and well-developed shoreline, although with sparse vegetation and in places some human disturbance. It is one of two representatives of Annual vegetation of drift lines on the south coast of England. The strandline community on this site comprises Babington's orache <i>Atriplex glabriuscula</i>, which occurs mostly on the accreting eastern shoreline, although it is also present on the eroding southern shoreline.</p> <p>1220 Perennial vegetation of stony banks Dungeness is the UK's largest shingle structure. Despite considerable disturbance and destruction of the surface shingle, the site retains very large areas of intact parallel ridges with characteristic zonation of vegetation. It still has the most diverse and most extensive examples of stable vegetated shingle in Europe, including the best representation of scrub on shingle, notably prostrate forms of broom <i>Cytisus scoparius</i> and blackthorn <i>Prunus spinosa</i>.</p> <p>1166 Great crested newt <i>Triturus cristatus</i></p>	The infrastructure is urban and existing so no direct effects are predicted, and most of the interest features are coastal and not vulnerable to the proposals. However, there could be a possible effect on great crested newt breeding ponds. Taken forward for appropriate assessment.

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
				This extensive site hosts a large and viable great crested newt <i>Triturus cristatus</i> population in a range of natural and anthropogenic habitats. These include natural pools and those resulting from gravel extraction and other activities.	
		Leakage reduction	n.a.	n.a.	Generic measure, no possible effect
		Universal metering	n.a.	n.a.	Generic measure, no possible effect
EAST	Kent Medway	Asset improvement for groundwater sources	n.a.	n.a.	This group of groundwater asset improvements are mostly small scale, minor plant improvements within existing sites that should result in more reliable supply under extreme conditions. All the asset improvement schemes proposed will limit actual abstraction to within existing licence limits. Licences are managed and granted by the Environment Agency, who are carrying out retrospective appropriate assessments for licences as necessary. It is therefore considered reasonable to exclude AMP5 asset improvement schemes from this high level strategic appropriate assessment
		Optimisation of inter-zonal transfers (to Kent Thanet)	n.a.	n.a.	Using existing assets, no possible effect
		Renewal of the C552 scheme bulk supply to South East Water	n.a.	n.a.	Using existing assets, no possible effect
		Licence variation to the River Medway	Medway Estuary and	Article 4.1 Populations of European importance of	As there are no engineering works, no direct effects are anticipated. There will be some

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
		scheme	Marshes SPA	breeding avocet and little tern, and of wintering avocet. Article 4.2 Populations of European importance of migratory ringed plover on passage, eight species of wintering waterfowl, and an assemblage of more than 20,000 waterfowl over winter	changes to flow in the Medway, and there is a possibility that these could affect habitats downstream used by the SPA flock. Taken forward for appropriate assessment.
			Medway Estuary and Marshes Ramsar site	Ramsar criterion 2 The site supports several nationally scarce plants, at least twelve British Red Data Book species of wetland invertebrates, and nationally important breeding populations of Mediterranean gull, black-headed gull, Sandwich tern, common tern and little tern. 7 species of waterfowl reach nationally important numbers in spring/autumn, and 3 species in winter. Ramsar criterion 5 Winter assemblage of wintering waterfowl of international importance. Ramsar criterion 6 Internationally important numbers of grey plover and redshank on passage in spring/autumn, and of seven species of waterfowl in winter.	As there are no engineering works, no direct effects are anticipated. There will be some changes to flow in the Medway, and there is a possibility that these could affect habitats and birds that are qualifying features for the Ramsar site. Taken forward for appropriate assessment.
		Licence variation of S271 groundwater source (Danaway)	Queendown Warren SAC, 4km	6211 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>) (important orchid sites) (Priority feature) Queendown Warren consists of CG3 <i>Bromus erectus</i> grassland. It contains an important	No predicted effect at this distance on this dry habitat qualifying feature.

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
				assemblage of rare and scarce species, including early spider-orchid <i>Ophrys sphegodes</i> , burnt orchid <i>Orchis ustulata</i> and man orchid <i>Aceras anthropophorum</i> .	
			The Swale SPA, 7km	<p>Article 4.1 During the breeding season avocet, marsh harrier and Mediterranean gull in internationally important numbers. Over winter, Avocet, Bar-tailed Godwit, Golden Plover, Hen Harrier in internationally important numbers.</p> <p>Article 4.2 Ringed plover on passage, and wintering flocks of six species of waterfowl of international importance. Also assemblage qualification as over winter, the area regularly supports 65,390 individual waterfowl.</p>	No predicted effects from this groundwater abstraction licence variation on birds from the SPA flock at this distance
			The Swale Ramsar site, 7km	<p>Ramsar criterion 2 The site supports at least seven British Red data book invertebrates (<i>Bagous cylindrus</i>, <i>Erioptera bivittata</i>, <i>Lejops vittata</i>, <i>Peecilobothris ducalis</i>, <i>Philonthus punctus</i>, <i>Micronecta minutissima</i>, <i>Malchius vulneratus</i>, <i>Campsicnemus majus</i>, <i>Elachiptera rufifrons</i>, <i>Myopites eximia</i>) and nationally scarce plants (including <i>Chenopodium chenopodioides</i>, <i>Peucedanum officinale</i>, <i>Bupleurum tenuissimum</i>, <i>Spartina maritima</i>, <i>Inula crithmoides</i>, <i>Carex divisa</i>, <i>Trifolium squamosum</i> and <i>Hordeum marinum</i>). Birds occurring at levels of national importance include breeding Mediterranean</p>	No predicted effects from this groundwater abstraction licence variation on birds from the Ramsar flocks at this distance

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
				<p>gull, black-headed gull and little tern, autumn/spring little egret, whimbrel, curlew, spotted redshank and greenshank, and 11 species of wintering waterfowl.</p> <p>Ramsar criterion 6 Species/populations occurring at levels of international importance include spring/autumn redshank, and wintering dark-bellied Brent goose and grey plover. Spring/autumn ringed plover and four further species of wintering waterfowl were identified subsequent to designation</p>	
			<p>Medway Estuary and Marshes SPA, 5km</p>	<p>Article 4.1 Populations of European importance of breeding avocet and little tern, and of wintering avocet.</p> <p>Article 4.2 Populations of European importance of migratory ringed plover on passage, eight species of wintering waterfowl, and an assemblage of more than 20,000 waterfowl over winter</p>	<p>Any effect considered most unlikely from this groundwater abstraction on SPA features at this distance, but taken forward for appropriate assessment</p>
			<p>Medway Estuary and Marshes Ramsar site, 5km</p>	<p>Ramsar criterion 2 The site supports several nationally scarce plants, at least twelve British Red Data Book species of wetland invertebrates, and nationally important breeding populations of Mediterranean gull, black-headed gull, Sandwich tern, common tern and little tern. 7 species of waterfowl reach nationally important numbers in spring/autumn, and 3 species in winter.</p>	<p>Any effect considered most unlikely from this groundwater abstraction on Ramsar site features at this distance, but taken forward for appropriate assessment</p>

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
				<p>Ramsar criterion 5 Winter assemblage of wintering waterfowl of international importance.</p> <p>Ramsar criterion 6 Internationally important numbers of grey plover and redshank on passage in spring/autumn, and of seven species of waterfowl in winter.</p>	
		Leakage reduction	n.a.	n.a.	Generic measure, no possible effect
		Aylesford wastewater recycling scheme	North Downs Woodlands SAC, 4km	<p>9130 <i>Asperulo-Fagetum</i> beech forests This site consists of mature <i>Asperulo-Fagetum</i> beech forests and also yew 91J0 Yew <i>Taxus baccata</i> woods on steep slopes. The stands lie within a mosaic of scrub and other woodland types and are the most easterly of the beech woodland sites selected.</p> <p>91J0 <i>Taxus baccata</i> woods of the British Isles (Priority feature) Yew <i>Taxus baccata</i> woodland at this site is associated with 9130 <i>Asperulo-Fagetum</i> beech forests, scrub and small areas of unimproved grassland on thin chalk soils. Where the shade is not too dense dog's mercury <i>Mercurialis perennis</i> predominates in the ground flora. The site is the most easterly of those selected</p> <p>6210 Semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>)</p>	No predicted effect on these features at this distance.
			Peter's Pit SAC, 4km	<p>1166 Great crested newt <i>Triturus cristatus</i> Peter's Pit is an old chalk quarry situated in the North Downs in north Kent, with large</p>	No predicted effect at this distance on qualifying feature.

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
				ponds situated amongst grassland, scrub and woodland. The ponds have widely fluctuating water levels and large great crested newt <i>Triturus cristatus</i> populations have been recorded breeding here	
			Medway Estuary and Marshes SPA, 10km+ downstream	<p>Article 4.1 Populations of European importance of breeding avocet and little tern, and of wintering avocet.</p> <p>Article 4.2 Populations of European importance of migratory ringed plover on passage, eight species of wintering waterfowl, and an assemblage of more than 20,000 waterfowl over winter</p>	Water flows will balance downstream at the designated area, though there is a possibility of changes to water quality. Taken forward for appropriate assessment.
			Medway Estuary Ramsar site, 10km+ downstream	<p>Ramsar criterion 2 The site supports several nationally scarce plants, at least twelve British Red Data Book species of wetland invertebrates, and nationally important breeding populations of Mediterranean gull, black-headed gull, Sandwich tern, common tern and little tern. 7 species of waterfowl reach nationally important numbers in spring/autumn, and 3 species in winter.</p> <p>Ramsar criterion 5 Winter assemblage of wintering waterfowl of international importance.</p> <p>Ramsar criterion 6 Internationally important numbers of grey plover and redshank on passage in spring/autumn, and of seven species of</p>	Water flows will balance downstream at the designated area, though there is a possibility of changes to water quality. Taken forward for appropriate assessment.

Area	Zone	Measure	Site(s) potentially affected	Nature of the site(s) potentially affected	Comments / reasoning
				waterfowl in winter.	
		Raising Bewl Water	None	n.a.	n.a.
		Bulk supply from Bewl Water to South East Water	n.a.	n.a.	n.a.
		Bulk supply from Burham to South East Water	n.a.	n.a.	n.a.
		Universal metering	n.a.	n.a.	Generic measure, no possible effect
	Kent Thanet	Optimisation of inter-zonal transfers (from Kent Medway)	n.a.	n.a.	Using existing assets, no possible effect
		Renewal of the bulk supply to Folkestone and Dover	n.a.	n.a.	Using existing assets, no possible effect
		Leakage reduction	n.a.	n.a.	Generic measure, no possible effect
		Enhancement of the bulk supply to Folkestone and Dover	n.a.	n.a.	n.a.

Summary of measures taken forward for stage 2 strategic appropriate assessment

	Measure	Site potentially affected
1	Increase Testwood WSW to licence limit	Solent and Southampton Water Ramsar site
	Increase Testwood WSW to licence limit	Solent and Southampton Water SPA
	Increase Testwood WSW to licence limit	Solent Maritime SAC
2	Development of the enabling Testwood to Otterbourne transfer	River Itchen SAC
3	Candover and Arle augmentation	Itchen SAC

4	River Itchen sustainability reductions	River Itchen SAC
5	River Arun Abstraction	Arun Valley SPA
	River Arun Abstraction	Arun Valley Ramsar site
	River Arun Abstraction	The Mens SAC
	River Arun Abstraction	Ebernoe Common SAC
6	Re-introduction of the S556 source (Cadborough)	Dungeness SAC
	Re-introduction of the S556 source (Cadborough)	Dungeness to Pett Level SPA
7	Licence variation Medway	Medway Estuary and Marshes SPA
	Licence variation Medway	Medway Estuary and Marshes Ramsar site
8	Licence variation of S271 groundwater source (Danaway)	Medway Estuary and Marshes SPA
	Licence variation of S271 groundwater source (Danaway)	Medway Estuary and Marshes Ramsar site
9	Aylesford wastewater recycling	Medway Estuary and Marshes SPA
	Aylesford wastewater recycling	Medway Estuary and Marshes Ramsar site

1: Appropriate assessment : Increase Testwood WSW to licence limit

Solent and Southampton Water Ramsar site

Solent and Southampton Water SPA

Solent Maritime SAC

Existing plant at Testwood to be upgraded to allow abstraction from the River Test up to the full existing licence amount. For full details see the WRMP and revised Environmental Report. The plant lies outside the protected sites, but downstream of the abstraction point the River Test flows into part of the Solent and Southampton Water SPA and Ramsar site, and ultimately the waters feed into a part of the Solent Maritime SAC.

The Solent and Southampton Water sites lie on the central southern coast of England and sections of the designated sites lie on both the Hampshire coast and along the northern coast of the Isle of Wight. The Solent Maritime SAC is continuous with the Solent and Southampton Water SPA and Ramsar site in places, and extends protection into complimentary coastal and marine habitats.

The Solent and Southampton Water SPA extends from Hurst Spit to Hill Head along the south coast of Hampshire, and from Yarmouth to Whitecliff Bay along the north coast of the Isle of Wight. The site comprises a series of estuaries and harbours with extensive mud-flats and saltmarshes together with adjacent coastal habitats including saline lagoons, shingle beaches, reedbeds, damp woodland and grazing marsh. The mud-flats support beds of *Enteromorpha* spp. and *Zostera* spp., and have a rich invertebrate fauna that forms the food resource for the estuarine birds. In summer, the site is of importance for breeding seabirds, including gulls and four species of terns. In winter, the SPA holds a large and diverse assemblage of waterbirds, including geese, ducks and waders. Dark-bellied Brent goose (*Branta b. bernicla*) also feed in surrounding areas of agricultural land outside the SPA.

The area also includes some unusual geomorphological features and some nationally rare invertebrates and plants that are noted on the Ramsar site citation.

Solent and Southampton Water SPA

Qualifying species

This site qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

During the breeding season;

Common tern (*Sterna hirundo*)

267 pairs representing at least 2.2% of the breeding population in Great Britain (5 year peak mean, 1993-1997).

Little tern (*Sterna albifrons*)

49 pairs representing at least 2.0% of the breeding population in Great Britain (5 year peak mean, 1993-1997).

Mediterranean gull (*Larus melanocephalus*)

2 pairs representing at least 20.0% of the breeding population in Great Britain (5 year peak mean, 1994-1998).

Roseate tern (*Sterna dougallii*)

2 pairs representing at least 3.3% of the breeding population in Great Britain (5 year peak mean, 1993-1997).

Sandwich tern (*Sterna sandvicensis*)

231 pairs representing at least 1.7% of the breeding population in Great Britain (5 year peak mean, 1993-1997).

This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:

Over winter;

Black-tailed godwit (*Limosa limosa islandica*)

1,125 individuals representing at least 1.6% of the wintering Iceland - breeding population (5 year peak mean, 1992/3-1996/7).

Dark-bellied Brent goose (*Branta bernicla bernicla*)

7,506 individuals representing at least 2.5% of the wintering Western Siberia/Western Europe population (5 year peak mean, 1992/3-1996/7).

Ringed plover (*Charadrius hiaticula*)

552 individuals representing at least 1.1% of the wintering Europe/Northern Africa - wintering population (5 year peak mean, 1992/3-1996/7).

Teal (*Anas crecca*)

4,400 individuals representing at least 1.1% of the wintering Northwestern Europe population (5 year peak mean, 1992/3-1996/7).

Assemblage qualification

The area qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl. Over winter, the area regularly supports 53,948 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: gadwall (*Anas strepera*), teal (*Anas crecca*), ringed plover (*Charadrius hiaticula*), black-tailed godwit (*Limosa limosa islandica*), little grebe (*Tachybaptus ruficollis*), great crested grebe (*Podiceps cristatus*), cormorant (*Phalacrocorax carbo*), dark-bellied Brent goose (*Branta bernicla bernicla*), wigeon (*Anas penelope*), redshank (*Tringa totanus*), pintail (*Anas acuta*), shoveler (*Anas clypeata*), red-breasted merganser (*Mergus serrator*), grey plover (*Pluvialis squatarola*), lapwing (*Vanellus vanellus*), dunlin (*Calidris alpina alpina*), curlew (*Numenius arquata*), and shelduck (*Tadorna tadorna*).

Solent and Southampton Water Ramsar site

Ramsar criterion 1

The site is one of the few major sheltered channels between a substantial island and mainland in European waters, exhibiting an unusual strong double tidal flow and has long periods of slack water at high and low tide. It includes many wetland habitats characteristic of the biogeographic region: saline lagoons, saltmarshes, estuaries, intertidal flats, shallow coastal waters, grazing marshes, reedbeds, coastal woodland and rocky boulder reefs.

Ramsar criterion 2

The site supports an important assemblage of rare plants and invertebrates. At least 33 British Red Data Book invertebrates and at least eight British Red Data Book plants are represented on site.

Nationally important plants occurring on the site

Eleocharis parvula, *Geranium purpureum forsteri*, *Lotus angustissimus*, *Ludwigia palustris*, *Orobanche purpurea*, *Lamprothamnium papulosum*, *Spartina maritima*, *Zostera marina*

Nationally important invertebrates occurring on the site

Allomelita pellucida, *Gammarus insensibilis*, *Nematostella vectensis*, *Arctosa fulvolineata*, *Aulonia albimana*, *Anisodactylus poeciloides*, *Anthonomus rufus*, *Baris analis*, *Berosus spinosus*, *Cantharis fusca*, *Drypta dentata*, *Leptura fulva*, *Meligethes bidentatus*, *Paracymus aeneus*, *Staphylinus caesareus*, *Aphrosylus mitis*, *Atylotus latistriatus*, *Dorycera graminum*, *Haematopoda grandis*, *Hippobosca equina*, *Linnaemya comta*, *Stratiomys longicornis*, *Syntormon mikii*, *Tetanocera freyi*, *Villa circumdata*, *Trachysphaera lobata*, *Paludinella littorina*, *Truncatellina cylindrica*, *Andrena alfkenella*, *Acleris lorquiniana*, *Elachista littoricola*, *Melissoblaptes zelleri*, *Platytes alpinella*, *Psamathrocrita argentella*, *Armandia cirrhosa*

Birds occurring at levels of national importance

Species regularly supported during the breeding season:

Mediterranean gull , *Larus melanocephalus*

11 apparently occupied nests, representing an average of 10.1% of the GB population (Seabird 2000 Census)

Black-headed gull , *Larus ridibundus*

6911 apparently occupied nests, representing an average of 5.4% of the GB population (Seabird 2000 Census)

Sandwich tern , *Sterna (Thalasseus) sandvicensis sandvicensis*

268 apparently occupied nests, representing an average of 2.5% of the GB population (Seabird 2000 Census)

Roseate tern , *Sterna dougallii dougallii*

1 apparently occupied nest, representing an average of 1.9% of the GB population (Seabird 2000 Census)

Common tern , *Sterna hirundo hirundo*

192 apparently occupied nests, representing an average of 1.8% of the GB population (Seabird 2000 Census)

Little tern , *Sterna albifrons albifrons*

22 apparently occupied nests, representing an average of 1.1% of the GB population (Seabird 2000 Census)

Species with peak counts in spring/autumn:

Little egret , *Egretta garzetta*

115 individuals, representing an average of 6.9% of the GB population (5 year peak mean 1998/9-2002/3)

Spotted redshank , *Tringa erythropus*

13 individuals, representing an average of 9.5 of the GB population (5 year peak mean 1998/9-2002/3)

Common greenshank , *Tringa nebularia*

58 individuals, representing an average of 9.7% of the GB population (5 year peak mean 1998/9- 2002/3)

Species with peak counts in winter:

Little grebe , *Tachybaptus ruficollis ruficollis*

105 individuals, representing an average of 1.3% of the GB population (5 year peak mean 1998/9-2002/3)

Slavonian grebe , *Podiceps auritus*

12 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)

Black-necked grebe , *Podiceps nigricollis nigricollis*

3 individuals, representing an average of 2.5% of the GB population (5 year peak mean 1998/9- 2002/3)

Great cormorant , *Phalacrocorax carbo carbo*

247 individuals, representing an average of 1% of the GB population (5 year peak mean 1998/9-2002/3)

Common shelduck , *Tadorna tadorna*

964 individuals, representing an average of 1.2% of the GB population (5 year peak mean 1998/9-2002/3)

Eurasian wigeon , *Anas penelope*

7907 individuals, representing an average of 1.9% of the GB population (5 year peak mean 1998/9-2002/3)

Northern pintail , *Anas acuta*

359 individuals, representing an average of 1.2% of the GB population (5 year peak mean 1998/9-2002/3)

Northern shoveler , *Anas clypeata*

267 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)

Red-breasted merganser , *Mergus serrator*

142 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)

Water rail , *Rallus aquaticus*

17 individuals, representing an average of 3.7% of the GB population (5 year peak mean 1998/9-2002/3)

Grey plover , *Pluvialis squatarola*

1171 individuals, representing an average of 2.2% of the GB population (5 year peak mean 1998/9-2002/3)

Dunlin , *Calidris alpina alpina*

10417 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)

Eurasian curlew , *Numenius arquata arquata*

1766 individuals, representing an average of 1.2% of the GB population (5 year peak mean 1998/9-2002/3)

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:

51343 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6

Species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):

Species with peak counts in spring/autumn:

Ringed plover , *Charadrius hiaticula*

397 individuals, representing an average of 1.2% of the GB population (5 year peak mean 1998/9- 2002/3)

Species with peak counts in winter:

Dark-bellied Brent goose, *Branta bernicla bernicla*

6456 individuals, representing an average of 3% of the population (5 year peak mean 1998/9- 2002/3).

Eurasian teal , *Anas crecca*

5514 individuals, representing an average of 1.3% of the population (5 year peak mean 1998/9-2002/3).

Black-tailed godwit , *Limosa limosa islandica*

1240 individuals, representing an average of 3.5% of the population (5 year peak mean 1998/9-2002/3).

Solent Maritime SAC

Annex I habitats that are a primary reason for selection of this site

1130 Estuaries

The Solent encompasses a major estuarine system on the south coast of England with four coastal plain estuaries (Yar, Medina, King's Quay Shore, Hamble) and four bar-built estuaries (Newtown Harbour, Beaulieu, Langstone Harbour, Chichester Harbour). The site is the only one in the series to contain more than one physiographic sub-type of estuary and is the only cluster site.

The Solent and its inlets are unique in Britain and Europe for their hydrographic regime of four tides each day, and for the complexity of the marine and estuarine habitats present within the area. Sediment habitats within the estuaries include extensive estuarine flats, often with intertidal areas supporting eelgrass *Zostera* spp. and green algae, sand and shingle spits, and natural shoreline transitions. The mudflats range from low and variable salinity in the upper reaches of the estuaries to very sheltered almost fully marine muds in Chichester and Langstone Harbours. Unusual features include the presence of very rare sponges in the Yar estuary and a sandy 'reef' of the polychaete *Sabellaria spinulosa* on the steep eastern side of the entrance to Chichester Harbour.

1320 Spartina swards (*Spartinion maritimae*)

Solent Maritime is the only site for smooth cord-grass *Spartina alterniflora* in the UK and is one of only two sites where significant amounts of small cord-grass *S. maritima* are found. It is also one of the few remaining sites for Townsend's cord-grass *S. x townsendii* and holds extensive areas of common cord-grass *Spartina anglica*, all four taxa thus occurring here in close proximity. It has additional historical and scientific interest as the site where *S. alterniflora* was first recorded in the UK (1829) and where *S. x townsendii* and, later, *S. anglica* first occurred.

1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

The Solent contains the second-largest aggregation of Atlantic salt meadows in south and south-west England. Solent Maritime is a composite site composed of a large number of separate areas of saltmarsh. In contrast to the Severn estuary, the salt meadows at this site are notable as being representative of the ungrazed type and support a different range of communities dominated by sea-purslane *Atriplex portulacoides*, common sea-lavender *Limonium vulgare* and thrift *Armeria maritima*. As a whole the site is less truncated by man-made features than other parts of the south coast and shows rare and unusual transitions to freshwater reedswamp and alluvial woodland as well as coastal grassland. Typical Atlantic salt meadow is still widespread in this site, despite a long history of colonisation by cord-grass *Spartina* spp.

Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site

1110 Sandbanks which are slightly covered by sea water all the time

1140 Mudflats and sandflats not covered by seawater at low tide

1150 Coastal lagoons (priority feature)

1210 Annual vegetation of drift lines

1220 Perennial vegetation of stony banks

1310 *Salicornia* and other annuals colonising mud and sand

2120 Shifting dunes along the shoreline with *Ammophila arenaria* ('white dunes')

Annex II species present as a qualifying feature, but not a primary reason for site selection

1016 Desmoulin's whorl snail *Vertigo moulinsiana*

The potential effect of the Testwood abstraction on the integrity of these protected sites was recently included in a review study by the Environment Agency, and to avoid duplication, this assessment has drawn on the information and findings set out in Environment Agency (Hampshire & Isle of Wight Area)'s document *Habitats Regulations (50) Review of Consents : Stage 3 – Appropriate Assessment, Solent and Southampton Water SPA (April 2005)*. (As a competent authority under the Habitats Regulations 1994, the Environment Agency needed to

assess the possible effects of all of its licences on European sites, and undertook a review of existing permissions. An appropriate assessment was undertaken of those licences with the potential to affect the European sites.)

One section of Agency's appropriate assessment document considers water resources permissions (ie abstraction licences) and their potential impacts on the qualifying interest features of the protected sites, at their maximum authorised quantity: the assessment is therefore also valid for this proposal, which looks to increase the actual amount of abstraction up to the licence limit – the same figure that was used by the Environment Agency in its assessment. The document states:

'River Test

The strongest influence on Eling and Bury Marshes is believed to be mainly marine, although clearly the marshes can be influenced by freshwater flows. There are freshwater flows into the site which are unaffected by abstraction. Flows in the River Test are reduced by abstraction but could only affect the site where it flows adjacent to the marshes. At this point, it will be mixing with seawater and marine influences are expected to predominate.

Lower Test Nature Reserve is a very important freshwater dominated wetland which birds appear to make great use of. The main impact on habitats for birds is thought to be management and, to a lesser extent, the amount of fresh water available. An assessment of saltmarsh suggests that this transitional habitat can move within the nature reserve and will be as affected by abstraction. As a consequence, abstraction of freshwater could be having an effect on site integrity in combination with other areas within the SPA.'

The Environment Agency concludes that alone, each abstraction licence on the River Test, including that for Testwood WSW at its full amount, can be shown to have no adverse effect on the integrity of the Solent and Southampton Water sites. The proposal in the WRMP is to increase abstraction up to the licence limit (136 Ml/d), so it follows that the Agency's assessment remains valid for the proposed new situation.

This assessment notes that there are other plans and projects associated with the water flows in the Test, and that there will be a further Environment Agency review of consents in the Test (2010/15). By the time that the application is made for the new works to increase the abstraction at Testwood to its maximum amount, there will be more detailed information available on other relevant consents and plans, and therefore the possible impacts in combination with others, and whether mitigation will be necessary to avoid adverse impact on the integrity of the SPA and Ramsar site. It is therefore assumed that a further appropriate assessment will be required at the project (planning application) stage, and that, if necessary, mitigation such as additional storage, timing restrictions on abstraction, etc, will be conditioned.

The Solent Marine sites are further downstream again, and the influence of the River Test input is much diluted. Given the conclusion that the Southampton and Solent Water sites will not be adversely affected, and that mitigation would be available at the project stage, it is considered

that a similar conclusion can be reached for the Solent Maritime SAC. This conclusion was also reached by the Environment Agency in its review of consents appropriate assessment for Solent Maritime SAC.

Conclusion: The proposal to increase the Testwood WSW to its licence limit alone will not have a significant effect on the integrity of the protected sites, and with the opportunity to impose conditions that would ensure mitigation of the project's contribution to any in-combination adverse effect on the integrity of the protected sites at the project application stage, this assessment finds that the Plan in respect of this proposal presents no adverse impact on the integrity of the protected sites.

In the unlikely event that the mitigated project cannot satisfy the appropriate assessment tests, a further options appraisal would be undertaken using the sustainability measures set out in the SEA, and an alternative source would be put forward for consent (with appropriate assessment if relevant).

2: Appropriate assessment : Development of the enabling Testwood to Otterbourne transfer

River Itchen SAC

Part of the additional abstraction from the River Test in the previous section is to be transferred to the River Itchen for sustainability purposes. This will help to restore more natural levels of flow in the Itchen, and help to maintain the conditions required for the SAC qualifying features.

River Itchen SAC

Annex I habitats that are a primary reason for selection of this site

3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation.

This habitat type is characterised by the abundance of water-crowfoots *Ranunculus* spp., subgenus *Batrachium* (*Ranunculus fluitans*, *R. penicillatus* ssp. *penicillatus*, *R. penicillatus* ssp. *pseudofluitans*, and *R. peltatus* and its hybrids). Floating mats of these white-flowered species are characteristic of river channels in early to mid-summer. They may modify water flow, promote fine sediment deposition, and provide shelter and food for fish and invertebrate animals.

There are several variants of this habitat in the UK, depending on geology and river type. In each, *Ranunculus* species are associated with a different assemblage of other aquatic plants, such as water-cress *Rorippa nasturtium-aquaticum*, water-starworts *Callitriche* spp., water-parsnips *Sium latifolium* and *Berula erecta*, water-milfoils *Myriophyllum* spp. and water forget-me-not *Myosotis scorpioides*. In some rivers, the cover of these species may exceed that of *Ranunculus* species. Three main sub-types are defined by substrate and the dominant species within the *Ranunculus* community.

The Itchen is a classic example of a sub-type 1 chalk river. The river is dominated throughout by aquatic *Ranunculus* spp. The headwaters contain pond water-crowfoot *Ranunculus peltatus*, while two *Ranunculus* species occur further downstream: stream water-crowfoot *R. penicillatus* ssp. *pseudofluitans*, a species especially characteristic of calcium-rich rivers, and river water-crowfoot *R. fluitans*.

Sub-type 1 is found on rivers on chalk substrates. The community is characterised by pond water-crowfoot *Ranunculus peltatus* in spring-fed headwater streams (winterbournes), stream water-crowfoot *R. penicillatus* ssp. *pseudofluitans* in the middle reaches, and river water-crowfoot *R. fluitans* in the downstream sections. *Ranunculus* is typically associated in the upper and middle reaches with *Callitriche obtusangula* and *C. platycarpa*.

The habitat type is widespread in rivers in the UK, especially on softer and more mineral-rich substrates. It is largely absent from areas underlain by acid rock types (principally in the north and west). It has been adversely affected by nutrient enrichment, mainly from sewage inputs and agriculture, and where agriculture has caused serious siltation. It is also vulnerable to artificial reductions in river flows and to unsympathetic channel engineering works. Consequently, the habitat has been reduced or has disappeared from parts of its range in Britain. The habitat type is widespread in Europe, though examples on chalk (sub-type 1) are rare, with UK distribution being restricted by geology to southern and eastern England.

Sites have been selected to represent the geographical distribution of the habitat, the range of substrates on which it occurs, and its ecological variation. The presence of characteristic plant communities (for example, association with water-starworts *Callitriche*) is considered important, and the selected sites also include the biologically richest examples in the UK. Rivers that show a transition from one substrate to another, e.g. as geology changes from chalk to clay, have also been included. Being restricted in distribution, chalk rivers (sub-type 1) have received particular attention; sites have been selected to represent the characteristic communities of both ephemeral (winterbourne) and perennial river sections.

Annex II species that are a primary reason for selection of this site

1044 Southern damselfly *Coenagrion mercuriale*

The southern damselfly (*Coenagrion mercuriale*) has very specialised habitat requirements, being confined to shallow, well-vegetated, base-rich runnels and flushes in open areas or small side-channels of chalk rivers. Most sites are on wet heath. The larvae live in flushes and shallow runnels, often less than 10 cm deep, with slow-flowing water. Adults fly from June to August. Females lay eggs onto submerged plants, and the predatory aquatic larvae probably take two years to mature.

Coenagrion mercuriale is widespread but rare in southern central and south-west Europe, and its range extends to northern Africa. The fairly stable centre of distribution in the south-west of the UK appears to constitute a major European stronghold of the species.

In the UK, *Coenagrion mercuriale* occurs mainly in south-west England and in south Wales. It has declined in many places and appears to be present only in low numbers at most of its localities. However, more recently the decline may have ceased, with some evidence of recovery in numbers. Strong populations, numbering hundreds to thousands, occur in Dorset, the New Forest and the Itchen Valley, and on the Pembrokeshire Commons.

As well as being one of the major population centres in the UK, the Itchen also represents a population in an unusual habitat for this species in the UK, a managed chalk-river flood plain rather than heathland.

1163 Bullhead *Cottus gobio*

The bullhead (*Cottus gobio*) is a small, bottom-living fish that inhabits a variety of rivers, streams and stony lakes. It appears to favour fast-flowing, clear shallow water with a hard substrate (gravel/cobble/pebble) and is frequently found in the headwaters of upland streams. However, it also occurs in lowland situations on softer substrates so long as the water is well-oxygenated and there is sufficient cover. It is not found in badly polluted rivers. It is widespread and often common in rivers across Europe.

Good populations are widely distributed in freshwaters across almost the whole of England and much of Wales, but in Scotland the species is restricted to the Clyde and Forth catchments, where it is thought to result from an introduction.

The Itchen is a classic chalk river that supports high densities of bullhead throughout much of its length. The river provides good water quality, extensive beds of submerged plants that act as a refuge for the species, and coarse sediments that are vital for spawning and juvenile development.

Annex II species present as a qualifying feature, but not a primary reason for site selection

1092 White-clawed (or Atlantic stream) crayfish *Austropotamobius pallipes*

The white-clawed crayfish (*Austropotamobius pallipes*) lives in a diverse variety of clean aquatic habitats but especially favours hard-water streams and rivers. A major threat to the native white-clawed crayfish is posed by the introduction of non-native species of crayfish, which have been farmed in Britain since the late 1970s. Crayfish plague (a virulent disease caused by the fungus *Aphanomyces astaci*) has spread rapidly, causing drastic losses of native crayfish in rivers in England. It is believed that this disease was introduced and is spread by the most frequently farmed species, the North American signal crayfish (*Pacifastacus leniusculus*), a known carrier of the disease. Crayfish plague can be introduced into a waterbody not only by entry of signal crayfish but also by water, fish or equipment that has been in contact with signals. This greatly increases the risk to remaining white-clawed crayfish populations.

Signal and other non-native crayfish are larger and more aggressive than the native species and are able to produce more young. Consequently, the introduced species pose a threat not only because some are disease-carriers, but also through predation and competition with white-clawed crayfish. In Britain, signal crayfish are now well-established in the wild. In Northern Ireland, no crayfish farms have been established and crayfish plague is unknown, although it occurs in the Republic of Ireland. It is only in areas free of disease that white-clawed crayfish are likely to survive in the future.

Austropotamobius pallipes is widespread in most parts of England and is common in parts of eastern Wales. It is present in south-west Northern Ireland. A significant part of the EU resource is found in the UK, but the species is now seriously threatened over most of its range in Britain.

1096 Brook lamprey *Lampetra planeri*

The brook lamprey (*Lampetra planeri*) is a primitive, jawless fish resembling an eel, and is the smallest of the lampreys found in the UK. It is a non-migratory freshwater species, occurring in streams and occasionally in lakes in north-west Europe. Like other lamprey species, the brook lamprey requires clean gravel beds for spawning and soft marginal silt or sand for the ammocoete larvae. It spawns mostly in parts of the river where the current is not too strong.

The brook lamprey has declined in some parts of its European range, including parts of the UK, although it is still widespread. This species is the most abundant and widespread of the British lampreys and is often found in the absence of the other two species, for example above a barrier that precludes the presence of the migratory species. It is common in many areas of England but is absent from much of Scotland north of the Great Glen, including Orkney and Shetland and all but a few of the Western Isles.

1106 Atlantic salmon *Salmo salar*

The Atlantic salmon (*Salmo salar*) is an anadromous species (i.e. adults migrate from the sea to breed in freshwater). Spawning takes place in shallow excavations in shallow gravelly areas in clean rivers and streams where the water flows swiftly. The young that emerge spread out into other parts of the river. After a period of 1-6 years the young salmon migrate downstream to the sea as 'smolts'. Salmon have a homing instinct that draws them back to spawn in the river of their birth after 1-3 years in the sea. This behaviour has resulted in genetically distinct stock between rivers and even within individual rivers, with some evidence of further genetic distinctiveness in the tributaries of large rivers.

Salmon rivers vary considerably in their ecological and hydrological characteristics and in the life-cycle strategies adopted by the salmon within them. There are particularly strong contrasts between southern and northern rivers, and the UK's varied climate, geology and terrain means that high diversity can be found within some of the large rivers. The cool and wet climate in the north, often with harder, more resistant rocks and steeper slopes, results in salmon rivers that are sparsely vegetated, nutrient-poor and prone to sudden increases in flow ('spates') in response to heavy downfalls or sudden snow-melt. As a result, salmon may take several years to reach the smolt stage and migrate to sea. In the south, rivers flow across gentler terrain and softer rocks, in a warmer, drier climate. Here, salmon often grow sufficiently quickly to smolt as yearlings.

The species is subject to many pressures in Europe, including pollution, the introduction of non-native salmon stocks, physical barriers to migration, exploitation from netting and angling, physical degradation of spawning and nursery habitat, and increased marine mortality.

The Atlantic salmon is widely distributed within the EU, ranging from Portugal in the south to Sweden and Finland in the north. The UK salmon population comprises a significant proportion of the total European stock.

The Atlantic salmon is a widespread species in the UK and is found in several hundred rivers, many of which have adult runs in excess of 1000. The latest estimates of the UK spawning population size are, however, about 50% down on the ten-year average.

1355 Otter *Lutra lutra*

The otter (*Lutra lutra*) is a semi-aquatic mammal, which occurs in a wide range of ecological conditions, including inland freshwater and coastal areas (particularly in Scotland). Populations in coastal areas utilise shallow, inshore marine areas for feeding but also require fresh water for bathing and terrestrial areas for resting and breeding holts. Coastal otter habitat ranges from sheltered wooded inlets to more open, low-lying coasts. Inland populations utilise a range of running and standing freshwaters. These must have an abundant supply of food (normally associated with high water quality), together with suitable habitat, such as vegetated river banks, islands, reedbeds and woodland, which are used for foraging, breeding and resting.

The otter was once widespread in Europe, but populations declined sharply during the 1960s and 1970s due to pollution, exacerbated by hunting and habitat loss. Currently it has a rather discontinuous distribution with strong populations in Greece, Spain, Portugal and much of eastern Europe. Over most of continental western Europe the species is scarce to extinct, but reintroduction or restocking projects are in progress in several countries.

Historically, otters occurred over most of the UK. However, persecution, habitat loss and, more recently, the impact of toxic organochlorine insecticides caused a marked reduction in the range of the species. At present, the majority of the otter population in Great Britain occurs in Scotland, with a significant proportion of this number being found in the north and west of the country. Other strong populations survive in Wales and Ireland. The otter is still scarce over much of England, where the highest concentrations are in the south-west. However, recent surveys suggest that the otter population is recovering well and recolonising parts of its former range.

All of the qualifying features will potentially benefit from the sustainability measures, including this proposal. The proposal includes the installation of a pipeline that may come close to the valley of the River Itchen at Otterbourne. This could have an adverse impact on the integrity of the SAC if construction methods cause damage or fragmentation of habitats in or along the river, or if sediment was to be released into the water. Construction and routing detail is not available at this planning stage, so there is insufficient information about potential impacts on the integrity of the site. However, further consents will be required at the implementation stage, and appropriate assessment can be carried out

then. The installation of pipelines near to sensitive rivers is now standard procedure, with mitigation such as following PPGs available to avoid any adverse effects.

Conclusion: the development of the enabling Testwood to Otterbourne transfer will bring benefits to the integrity of the River Itchen SAC, and, provided standard mitigation such as compliance with PPGs is conditioned at the project stage, the installation of the necessary pipeline will not have an adverse effect on the integrity of the protected site.

3: Appropriate assessment : Candover and Arle augmentation

River Itchen SAC

These two streams feed into the River Itchen SAC, and the proposal is to use the existing groundwater boreholes to enhance flows in the SAC during periods of low flow and drought. This will allow continued abstraction downstream while maintaining sustainability reduction flow requirements. As such, this is expected to be required on a very occasional basis only. Plant construction works would not affect the protected site, though some of the pipeline works will need to be in close proximity.

River Itchen SAC

Annex I habitats that are a primary reason for selection of this site

3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation.

This habitat type is characterised by the abundance of water-crowfoots *Ranunculus* spp., subgenus *Batrachium* (*Ranunculus fluitans*, *R. penicillatus* ssp. *penicillatus*, *R. penicillatus* ssp. *pseudofluitans*, and *R. peltatus* and its hybrids). Floating mats of these white-flowered species are characteristic of river channels in early to mid-summer. They may modify water flow, promote fine sediment deposition, and provide shelter and food for fish and invertebrate animals.

There are several variants of this habitat in the UK, depending on geology and river type. In each, *Ranunculus* species are associated with a different assemblage of other aquatic plants, such as water-cress *Rorippa nasturtium-aquaticum*, water-starworts *Callitriche* spp., water-parsnips *Sium latifolium* and *Berula erecta*, water-milfoils *Myriophyllum* spp. and water forget-me-not *Myosotis scorpioides*. In some rivers, the cover of these species may exceed that of *Ranunculus* species. Three main sub-types are defined by substrate and the dominant species within the *Ranunculus* community.

The Itchen is a classic example of a sub-type 1 chalk river. The river is dominated throughout by aquatic *Ranunculus* spp. The headwaters contain pond water-crowfoot *Ranunculus peltatus*, while two *Ranunculus* species occur further downstream: stream water-crowfoot *R. penicillatus* ssp. *pseudofluitans*, a species especially characteristic of calcium-rich rivers, and river water-crowfoot *R. fluitans*.

Sub-type 1 is found on rivers on chalk substrates. The community is characterised by pond water-crowfoot *Ranunculus peltatus* in spring-fed headwater streams (winterbournes), stream water-crowfoot *R. penicillatus* ssp. *pseudofluitans* in the middle reaches, and river water-crowfoot

R. fluitans in the downstream sections. *Ranunculus* is typically associated in the upper and middle reaches with *Callitriche obtusangula* and *C. platycarpa*.

The habitat type is widespread in rivers in the UK, especially on softer and more mineral-rich substrates. It is largely absent from areas underlain by acid rock types (principally in the north and west). It has been adversely affected by nutrient enrichment, mainly from sewage inputs and agriculture, and where agriculture has caused serious siltation. It is also vulnerable to artificial reductions in river flows and to unsympathetic channel engineering works. Consequently, the habitat has been reduced or has disappeared from parts of its range in Britain. The habitat type is widespread in Europe, though examples on chalk (sub-type 1) are rare, with UK distribution being restricted by geology to southern and eastern England.

Sites have been selected to represent the geographical distribution of the habitat, the range of substrates on which it occurs, and its ecological variation. The presence of characteristic plant communities (for example, association with water-starworts *Callitriche*) is considered important, and the selected sites also include the biologically richest examples in the UK. Rivers that show a transition from one substrate to another, e.g. as geology changes from chalk to clay, have also been included. Being restricted in distribution, chalk rivers (sub-type 1) have received particular attention; sites have been selected to represent the characteristic communities of both ephemeral (winterbourne) and perennial river sections.

Annex II species that are a primary reason for selection of this site

1044 Southern damselfly *Coenagrion mercuriale*

The southern damselfly (*Coenagrion mercuriale*) has very specialised habitat requirements, being confined to shallow, well-vegetated, base-rich runnels and flushes in open areas or small side-channels of chalk rivers. Most sites are on wet heath. The larvae live in flushes and shallow runnels, often less than 10 cm deep, with slow-flowing water. Adults fly from June to August. Females lay eggs onto submerged plants, and the predatory aquatic larvae probably take two years to mature.

Coenagrion mercuriale is widespread but rare in southern central and south-west Europe, and its range extends to northern Africa. The fairly stable centre of distribution in the south-west of the UK appears to constitute a major European stronghold of the species.

In the UK, *Coenagrion mercuriale* occurs mainly in south-west England and in south Wales. It has declined in many places and appears to be present only in low numbers at most of its localities. However, more recently the decline may have ceased, with some evidence of recovery in numbers. Strong populations, numbering hundreds to thousands, occur in Dorset, the New Forest and the Itchen Valley, and on the Pembrokeshire Commons.

As well as being one of the major population centres in the UK, the Itchen also represents a population in an unusual habitat for this species in the UK, a managed chalk-river flood plain rather than heathland.

1163 Bullhead *Cottus gobio*

The bullhead (*Cottus gobio*) is a small, bottom-living fish that inhabits a variety of rivers, streams and stony lakes. It appears to favour fast-flowing, clear shallow water with a hard substrate (gravel/cobble/pebble) and is frequently found in the headwaters of upland streams. However, it also occurs in lowland situations on softer substrates so long as the water is well-oxygenated and there is sufficient cover. It is not found in badly polluted rivers. It is widespread and often common in rivers across Europe.

Good populations are widely distributed in freshwaters across almost the whole of England and much of Wales, but in Scotland the species is restricted to the Clyde and Forth catchments, where it is thought to result from an introduction.

The Itchen is a classic chalk river that supports high densities of bullhead throughout much of its length. The river provides good water quality, extensive beds of submerged plants that act as a refuge for the species, and coarse sediments that are vital for spawning and juvenile development.

Annex II species present as a qualifying feature, but not a primary reason for site selection

1092 White-clawed (or Atlantic stream) crayfish *Austropotamobius pallipes*

The white-clawed crayfish (*Austropotamobius pallipes*) lives in a diverse variety of clean aquatic habitats but especially favours hard-water streams and rivers. A major threat to the native white-clawed crayfish is posed by the introduction of non-native species of crayfish, which have been farmed in Britain since the late 1970s. Crayfish plague (a virulent disease caused by the fungus *Aphanomyces astaci*) has spread rapidly, causing drastic losses of native crayfish in rivers in England. It is believed that this disease was introduced and is spread by the most frequently farmed species, the North American signal crayfish (*Pacifastacus leniusculus*), a known carrier of the disease. Crayfish plague can be introduced into a waterbody not only by entry of signal crayfish but also by water, fish or equipment that has been in contact with signals. This greatly increases the risk to remaining white-clawed crayfish populations.

Signal and other non-native crayfish are larger and more aggressive than the native species and are able to produce more young. Consequently, the introduced species pose a threat not only because some are disease-carriers, but also through predation and competition with white-clawed crayfish. In Britain, signal crayfish are now well-established in the wild. In Northern Ireland, no crayfish farms have been

established and crayfish plague is unknown, although it occurs in the Republic of Ireland. It is only in areas free of disease that white-clawed crayfish are likely to survive in the future.

Austropotamobius pallipes is widespread in most parts of England and is common in parts of eastern Wales. It is present in south-west Northern Ireland. A significant part of the EU resource is found in the UK, but the species is now seriously threatened over most of its range in Britain.

1096 Brook lamprey *Lampetra planeri*

The brook lamprey (*Lampetra planeri*) is a primitive, jawless fish resembling an eel, and is the smallest of the lampreys found in the UK. It is a non-migratory freshwater species, occurring in streams and occasionally in lakes in north-west Europe. Like other lamprey species, the brook lamprey requires clean gravel beds for spawning and soft marginal silt or sand for the ammocoete larvae. It spawns mostly in parts of the river where the current is not too strong.

The brook lamprey has declined in some parts of its European range, including parts of the UK, although it is still widespread. This species is the most abundant and widespread of the British lampreys and is often found in the absence of the other two species, for example above a barrier that precludes the presence of the migratory species. It is common in many areas of England but is absent from much of Scotland north of the Great Glen, including Orkney and Shetland and all but a few of the Western Isles.

1106 Atlantic salmon *Salmo salar*

The Atlantic salmon (*Salmo salar*) is an anadromous species (i.e. adults migrate from the sea to breed in freshwater). Spawning takes place in shallow excavations in shallow gravelly areas in clean rivers and streams where the water flows swiftly. The young that emerge spread out into other parts of the river. After a period of 1-6 years the young salmon migrate downstream to the sea as 'smolts'. Salmon have a homing instinct that draws them back to spawn in the river of their birth after 1-3 years in the sea. This behaviour has resulted in genetically distinct stock between rivers and even within individual rivers, with some evidence of further genetic distinctiveness in the tributaries of large rivers.

Salmon rivers vary considerably in their ecological and hydrological characteristics and in the life-cycle strategies adopted by the salmon within them. There are particularly strong contrasts between southern and northern rivers, and the UK's varied climate, geology and terrain means that high diversity can be found within some of the large rivers. The cool and wet climate in the north, often with harder, more resistant rocks and steeper slopes, results in salmon rivers that are sparsely vegetated, nutrient-poor and prone to sudden increases in flow ('spates') in response to heavy downfalls or sudden snow-melt. As a result, salmon may take several years to reach the smolt stage and migrate to sea. In the south, rivers flow across gentler terrain and softer rocks, in a warmer, drier climate. Here, salmon often grow sufficiently quickly to smolt as yearlings.

The species is subject to many pressures in Europe, including pollution, the introduction of non-native salmon stocks, physical barriers to migration, exploitation from netting and angling, physical degradation of spawning and nursery habitat, and increased marine mortality.

The Atlantic salmon is widely distributed within the EU, ranging from Portugal in the south to Sweden and Finland in the north. The UK salmon population comprises a significant proportion of the total European stock.

The Atlantic salmon is a widespread species in the UK and is found in several hundred rivers, many of which have adult runs in excess of 1000. The latest estimates of the UK spawning population size are, however, about 50% down on the ten-year average.

1355 Otter *Lutra lutra*

The otter (*Lutra lutra*) is a semi-aquatic mammal, which occurs in a wide range of ecological conditions, including inland freshwater and coastal areas (particularly in Scotland). Populations in coastal areas utilise shallow, inshore marine areas for feeding but also require fresh water for bathing and terrestrial areas for resting and breeding holts. Coastal otter habitat ranges from sheltered wooded inlets to more open, low-lying coasts. Inland populations utilise a range of running and standing freshwaters. These must have an abundant supply of food (normally associated with high water quality), together with suitable habitat, such as vegetated river banks, islands, reedbeds and woodland, which are used for foraging, breeding and resting.

The otter was once widespread in Europe, but populations declined sharply during the 1960s and 1970s due to pollution, exacerbated by hunting and habitat loss. Currently it has a rather discontinuous distribution with strong populations in Greece, Spain, Portugal and much of eastern Europe. Over most of continental western Europe the species is scarce to extinct, but reintroduction or restocking projects are in progress in several countries.

Historically, otters occurred over most of the UK. However, persecution, habitat loss and, more recently, the impact of toxic organochlorine insecticides caused a marked reduction in the range of the species. At present, the majority of the otter population in Great Britain occurs in Scotland, with a significant proportion of this number being found in the north and west of the country. Other strong populations survive in Wales and Ireland. The otter is still scarce over much of England, where the highest concentrations are in the south-west. However, recent surveys suggest that the otter population is recovering well and recolonising parts of its former range.

The transfer of groundwater into the headwaters of the River Itchen during times of low flow when many of the qualifying features (especially the floating vegetation, the various fish species, and the white-clawed crayfish) are particularly vulnerable to drought will generally be a benefit of the scheme and aid maintenance of the integrity of the SAC. However, white-clawed crayfish are known to be sensitive to changes in water

temperature and flows in early summer, and surveys have shown them to occur in the Candover stream. Any adverse effects can, however, be mitigated by control of timing over the use of the two streams, such that the Arle is used in the summer period when the crayfish are vulnerable, with the Candover being used outside the most sensitive period. This can be conditioned at the project licensing stage.

No new construction or installation works are envisaged, so no physical effect on the protected site is predicted..

Conclusion: the Candover and Arle augmentation scheme will allow continuation of vital abstractions downstream in the River Itchen without compromising the integrity of the River Itchen SAC. Mitigation measures are available to protect the white-clawed crayfish in the Candover stream and no adverse impacts on the integrity of the River Itchen SAC are predicted.

In the unlikely event that the mitigated project cannot satisfy the appropriate assessment tests, a further options appraisal would be undertaken using the sustainability measures set out in the SEA, and an alternative source would be put forward for consent (with appropriate assessment if relevant).

4: Appropriate assessment : River Itchen Sustainability Reductions

River Itchen SAC

This group of reductions in abstractions that have been brought forward through consent review appropriate assessments by the Environment Agency are facilitated by the previous projects. They will each individually and collectively help to maintain and restore the integrity of the River Itchen SAC.

River Itchen SAC

Annex I habitats that are a primary reason for selection of this site

3260 Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitriche-Batrachion* vegetation.

This habitat type is characterised by the abundance of water-crowfoots *Ranunculus* spp., subgenus *Batrachium* (*Ranunculus fluitans*, *R. penicillatus* ssp. *penicillatus*, *R. penicillatus* ssp. *pseudofluitans*, and *R. peltatus* and its hybrids). Floating mats of these white-flowered species are characteristic of river channels in early to mid-summer. They may modify water flow, promote fine sediment deposition, and provide shelter and food for fish and invertebrate animals.

There are several variants of this habitat in the UK, depending on geology and river type. In each, *Ranunculus* species are associated with a different assemblage of other aquatic plants, such as water-cress *Rorippa nasturtium-aquaticum*, water-starworts *Callitriche* spp., water-parsnips *Sium latifolium* and *Berula erecta*, water-milfoils *Myriophyllum* spp. and water forget-me-not *Myosotis scorpioides*. In some rivers, the cover of these species may exceed that of *Ranunculus* species. Three main sub-types are defined by substrate and the dominant species within the *Ranunculus* community.

The Itchen is a classic example of a sub-type 1 chalk river. The river is dominated throughout by aquatic *Ranunculus* spp. The headwaters contain pond water-crowfoot *Ranunculus peltatus*, while two *Ranunculus* species occur further downstream: stream water-crowfoot *R. penicillatus* ssp. *pseudofluitans*, a species especially characteristic of calcium-rich rivers, and river water-crowfoot *R. fluitans*.

Sub-type 1 is found on rivers on chalk substrates. The community is characterised by pond water-crowfoot *Ranunculus peltatus* in spring-fed headwater streams (winterbournes), stream water-crowfoot *R. penicillatus* ssp. *pseudofluitans* in the middle reaches, and river water-crowfoot *R. fluitans* in the downstream sections. *Ranunculus* is typically associated in the upper and middle reaches with *Callitriche obtusangula* and *C. platycarpa*.

The habitat type is widespread in rivers in the UK, especially on softer and more mineral-rich substrates. It is largely absent from areas underlain by acid rock types (principally in the north and west). It has been adversely affected by nutrient enrichment, mainly from sewage inputs and agriculture, and where agriculture has caused serious siltation. It is also vulnerable to artificial reductions in river flows and to unsympathetic channel engineering works. Consequently, the habitat has been reduced or has disappeared from parts of its range in Britain. The habitat type is widespread in Europe, though examples on chalk (sub-type 1) are rare, with UK distribution being restricted by geology to southern and eastern England.

Sites have been selected to represent the geographical distribution of the habitat, the range of substrates on which it occurs, and its ecological variation. The presence of characteristic plant communities (for example, association with water-starworts *Callitriche*) is considered important, and the selected sites also include the biologically richest examples in the UK. Rivers that show a transition from one substrate to another, e.g. as geology changes from chalk to clay, have also been included. Being restricted in distribution, chalk rivers (sub-type 1) have received particular attention; sites have been selected to represent the characteristic communities of both ephemeral (winterbourne) and perennial river sections.

Annex II species that are a primary reason for selection of this site

1044 Southern damselfly *Coenagrion mercuriale*

The southern damselfly (*Coenagrion mercuriale*) has very specialised habitat requirements, being confined to shallow, well-vegetated, base-rich runnels and flushes in open areas or small side-channels of chalk rivers. Most sites are on wet heath. The larvae live in flushes and shallow runnels, often less than 10 cm deep, with slow-flowing water. Adults fly from June to August. Females lay eggs onto submerged plants, and the predatory aquatic larvae probably take two years to mature.

Coenagrion mercuriale is widespread but rare in southern central and south-west Europe, and its range extends to northern Africa. The fairly stable centre of distribution in the south-west of the UK appears to constitute a major European stronghold of the species.

In the UK, *Coenagrion mercuriale* occurs mainly in south-west England and in south Wales. It has declined in many places and appears to be present only in low numbers at most of its localities. However, more recently the decline may have ceased, with some evidence of recovery in numbers. Strong populations, numbering hundreds to thousands, occur in Dorset, the New Forest and the Itchen Valley, and on the Pembrokeshire Commons.

As well as being one of the major population centres in the UK, the Itchen also represents a population in an unusual habitat for this species in the UK, a managed chalk-river flood plain rather than heathland.

1163 Bullhead *Cottus gobio*

The bullhead (*Cottus gobio*) is a small, bottom-living fish that inhabits a variety of rivers, streams and stony lakes. It appears to favour fast-flowing, clear shallow water with a hard substrate (gravel/cobble/pebble) and is frequently found in the headwaters of upland streams. However, it also occurs in lowland situations on softer substrates so long as the water is well-oxygenated and there is sufficient cover. It is not found in badly polluted rivers. It is widespread and often common in rivers across Europe.

Good populations are widely distributed in freshwaters across almost the whole of England and much of Wales, but in Scotland the species is restricted to the Clyde and Forth catchments, where it is thought to result from an introduction.

The Itchen is a classic chalk river that supports high densities of bullhead throughout much of its length. The river provides good water quality, extensive beds of submerged plants that act as a refuge for the species, and coarse sediments that are vital for spawning and juvenile development.

Annex II species present as a qualifying feature, but not a primary reason for site selection

1092 White-clawed (or Atlantic stream) crayfish *Austropotamobius pallipes*

The white-clawed crayfish (*Austropotamobius pallipes*) lives in a diverse variety of clean aquatic habitats but especially favours hard-water streams and rivers. A major threat to the native white-clawed crayfish is posed by the introduction of non-native species of crayfish, which have been farmed in Britain since the late 1970s. Crayfish plague (a virulent disease caused by the fungus *Aphanomyces astaci*) has spread rapidly, causing drastic losses of native crayfish in rivers in England. It is believed that this disease was introduced and is spread by the most frequently farmed species, the North American signal crayfish (*Pacifastacus leniusculus*), a known carrier of the disease. Crayfish plague can be introduced into a waterbody not only by entry of signal crayfish but also by water, fish or equipment that has been in contact with signals. This greatly increases the risk to remaining white-clawed crayfish populations.

Signal and other non-native crayfish are larger and more aggressive than the native species and are able to produce more young. Consequently, the introduced species pose a threat not only because some are disease-carriers, but also through predation and competition with white-clawed crayfish. In Britain, signal crayfish are now well-established in the wild. In Northern Ireland, no crayfish farms have been established and crayfish plague is unknown, although it occurs in the Republic of Ireland. It is only in areas free of disease that white-clawed crayfish are likely to survive in the future.

Austropotamobius pallipes is widespread in most parts of England and is common in parts of eastern Wales. It is present in south-west Northern Ireland. A significant part of the EU resource is found in the UK, but the species is now seriously threatened over most of its range in Britain.

1096 Brook lamprey *Lampetra planeri*

The brook lamprey (*Lampetra planeri*) is a primitive, jawless fish resembling an eel, and is the smallest of the lampreys found in the UK. It is a non-migratory freshwater species, occurring in streams and occasionally in lakes in north-west Europe. Like other lamprey species, the brook lamprey requires clean gravel beds for spawning and soft marginal silt or sand for the ammocoete larvae. It spawns mostly in parts of the river where the current is not too strong.

The brook lamprey has declined in some parts of its European range, including parts of the UK, although it is still widespread. This species is the most abundant and widespread of the British lampreys and is often found in the absence of the other two species, for example above a barrier that precludes the presence of the migratory species. It is common in many areas of England but is absent from much of Scotland north of the Great Glen, including Orkney and Shetland and all but a few of the Western Isles.

1106 Atlantic salmon *Salmo salar*

The Atlantic salmon (*Salmo salar*) is an anadromous species (i.e. adults migrate from the sea to breed in freshwater). Spawning takes place in shallow excavations in shallow gravelly areas in clean rivers and streams where the water flows swiftly. The young that emerge spread out into other parts of the river. After a period of 1-6 years the young salmon migrate downstream to the sea as 'smolts'. Salmon have a homing instinct that draws them back to spawn in the river of their birth after 1-3 years in the sea. This behaviour has resulted in genetically distinct stock between rivers and even within individual rivers, with some evidence of further genetic distinctiveness in the tributaries of large rivers.

Salmon rivers vary considerably in their ecological and hydrological characteristics and in the life-cycle strategies adopted by the salmon within them. There are particularly strong contrasts between southern and northern rivers, and the UK's varied climate, geology and terrain means that high diversity can be found within some of the large rivers. The cool and wet climate in the north, often with harder, more resistant rocks and steeper slopes, results in salmon rivers that are sparsely vegetated, nutrient-poor and prone to sudden increases in flow ('spates') in response to heavy downfalls or sudden snow-melt. As a result, salmon may take several years to reach the smolt stage and migrate to sea. In the south, rivers flow across gentler terrain and softer rocks, in a warmer, drier climate. Here, salmon often grow sufficiently quickly to smolt as yearlings.

The species is subject to many pressures in Europe, including pollution, the introduction of non-native salmon stocks, physical barriers to migration, exploitation from netting and angling, physical degradation of spawning and nursery habitat, and increased marine mortality.

The Atlantic salmon is widely distributed within the EU, ranging from Portugal in the south to Sweden and Finland in the north. The UK salmon population comprises a significant proportion of the total European stock.

The Atlantic salmon is a widespread species in the UK and is found in several hundred rivers, many of which have adult runs in excess of 1000. The latest estimates of the UK spawning population size are, however, about 50% down on the ten-year average.

1355 Otter *Lutra lutra*

The otter (*Lutra lutra*) is a semi-aquatic mammal, which occurs in a wide range of ecological conditions, including inland freshwater and coastal areas (particularly in Scotland). Populations in coastal areas utilise shallow, inshore marine areas for feeding but also require fresh water for bathing and terrestrial areas for resting and breeding holts. Coastal otter habitat ranges from sheltered wooded inlets to more open, low-lying coasts. Inland populations utilise a range of running and standing freshwaters. These must have an abundant supply of food (normally associated with high water quality), together with suitable habitat, such as vegetated river banks, islands, reedbeds and woodland, which are used for foraging, breeding and resting.

The otter was once widespread in Europe, but populations declined sharply during the 1960s and 1970s due to pollution, exacerbated by hunting and habitat loss. Currently it has a rather discontinuous distribution with strong populations in Greece, Spain, Portugal and much of eastern Europe. Over most of continental western Europe the species is scarce to extinct, but reintroduction or restocking projects are in progress in several countries.

Historically, otters occurred over most of the UK. However, persecution, habitat loss and, more recently, the impact of toxic organochlorine insecticides caused a marked reduction in the range of the species. At present, the majority of the otter population in Great Britain occurs in Scotland, with a significant proportion of this number being found in the north and west of the country. Other strong populations survive in Wales and Ireland. The otter is still scarce over much of England, where the highest concentrations are in the south-west. However, recent surveys suggest that the otter population is recovering well and recolonising parts of its former range.

No significant construction projects are required, and the operational changes will be beneficial to the River Itchen SAC, by ensuring more natural flow conditions, especially at times of drought and low flow when the habitats and species qualifying features such as white-clawed crayfish, various fish species, and floating mats of water-crowfoot vegetation are most vulnerable.

Conclusion: the package of sustainability measures will be beneficial to the integrity of the River Itchen, and no adverse effect on the SAC is predicted.

5: Appropriate assessment : River Arun abstraction

Arun Valley SPA

Arun Valley Ramsar site

The Mens SAC

Ebernoe Common SAC

The proposal involves an abstraction from the River Arun near Hardham and the construction of a pumping station and storage pond on the west bank of the River Arun (ie the opposite side of the river from the SPA). The appropriate assessment looked at possible impacts of the qualifying features of the SPA and Ramsar sites on the opposite bank of the river, and in addition the possible effects on bats feeding along the river valley from The Mens and Ebernoe Common SACs.

Arun Valley SPA

The Arun Valley in West Sussex is located just north of the South Downs escarpment about 15 km inland from the south coast of England. It consists of low-lying grazing marsh, largely on alluvial soils, but with an area of peat derived from a relict raised bog. Variation in soils and water supply lead to a wide range of ecological conditions and hence a rich flora and fauna. Southern parts of the Arun Valley are fed by calcareous springs, while to the north, where the underlying geology is Greensand, the water is more acidic. The history of management of fields and current water levels determine the plant communities present, with drier fields dominated by meadow grasses, typically crested dog's-tail (*Cynosurus cristatus*) and perennial rye-grass (*Lolium perenne*). In wetter areas, rushes, sedges and tufted hair-grass (*Deschampsia cespitosa*) are more frequent. Ungrazed fields have developed into fen, scrub or woodland. Fen areas consist of common reed (*Phragmites australis*), reed sweet-grass (*Glyceria maxima*) and greater tussock-sedge (*Carex paniculata*), often with scattered elder and willow scrub. On firmer ground, there is alder (*Alnus glutinosa*), willows, birch (*Betula* sp.), and willow, with oak (*Quercus robur*) and hazel (*Corylus avellana*) woodland on the driest ground. The ditches and margins between grazing marsh fields have an outstanding aquatic flora and invertebrate fauna. The Arun Valley supports important numbers of wintering waterbirds, which feed in the wetter, low-lying fields and along ditches.

Qualifying species

This site qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting an overwintering population of European importance of the following species listed on Annex I of the Directive.

Bewick's swan (*Cygnus columbianus bewickii*)

The site supports 115 individuals, representing at least 1.6% of the wintering population in Great Britain (5 year peak mean for 1992/93 to 1996/7).

The main European wintering grounds of Bewick's swan are in lowland areas of northern Europe, from Denmark, through the low countries to northern France, Britain and Ireland. Smaller numbers occur in the Camargue, southern France and the south Caspian region. In Britain, the species has a southerly distribution during the winter, with by far the largest concentrations in eastern England, especially the Nene and Ouse Washes. Smaller flocks occur in western England with relatively small numbers in Wales. In Northern Ireland, the only flocks of note occur at Loughs Foyle, Neagh and Beg. The species shows a high level of winter site fidelity in the UK, and movements between sites within a given winter are infrequent, although such movements can occur, especially in response to severe weather conditions. Bewick's swans winter on shallow freshwater lakes, marshes or slow-moving rivers near or adjacent to extensive grasslands liable to flooding. In Ireland, they feed predominantly on permanent wet grassland and, in the past, brackish coastal lagoons. In recent decades this species has increasingly taken to foraging on agricultural land, especially waste root crops, grain stubbles and winter cereals. In general, they feed by day and return to wetland areas to roost overnight. They are highly gregarious and often occur in flocks of several hundreds.

The trend for the population of Bewick's swans wintering in north-west Europe indicates that there was a marked increase in the population between 1974 and 1994, with slight evidence of a decline since the mid-1990s. In the mid-1970s, the population was thought to comprise 9,000-10,000, rising to 17,000 by the mid-1980s. A dramatic increase occurred during the 1980s; 25,800 birds were recorded in January 1990 and 29,000 in January 1995: the reasons for this increase are unknown but may have been related to increased survival rates or emigration from the eastern population. Productivity (judged from the numbers of juveniles occurring in wintering areas) was extremely variable during the period of increase and was therefore unlikely to have been responsible.

During the 19th and early 20th centuries, Bewick's Swan was rare in England and Wales but occurred in relatively high numbers in north-west Scotland, particularly in the Outer Hebrides and Tiree. In the 1930s, numbers began to rise in England and decline in Scotland as the migration route shifted southwards. It is thought that cold-weather influxes of birds in the late 1930s and mid-1950s helped establish England as a regular wintering area. The Scottish population dwindled to almost nothing until a small wintering flock started to over-winter at Caerlaverock, on the north shore of the Solway during the mid-1950s. Numbers of Bewick's Swans have increased at the Ouse Washes since the 1940s when only a small number of birds wintered there. The flock grew to about 1,000 in the early 1970s and numbers have continued to climb; around 5,000 birds now winter at this site making it the key wintering area in Britain. There is now some interchange between birds at this site and those at the nearby Nene Washes. Population increases at the Ouse Washes are largely due to the establishment of RSPB and WWT refuges during the late 1960s and early 1970s. These sites are characterised by low levels of disturbance and supplementary feeding at some sites.

Fewer Bewick's swans cross the North Sea from the continent during mild winters and this probably explains recent declines in the numbers visiting Britain and may also be responsible for the decline in numbers overwintering in Ireland in recent decades.

In the non-breeding season, the UK's SPA suite for Bewick's swan supports, on average, 7,072 individuals (calculated using WeBS January site totals for the period 1992/93 to 1996/97). This total amounts to about 99% of the British population, about 5% of the all-Ireland population, and about 42% of the international flyway population. The suite comprises 15 sites where Bewick's swan has been listed as a qualifying species. WeBS counts of swans at many of the sites selected may often include numbers in surrounding areas of intensively managed farmland outwith the SPA boundary. This highlights the continuing need to manage these areas in a way that is sympathetic to the needs of the swans.

Winter assemblage

The area also qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl. Over winter, the area regularly supports 27,241 individual waterfowl (5 year peak mean for 1992/93 to 1996/97) including: shoveler (*Anas clypeata*), teal (*Anas crecca*), wigeon (*Anas penelope*), and Bewick's swan (*Cygnus columbianus bewickii*).

Arun Valley Ramsar site

Ramsar criterion 2

The site holds seven wetland invertebrate species listed in the British Red Data Book as threatened: these are *Pseudamnicola confusa*, *Sciomyza dryomyzina*, *Anisus vorticulus*, *Pisidium pseudosphaerium*, *Libellula fulva*, *Hydrophilus piceus*, and *Paraphotistus nigricornis*. One of these, *Pseudamnicola confusa*, is considered to be endangered.

The site also supports four nationally rare and four nationally scarce plant species. The nationally important species occurring on the site are *Carex vulpina*, *Leersia oryzoides*, *Potamogeton acutifolius*, *Myriophyllum verticillatum*, *Oenanthe silaifolia*, *Sium latifolium*, and *Thelypteris palustris*.

Ramsar criterion 3

In addition to the Red Data Book invertebrate and plant species, the ditches intersecting the site have a particularly diverse and rich flora. All five British duckweed *Lemna* species, all five water-cress *Rorippa* species, and all three British water milfoils (*Myriophyllum* species), all but one of the seven British water dropworts (*Oenanthe* species), and two-thirds of the British pondweeds (*Potamogeton* species) can be found on site.

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:

13774 waterfowl (5 year peak mean 1998/99-2002/2003)

The potential for adverse effects on the integrity of these sites through disturbance, hydrological changes, saline intrusion and habitat deterioration has already been assessed in detail through a planning application and environmental impact assessment for the implementation of this scheme. The Environment Agency is the competent authority for the abstraction licence and Horsham District Council was the competent authority for the planning application. In determining those applications, the competent authorities considered the need for an appropriate assessment of the implications of the Arun abstraction scheme for the Arun Valley SPA and Ramsar site, and for The Mens SAC. On the basis of the information submitted with the planning application and discussions with Natural England officers, Natural England confirmed that the Arun abstraction scheme would not require an appropriate assessment as the package of mitigation and enhancement measures secured with the scheme “are sufficient to avoid a likely significant effect”. At the planning committee meeting on 18th August 2009, the Committee was advised as following on the issue of Appropriate Assessment:

The District Council is the competent authority under the terms of the Conservation (Natural Habitats &c) Regulations, 1994 and is required to consider whether there is a likely significant effect on designated European sites as a result of the proposed development. The applicant submitted information on appropriate assessment with the planning application and subsequently submitted additional information in an “ES Addendum” document. On the basis of the mitigation measures proposed within the planning application and ES, and as secured by the conditions recommended to be attached to the planning permission, Natural England advises that the package of measures are sufficient to avoid a likely significant effect on the Arun Valley SPA and Ramsar site. Therefore Natural England recommends that an Appropriate Assessment under (Regulation 48, Conservation (Natural Habitats &c) Regulations, 1994) will not be necessary. It also advises that the proposal is unlikely to have an adverse effect on the interest features of Amberley Wildbrooks SSSI.

In relation to The Mens SAC, Natural England did not raise any objection to the scheme or concerns relating to the Barbastelle bats that are known to forage in the Arun Valley. Sussex Wildlife Trust has confirmed that it does not consider the application to raise issues such that an Appropriate Assessment under Regulation 48 is required. It is considered that the mitigation measures being discussed with the Wildlife Trust are capable of being secured through appropriately worded planning conditions, and that this would be sufficient to avoid a likely significant effect.

Conclusion: through a planning application, it has already been determined that this project will not have an adverse effect on the integrity of the protected sites, so in terms of this plan assessment, it can be concluded that there will no impact on the integrity of the Arun Valley SPA or

Ramsar site. It will be necessary for the Environment Agency as competent authority for the abstraction licence to consider the need for appropriate assessment.

6: Appropriate assessment : reintroduction of the Cadborough source

Dungeness SAC

Dungeness to Pett Level SPA

The Cadborough source is currently disused but tests have shown that a borehole here could produce in the region of 1.0 MI/day. Much of the required infrastructure is already present and new works will be within the confines of an existing urban site, screened from the European site. The abstraction of groundwater and the possible effects on the nearby protected sites (SPA 1km, SAC 3km) has been assessed.

Dungeness SAC

Dungeness is a complex coastal area that includes tidal river habitats, estuary habitats (mud flats, sand flats, salt marshes, salt pastures and salt steppes lagoons - including saltwork basins), lagoons, coastal sand dunes and beaches, machair, shingle, sea cliffs, islets, inland water bodies (standing and running water), bogs, marshes, water fringed vegetation, fens and coniferous woodland.

Annex I habitats that are a primary reason for selection of this site

1210 Annual vegetation of drift lines

The Dungeness foreland has a very extensive and well-developed shoreline, although with sparse vegetation and in places some human disturbance. It is one of two representatives of Annual vegetation of drift lines on the south coast of England. The strandline community on this site comprises Babington's orache *Atriplex glabriuscula*, which occurs mostly on the accreting eastern shoreline, although it is also present on the eroding southern shoreline.

1220 Perennial vegetation of stony banks

Dungeness is the UK's largest shingle structure and represents the habitat type on the south-east coast of England. The total area of exposed shingle covers some 1,600 ha, though the extent of the buried shingle ridges is much greater. Despite considerable disturbance and destruction of the surface shingle, the site retains very large areas of intact parallel ridges with characteristic zonation of vegetation. It still has the most diverse and most extensive examples of stable vegetated shingle in Europe, including the best representation of scrub on shingle, notably prostrate forms of broom *Cytisus scoparius* and blackthorn *Prunus spinosa*. A feature of the site, thought to be unique in the UK, is the small depressions formed within the shingle structure, which support fen and open-water communities.

Annex II species that are a primary reason for selection of this site

1166 Great crested newt *Triturus cristatus*

Dungeness in south-east England has the largest shingle expanse in Europe and contains a large number of waterbodies within its 2,000 ha. This extensive site hosts a large and viable great crested newt *Triturus cristatus* population in a range of natural and anthropogenic habitats. These include natural pools and those resulting from gravel extraction and other activities. Terrestrial habitat of importance for feeding and shelter is provided by a range of open shingle vegetation with scrub in the vicinity of some of the waterbodies.

Dungeness to Pett Level SPA

Dungeness to Pett Level is located on the border of East Sussex and Kent between Hastings and New Romney. This large area includes a wide variety of coastal habitats, ranging from shingle beaches through to open water and various other wetland types. Dungeness is a large cusped shingle foreland with a complex pattern of ridges reflecting its accretion and development over hundreds of years. The Open Pits contain a natural succession of wetlands from species-rich fen through to sallow carr. The nearby gravel pits have developed features of open water and marginal interest, and, together with the Open Pits, are used by important numbers of wintering wildfowl.

Rye Harbour has a smaller shingle beach which, together with the pits at Dungeness, supports breeding terns and gulls. The grazing marshes at Pett Level and Rye Harbour include close-cropped, sheep-grazed swards and support wintering wildfowl, including Bewick's Swan *Cygnus columbianus bewickii*. The ditches that intersect these marshes have developed a rich aquatic flora and invertebrate fauna, and provide important habitat for migrating Aquatic Warbler *Acrocephalus paludicola*. Rye Harbour and Camber Sands and Rye Saltings include saltmarsh, sand-flats and mud-flats that provide valuable feeding areas for wintering waterbirds. As a whole, the area is important for breeding and wintering waterbirds, passage warblers and breeding terns, which feed outside the designated areas in nearby shallow waters. Bewick's Swans also feed on arable fields outside the designated area.

Qualifying species

This site qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

During the breeding season;

Common Tern (*Sterna hirundo*)

266 pairs representing at least 2.2% of the breeding population in Great Britain (5 year mean, 1993-1997).

Little Tern (*Sterna albifrons*)

35 pairs representing at least 1.5% of the breeding population in Great Britain (5 year mean, 1993-1997).

Mediterranean Gull (*Larus melanocephalus*)

2 pairs representing at least 20.0% of the breeding population in Great Britain (5 year mean, 1993-1997).

On passage;

Aquatic Warbler (*Acrocephalus paludicola*)

30 individuals representing at least 44.8% of the population in Great Britain (Count as at 1997).

Over winter;

Bewick's Swan (*Cygnus columbianus bewickii*)

179 individuals representing at least 2.6% of the wintering population in Great Britain (5 year peak mean, 1992/3-1996/7).

This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:

Over winter;

Shoveler (*Anas clypeata*)

419 individuals representing at least 1.0% of the wintering Northwestern/Central Europe population (5 year peak mean 1991/2 - 1995/6).

The exact detail of the proposal is not known at this stage, though preliminary tests have shown that this source could provide a useful amount of water. The only vulnerable qualifying feature of the Dungeness SAC is the population of great crested newts, which are dependent on a considerable number of natural and artificial water bodies, which are believed to be fed by local sources of ground and surface water. At a range of 3km, the modest borehole is not predicted to have any effect on the hydrology of Dungeness SAC. In relation to the SPA, the

breeding qualifying species are reliant on the shingle beach and locally fed pools, and again are not considered vulnerable to the proposed development. The wintering waterfowl use the grazing meadows, ditches and pools would potentially be more sensitive to an alteration in the groundwater regime, which could, in turn, affect the integrity of the SPA if there were adverse effects on the habitat that supports the waterfowl. An assessment of the surface water and groundwater hydrology suggests that the proposed borehole would have no significant influence on the hydrological regime of the Pett Level and Rye Harbour grazing marshes, and therefore would not affect the integrity of the SPA. However, full design details and hydrological tests would be needed to make a final determination, and thus an appropriate assessment of the detailed proposal would be required. Mitigation such as seasonal restriction would be available if necessary.

Conclusion: no adverse effects on the integrity of the Dungeness SAC is predicted, and - provided that a project appropriate assessment is carried out once the detail is available to test the significance of any possible effect on the grazing marshes within the SPA used by the qualifying wintering waterfowl and any seasonal restrictions or other mitigation that may be found necessary are implemented – there is no predicted impact on the integrity of the Pett Level to Dungeness SPA.

In the unlikely event that the mitigated project cannot satisfy the appropriate assessment tests, a further options appraisal would be undertaken using the sustainability measures set out in the SEA, and an alternative source would be put forward for consent (with appropriate assessment if relevant).

7: Appropriate assessment : licence variation Medway

Medway Estuary and Marshes Ramsar site

Medway Estuary and Marshes SPA

This is one of a number of proposals that relate to the revised operation of Bewl reservoir. While changes at the reservoir itself are not predicted to have any effect on protected sites, the variation of this abstraction licence could potentially affect the Medway Estuary and Marshes SPA and Ramsar site further downstream.

The Medway Estuary and Marshes is a complex and diverse mix of rain-fed, brackish, floodplain grazing marsh with ditches, and, outside the sea walls, intertidal saltmarsh and mudflats that together support internationally important numbers of wintering geese, ducks, grebes and waders. The area is also of importance during spring and autumn migration periods, especially for waders, and terns and waders breed in important numbers. The saltmarsh and grazing marsh are also of international importance for their diverse assemblages of wetland plants and invertebrates.

The Medway Estuary feeds into and lies on the south side of the outer Thames Estuary in Kent. It forms a single tidal system with the Swale and joins the Thames Estuary between the Isle of Grain and Sheerness. It has a complex arrangement of tidal channels that drain around large islands of saltmarsh and peninsulas of grazing marsh. The intertidal mud-flats are of fine, silty sediment, and are rich in invertebrates and also support beds of *Enteromorpha* and some Eelgrass *Zostera* spp. The saltmarsh shows a transition from pioneer communities containing *Zostera* to high saltmarsh dominated by *Atriplex portulacoides*. The grazing marsh grassland is mesotrophic and generally species-poor. It does, however, contain scattered rarities, mostly annuals characteristic of bare ground. Where the grassland is seasonally inundated and the marshes are brackish the plant communities are intermediate between those of mesotrophic grassland and those of saltmarsh. The grazing marsh ditches contain a range of flora of brackish and fresh water. The aquatic flora is a mosaic of successional stages resulting from periodic clearance of drainage channels. The dominant emergent plants are *Phragmites australis* and *Bolboschoenus maritimus*.

There are some small beaches of shell, particularly in the outer part of the estuary.

Medway Estuary and Marshes Ramsar site

Ramsar criterion 2

Nationally important plants

The site holds several nationally scarce plants, including sea barley *Hordeum marinum*, curved hard-grass *Parapholis incurva*, annual beard-grass *Polypogon monspeliensis*, Borrer's saltmarsh-grass *Puccinellia fasciculata*, slender hare's-ear *Bupleurum tenuissimum*, sea clover *Trifolium squamosum*, saltmarsh goose-foot *Chenopodium chenopodioides*, golden samphire *Inula crithmoides*, perennial glasswort *Sarcocornia perennis* and one-flowered glasswort *Salicornia pusilla*.

Nationally important invertebrates

A total of at least twelve British Red Data Book species of wetland invertebrates have been recorded on the site. These include a ground beetle *Polistichus connexus*, a fly *Cephalops perspicuus*, a dancefly *Poecilobothrus ducalis*, a fly *Anagnota collini*, a weevil *Baris scolopacea*, a water beetle *Berosus spinosus*, a beetle *Malachius vulneratus*, a rove beetle *Philonthus punctus*, the ground lackey moth *Malacosoma castrensis*, a horsefly *Atylotus latistriatus*, a fly *Campsicnemus magius*, a soldier beetle, *Cantharis fusca*, and a crane fly *Limonia danica*. Other notable species include *Lestes dryas*, *Hydrochus ignicollis*, *Hydrophilus piceus*, *Dicranomyia danica* and *Lejops vittata*. A significant number of non-wetland British Red Data Book species also occur.

Bird species occurring at levels of national importance

Species regularly supported during the breeding season:

Mediterranean gull (*Larus melanocephalus*)

10 apparently occupied nests, representing an average of 9.2% of the GB population (Seabird 2000 Census)

Black-headed gull (*Larus ridibundus*)

7050 apparently occupied nests, representing an average of 5.5% of the GB population (Seabird 2000 Census)

Sandwich tern (*Sterna (Thalasseus) sandvicensis sandvicensis*)

333 apparently occupied nests, representing an average of 3.1% of the GB population (Seabird 2000 Census)

Common tern (*Sterna hirundo hirundo*)

228 apparently occupied nests, representing an average of 2.2% of the GB population (Seabird 2000 Census)

Little tern (*Sterna albifrons albifrons*)

28 pairs, representing an average of 1.4% of the GB population (5 year mean 1991-1995)

Species with peak counts in spring/autumn:

Great cormorant (*Phalacrocorax carbo carbo*)

271 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1998/9-2002/3)

Little egret (*Egretta garzetta*)

125 individuals, representing an average of 7.5% of the GB population (5 year peak mean 1998/9-2002/3)

Pied avocet (*Recurvirostra avosetta*)

645 individuals, representing an average of 18.9% of the GB population (5 year peak mean 1998/9-2002/3)

Whimbrel (*Numenius phaeopus*)

49 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)

Eurasian curlew (*Numenius arquata arquata*)

3575 individuals, representing an average of 2.4% of the GB population (5 year peak mean 1998/9-2002/3)

Common greenshank (*Tringa nebularia*)

68 individuals, representing an average of 11.3% of the GB population (5 year peak mean 1998/9-2002/3)

Ruddy turnstone (*Arenaria interpres interpres*)

600 individuals, representing an average of 1.2% of the GB population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Northern shoveler (*Anas clypeata*)

214 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)

Eurasian oystercatcher (*Haematopus ostralegus ostralegus*)

3632 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1998/9-2002/3)

European golden plover (*Pluvialis apricaria apricaria*, *P. a. altifrons*)

4500 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:

47637 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6

Species/populations occurring at levels of international importance

Species with peak counts in spring/autumn:

Grey plover (*Pluvialis squatarola*)

3103 individuals, representing an average of 1.2% of the population (5 year peak mean 1998/9-2002/3)

Common redshank (*Tringa totanus totanus*)

3709 individuals, representing an average of 1.4% of the population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Dark-bellied Brent goose (*Branta bernicla bernicla*)

2575 individuals, representing an average of 1.1% of the population (5 year peak mean 1998/9-2002/3)

Common shelduck (*Tadorna tadorna*)

2627 individuals, representing an average of 3.3% of the GB population (5 year peak mean 1998/9-2002/3)

Northern pintail (*Anas acuta*)

1118 individuals, representing an average of 1.8% of the population (5 year peak mean 1998/9-2002/3)

Ringed plover (*Charadrius hiaticula*)

540 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)

Red knot (*Calidris canutus islandica*)

3021 individuals, representing an average of 1% of the GB population (5 year peak mean 1998/9-2002/3)

Dunlin (*Calidris alpina alpina*)

8263 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)

Species/populations identified subsequent to designation for possible future consideration under criterion 6.

Species with peak counts in spring/autumn:

Black-tailed godwit (*Limosa limosa islandica*)

721 individuals, representing an average of 2% of the population (5 year peak mean 1998/9-2002/3)

Medway and Estuary Marshes SPA

Qualifying species

This site qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

During the breeding season;

Avocet *Recurvirostra avosetta*

28 pairs representing at least 4.7% of the breeding population in Great Britain (5 year mean, 1988-1992)

Little Tern *Sterna albifrons*

28 pairs representing at least 1.2% of the breeding population in Great Britain (5 year mean, 1991-1995)

Over winter;

Avocet *Recurvirostra avosetta*

314 individuals representing at least 24.7% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6)

This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:

On passage;

Ringed Plover *Charadrius hiaticula*

1,337 individuals representing at least 2.7% of the Europe/Northern Africa - wintering population (5 year peak mean 1991/2 - 1995/6)

Over winter;

Black-tailed Godwit *Limosa limosa islandica*

957 individuals representing at least 1.4% of the wintering Iceland - breeding population (5 year peak mean 1991/2 - 1995/6)

Dark-bellied Brent Goose *Branta bernicla bernicla*

3,205 individuals representing at least 1.1% of the wintering Western Siberia/Western Europe population (5 year peak mean 1991/2 - 1995/6)

Dunlin *Calidris alpina alpina*

25,936 individuals representing at least 1.9% of the wintering Northern Siberia/Europe/Western Africa population (5 year peak mean 1991/2 - 1995/6)

Grey Plover *Pluvialis squatarola*

3,406 individuals representing at least 2.3% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6)

Pintail *Anas acuta*

697 individuals representing at least 1.2% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6)

Redshank *Tringa totanus*

3,690 individuals representing at least 2.5% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6)

Ringed Plover *Charadrius hiaticula*

768 individuals representing at least 1.5% of the wintering Europe/Northern Africa - wintering population (5 year peak mean 1991/2 - 1995/6)

Shelduck *Tadorna tadorna*

4,465 individuals representing at least 1.5% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6)

Assemblage qualification: A wetland of international importance.

The area qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl. Over winter, the area regularly supports 65,274 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: Little Grebe *Tachybaptus ruficollis*, Dark-bellied Brent Goose *Branta bernicla bernicla*, Shelduck *Tadorna tadorna*, Pintail *Anas acuta*, Ringed Plover *Charadrius hiaticula*, Grey Plover *Pluvialis squatarola*, Dunlin *Calidris alpina alpina*, Avocet *Recurvirostra avosetta*, Redshank *Tringa totanus*, Curlew *Numenius arquata*, Great Crested Grebe *Podiceps cristatus*, Cormorant *Phalacrocorax carbo*, Wigeon *Anas penelope*, Teal *Anas crecca*, Oystercatcher *Haematopus ostralegus*, Lapwing *Vanellus vanellus*, Black-tailed Godwit *Limosa limosa islandica*, Whimbrel *Numenius phaeopus*.

At this distance, a relatively small variation in the abstraction licence is most unlikely to have any significant effect on the tidal river Medway and hence the disposition and condition of the estuarine habitats that support the waterfowl qualifying features. The features behind the sea wall are sensitive to freshwater inputs to the marshes and ditches, but are effectively separated from changes in the river itself that might result from the variation in this abstraction. At this plan stage it is not possible to make a full assessment, especially in the context of other proposals and possible cumulative effects. An appropriate assessment can be carried out at the licence application stage for this proposal, at which time mitigation such as time or seasonal restrictions can be introduced to ensure that there will be no impact on the integrity of the Medway Estuary and Marshes SPA and Ramsar site.

Conclusion: through appropriate assessment at the licensing stage, together with any necessary mitigation, it can be ensured that there will be no effect on the integrity of the Medway Estuary and Marshes SPA and Ramsar site.

In the unlikely event that the mitigated project cannot satisfy the appropriate assessment tests, a further options appraisal would be undertaken using the sustainability measures set out in the SEA, and an alternative source would be put forward for consent (with appropriate assessment if relevant).

8: Appropriate assessment : licence variation Danaway groundwater source

Medway Estuary and Marshes Ramsar site

Medway Estuary and Marshes SPA

This proposal is to alter the licence for this existing facility to remove the annual total abstraction constraint. No significant infrastructure works are necessary. The possible changes to groundwater flows that may occur and whether these would affect the integrity of the Medway Estuary and Marshes SPA and Ramsar site require assessment.

The Medway Estuary and Marshes is a complex and diverse mix of rain-fed, brackish, floodplain grazing marsh with ditches, and, outside the sea walls, intertidal saltmarsh and mudflats that together support internationally important numbers of wintering geese, ducks, grebes and waders. The area is also of importance during spring and autumn migration periods, especially for waders, and terns and waders breed in important numbers. The saltmarsh and grazing marsh are also of international importance for their diverse assemblages of wetland plants and invertebrates.

The Medway Estuary feeds into and lies on the south side of the outer Thames Estuary in Kent. It forms a single tidal system with the Swale and joins the Thames Estuary between the Isle of Grain and Sheerness. It has a complex arrangement of tidal channels that drain around large islands of saltmarsh and peninsulas of grazing marsh. The intertidal mud-flats are of fine, silty sediment, and are rich in invertebrates and also support beds of *Enteromorpha* and some Eelgrass *Zostera* spp. The saltmarsh shows a transition from pioneer communities containing *Zostera* to high saltmarsh dominated by *Atriplex portulacoides*. The grazing marsh grassland is mesotrophic and generally species-poor. It does, however, contain scattered rarities, mostly annuals characteristic of bare ground. Where the grassland is seasonally inundated and the marshes are brackish the plant communities are intermediate between those of mesotrophic grassland and those of saltmarsh. The grazing marsh ditches contain a range of flora of brackish and fresh water. The aquatic flora is a mosaic of successional stages resulting from periodic clearance of drainage channels. The dominant emergent plants are *Phragmites australis* and *Bolboschoenus maritimus*.

There are some small beaches of shell, particularly in the outer part of the estuary.

Medway Estuary and Marshes Ramsar site

Ramsar criterion 2

Nationally important plants

The site holds several nationally scarce plants, including sea barley *Hordeum marinum*, curved hard-grass *Parapholis incurva*, annual beard-grass *Polypogon monspeliensis*, Borrer's saltmarsh-grass *Puccinellia fasciculata*, slender hare's-ear *Bupleurum tenuissimum*, sea clover *Trifolium squamosum*, saltmarsh goose-foot *Chenopodium chenopodioides*, golden samphire *Inula crithmoides*, perennial glasswort *Sarcocornia perennis* and one-flowered glasswort *Salicornia pusilla*.

Nationally important invertebrates

A total of at least twelve British Red Data Book species of wetland invertebrates have been recorded on the site. These include a ground beetle *Polistichus connexus*, a fly *Cephalops perspicuus*, a dancefly *Poecilobothrus ducalis*, a fly *Anagnota collini*, a weevil *Baris scolopacea*, a water beetle *Berosus spinosus*, a beetle *Malachius vulneratus*, a rove beetle *Philonthus punctus*, the ground lackey moth *Malacosoma castrensis*, a horsefly *Atylotus latistriatus*, a fly *Campsicnemus magius*, a soldier beetle, *Cantharis fusca*, and a crane fly *Limonia danica*. Other notable species include *Lestes dryas*, *Hydrochus ignicollis*, *Hydrophilus piceus*, *Dicranomyia danica* and *Lejops vittata*. A significant number of non-wetland British Red Data Book species also occur.

Bird species occurring at levels of national importance

Species regularly supported during the breeding season:

Mediterranean gull (*Larus melanocephalus*)

10 apparently occupied nests, representing an average of 9.2% of the GB population (Seabird 2000 Census)

Black-headed gull (*Larus ridibundus*)

7050 apparently occupied nests, representing an average of 5.5% of the GB population (Seabird 2000 Census)

Sandwich tern (*Sterna (Thalasseus) sandvicensis sandvicensis*)

333 apparently occupied nests, representing an average of 3.1% of the GB population (Seabird 2000 Census)

Common tern (*Sterna hirundo hirundo*)

228 apparently occupied nests, representing an average of 2.2% of the GB population (Seabird 2000 Census)

Little tern (*Sterna albifrons albifrons*)

28 pairs, representing an average of 1.4% of the GB population (5 year mean 1991-1995)

Species with peak counts in spring/autumn:

Great cormorant (*Phalacrocorax carbo carbo*)

271 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1998/9-2002/3)

Little egret (*Egretta garzetta*)

125 individuals, representing an average of 7.5% of the GB population (5 year peak mean 1998/9-2002/3)

Pied avocet (*Recurvirostra avosetta*)

645 individuals, representing an average of 18.9% of the GB population (5 year peak mean 1998/9-2002/3)

Whimbrel (*Numenius phaeopus*)

49 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)

Eurasian curlew (*Numenius arquata arquata*)

3575 individuals, representing an average of 2.4% of the GB population (5 year peak mean 1998/9-2002/3)

Common greenshank (*Tringa nebularia*)

68 individuals, representing an average of 11.3% of the GB population (5 year peak mean 1998/9-2002/3)

Ruddy turnstone (*Arenaria interpres interpres*)

600 individuals, representing an average of 1.2% of the GB population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Northern shoveler (*Anas clypeata*)

214 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)

Eurasian oystercatcher (*Haematopus ostralegus ostralegus*)

3632 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1998/9-2002/3)

European golden plover (*Pluvialis apricaria apricaria*, *P. a. altifrons*)

4500 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:

47637 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6

Species/populations occurring at levels of international importance

Species with peak counts in spring/autumn:

Grey plover (*Pluvialis squatarola*)

3103 individuals, representing an average of 1.2% of the population (5 year peak mean 1998/9-2002/3)

Common redshank (*Tringa totanus totanus*)

3709 individuals, representing an average of 1.4% of the population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Dark-bellied Brent goose (*Branta bernicla bernicla*)

2575 individuals, representing an average of 1.1% of the population (5 year peak mean 1998/9-2002/3)

Common shelduck (*Tadorna tadorna*)

2627 individuals, representing an average of 3.3% of the GB population (5 year peak mean 1998/9-2002/3)

Northern pintail (*Anas acuta*)

1118 individuals, representing an average of 1.8% of the population (5 year peak mean 1998/9-2002/3)

Ringed plover (*Charadrius hiaticula*)

540 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)

Red knot (*Calidris canutus islandica*)

3021 individuals, representing an average of 1% of the GB population (5 year peak mean 1998/9-2002/3)

Dunlin (*Calidris alpina alpina*)

8263 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)

Species/populations identified subsequent to designation for possible future consideration under criterion 6.

Species with peak counts in spring/autumn:

Black-tailed godwit (*Limosa limosa islandica*)

721 individuals, representing an average of 2% of the population (5 year peak mean 1998/9-2002/3)

Medway and Estuary Marshes SPA

Qualifying species

This site qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

During the breeding season;

Avocet *Recurvirostra avosetta*

28 pairs representing at least 4.7% of the breeding population in Great Britain (5 year mean, 1988-1992)

Little Tern *Sterna albifrons*

28 pairs representing at least 1.2% of the breeding population in Great Britain (5 year mean, 1991-1995)

Over winter;

Avocet *Recurvirostra avosetta*

314 individuals representing at least 24.7% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6)

This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:

On passage;

Ringed Plover *Charadrius hiaticula*

1,337 individuals representing at least 2.7% of the Europe/Northern Africa - wintering population (5 year peak mean 1991/2 - 1995/6)

Over winter;

Black-tailed Godwit *Limosa limosa islandica*

957 individuals representing at least 1.4% of the wintering Iceland - breeding population (5 year peak mean 1991/2 - 1995/6)

Dark-bellied Brent Goose *Branta bernicla bernicla*

3,205 individuals representing at least 1.1% of the wintering Western Siberia/Western Europe population (5 year peak mean 1991/2 - 1995/6)

Dunlin *Calidris alpina alpina*

25,936 individuals representing at least 1.9% of the wintering Northern Siberia/Europe/Western Africa population (5 year peak mean 1991/2 - 1995/6)

Grey Plover *Pluvialis squatarola*

3,406 individuals representing at least 2.3% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6)

Pintail *Anas acuta*

697 individuals representing at least 1.2% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6)

Redshank *Tringa totanus*

3,690 individuals representing at least 2.5% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6)

Ringed Plover *Charadrius hiaticula*

768 individuals representing at least 1.5% of the wintering Europe/Northern Africa - wintering population (5 year peak mean 1991/2 - 1995/6)

Shelduck *Tadorna tadorna*

4,465 individuals representing at least 1.5% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6)

Assemblage qualification: A wetland of international importance.

The area qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl. Over winter, the area regularly supports 65,274 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: Little Grebe *Tachybaptus ruficollis*, Dark-bellied Brent Goose *Branta bernicla bernicla*, Shelduck *Tadorna tadorna*, Pintail *Anas acuta*, Ringed Plover *Charadrius hiaticula*, Grey Plover *Pluvialis squatarola*, Dunlin *Calidris alpina alpina*, Avocet *Recurvirostra avosetta*, Redshank *Tringa totanus*, Curlew *Numenius arquata*, Great Crested Grebe *Podiceps cristatus*, Cormorant *Phalacrocorax carbo*, Wigeon *Anas penelope*, Teal *Anas crecca*, Oystercatcher *Haematopus ostralegus*, Lapwing *Vanellus vanellus*, Black-tailed Godwit *Limosa limosa islandica*, Whimbrel *Numenius phaeopus*.

The borehole is some 5km from the nearest part of the Medway Estuary and Marshes SPA and Ramsar site at Halstow Creek, and at this distance and with the relatively minor increase in proposed abstraction, no effect is anticipated. Signal test pumping of all PWS sources in this area have been carried out as part of the NKMS and no impact on groundwater levels beneath the marshes could be detected. Any minor additional drawdown is therefore not predicted to extend to the protected sites and there will be no effect on their integrity.

Conclusion: no adverse effect on the Medway Estuary and Marshes SPA and Ramsar site is anticipated as a result of this proposal, but further tests and an appropriate assessment could be carried out at the licensing stage to ensure that the borehole can be operated without affecting the integrity of the wetland habitats that support the qualifying waterfowl, invertebrates and plants.

In the unlikely event that the mitigated project cannot satisfy the appropriate assessment tests, a further options appraisal would be undertaken using the sustainability measures set out in the SEA, and an alternative source would be put forward for consent (with appropriate assessment if relevant).

9: Appropriate assessment : Aylesford wastewater recycling

Medway Estuary and Marshes Ramsar site

Medway Estuary and Marshes SPA

Effluent from the Aylesford wastewater treatment works will no longer be discharged directly to the river at the works, but will be further treated and transferred into the River Medway upstream of the Springfield water abstraction. This will supplement low flows and reduce the need to release stored water from Bewl reservoir. Modelling has been carried out and this shows that, overall, the flows are balanced downstream, so there will be no effect by the time the waters reach the Medway Estuary and Marshes SPA and Ramsar site. The removal of the wastewater will cause a change to the quality of water in the river at various points, and this has the potential to alter biodiversity and the nutrient supply to the habitats in parts of the protected sites.

The Medway Estuary and Marshes is a complex and diverse mix of rain-fed, brackish, floodplain grazing marsh with ditches, and, outside the sea walls, intertidal saltmarsh and mudflats that together support internationally important numbers of wintering geese, ducks, grebes and waders. The area is also of importance during spring and autumn migration periods, especially for waders, and terns and waders breed in important numbers. The saltmarsh and grazing marsh are also of international importance for their diverse assemblages of wetland plants and invertebrates.

The Medway Estuary feeds into and lies on the south side of the outer Thames Estuary in Kent. It forms a single tidal system with the Swale and joins the Thames Estuary between the Isle of Grain and Sheerness. It has a complex arrangement of tidal channels that drain around large islands of saltmarsh and peninsulas of grazing marsh. The intertidal mud-flats are of fine, silty sediment, and are rich in invertebrates and also support beds of *Enteromorpha* and some Eelgrass *Zostera* spp. The saltmarsh shows a transition from pioneer communities containing *Zostera* to high saltmarsh dominated by *Atriplex portulacoides*. The grazing marsh grassland is mesotrophic and generally species-poor. It does, however, contain scattered rarities, mostly annuals characteristic of bare ground. Where the grassland is seasonally inundated and the marshes are brackish the plant communities are intermediate between those of mesotrophic grassland and those of saltmarsh. The grazing marsh ditches contain a range of flora of brackish and fresh water. The aquatic flora is a mosaic of successional stages resulting from periodic clearance of drainage channels. The dominant emergent plants are *Phragmites australis* and *Bolboschoenus maritimus*.

There are some small beaches of shell, particularly in the outer part of the estuary.

Medway Estuary and Marshes Ramsar site

Ramsar criterion 2

Nationally important plants

The site holds several nationally scarce plants, including sea barley *Hordeum marinum*, curved hard-grass *Parapholis incurva*, annual beard-grass *Polypogon monspeliensis*, Borrer's saltmarsh-grass *Puccinellia fasciculata*, slender hare's-ear *Bupleurum tenuissimum*, sea clover *Trifolium squamosum*, saltmarsh goose-foot *Chenopodium chenopodioides*, golden samphire *Inula crithmoides*, perennial glasswort *Sarcocornia perennis* and one-flowered glasswort *Salicornia pusilla*.

Nationally important invertebrates

A total of at least twelve British Red Data Book species of wetland invertebrates have been recorded on the site. These include a ground beetle *Polistichus connexus*, a fly *Cephalops perspicuus*, a dancefly *Poecilobothrus ducalis*, a fly *Anagnota collini*, a weevil *Baris scolopacea*, a water beetle *Berosus spinosus*, a beetle *Malachius vulneratus*, a rove beetle *Philonthus punctus*, the ground lackey moth *Malacosoma castrensis*, a horsefly *Atylotus latistriatus*, a fly *Campsicnemus magius*, a soldier beetle, *Cantharis fusca*, and a crane fly *Limonia danica*. Other notable species include *Lestes dryas*, *Hydrochus ignicollis*, *Hydrophilus piceus*, *Dicranomyia danica* and *Lejops vittata*. A significant number of non-wetland British Red Data Book species also occur.

Bird species occurring at levels of national importance

Species regularly supported during the breeding season:

Mediterranean gull (*Larus melanocephalus*)

10 apparently occupied nests, representing an average of 9.2% of the GB population (Seabird 2000 Census)

Black-headed gull (*Larus ridibundus*)

7050 apparently occupied nests, representing an average of 5.5% of the GB population (Seabird 2000 Census)

Sandwich tern (*Sterna (Thalasseus) sandvicensis sandvicensis*)

333 apparently occupied nests, representing an average of 3.1% of the GB population (Seabird 2000 Census)

Common tern (*Sterna hirundo hirundo*)

228 apparently occupied nests, representing an average of 2.2% of the GB population (Seabird 2000 Census)

Little tern (*Sterna albifrons albifrons*)

28 pairs, representing an average of 1.4% of the GB population (5 year mean 1991-1995)

Species with peak counts in spring/autumn:

Great cormorant (*Phalacrocorax carbo carbo*)

271 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1998/9-2002/3)

Little egret (*Egretta garzetta*)

125 individuals, representing an average of 7.5% of the GB population (5 year peak mean 1998/9-2002/3)

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645 individuals, representing an average of 18.9% of the GB population (5 year peak mean 1998/9-2002/3)

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49 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)

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3575 individuals, representing an average of 2.4% of the GB population (5 year peak mean 1998/9-2002/3)

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68 individuals, representing an average of 11.3% of the GB population (5 year peak mean 1998/9-2002/3)

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3632 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1998/9-2002/3)

European golden plover (*Pluvialis apricaria apricaria*, *P. a. altifrons*)

4500 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)

Ramsar criterion 5

Assemblages of international importance:

Species with peak counts in winter:

47637 waterfowl (5 year peak mean 1998/99-2002/2003)

Ramsar criterion 6

Species/populations occurring at levels of international importance

Species with peak counts in spring/autumn:

Grey plover (*Pluvialis squatarola*)

3103 individuals, representing an average of 1.2% of the population (5 year peak mean 1998/9-2002/3)

Common redshank (*Tringa totanus totanus*)

3709 individuals, representing an average of 1.4% of the population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Dark-bellied Brent goose (*Branta bernicla bernicla*)

2575 individuals, representing an average of 1.1% of the population (5 year peak mean 1998/9-2002/3)

Common shelduck (*Tadorna tadorna*)

2627 individuals, representing an average of 3.3% of the GB population (5 year peak mean 1998/9-2002/3)

Northern pintail (*Anas acuta*)

1118 individuals, representing an average of 1.8% of the population (5 year peak mean 1998/9-2002/3)

Ringed plover (*Charadrius hiaticula*)

540 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)

Red knot (*Calidris canutus islandica*)

3021 individuals, representing an average of 1% of the GB population (5 year peak mean 1998/9-2002/3)

Dunlin (*Calidris alpina alpina*)

8263 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)

Species/populations identified subsequent to designation for possible future consideration under criterion 6.

Species with peak counts in spring/autumn:

Black-tailed godwit (*Limosa limosa islandica*)

721 individuals, representing an average of 2% of the population (5 year peak mean 1998/9-2002/3)

Medway and Estuary Marshes SPA

Qualifying species

This site qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:

During the breeding season;

Avocet *Recurvirostra avosetta*

28 pairs representing at least 4.7% of the breeding population in Great Britain (5 year mean, 1988-1992)

Little Tern *Sterna albifrons*

28 pairs representing at least 1.2% of the breeding population in Great Britain (5 year mean, 1991-1995)

Over winter;

Avocet *Recurvirostra avosetta*

314 individuals representing at least 24.7% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6)

This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:

On passage;

Ringed Plover *Charadrius hiaticula*

1,337 individuals representing at least 2.7% of the Europe/Northern Africa - wintering population (5 year peak mean 1991/2 - 1995/6)

Over winter;

Black-tailed Godwit *Limosa limosa islandica*

957 individuals representing at least 1.4% of the wintering Iceland - breeding population (5 year peak mean 1991/2 - 1995/6)

Dark-bellied Brent Goose *Branta bernicla bernicla*

3,205 individuals representing at least 1.1% of the wintering Western Siberia/Western Europe population (5 year peak mean 1991/2 - 1995/6)

Dunlin *Calidris alpina alpina*

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3,406 individuals representing at least 2.3% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6)

Pintail *Anas acuta*

697 individuals representing at least 1.2% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6)

Redshank *Tringa totanus*

3,690 individuals representing at least 2.5% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6)

Ringed Plover *Charadrius hiaticula*

768 individuals representing at least 1.5% of the wintering Europe/Northern Africa - wintering population (5 year peak mean 1991/2 - 1995/6)

Shelduck *Tadorna tadorna*

4,465 individuals representing at least 1.5% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6)

Assemblage qualification: A wetland of international importance.

The area qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl. Over winter, the area regularly supports 65,274 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: Little Grebe *Tachybaptus ruficollis*, Dark-bellied Brent Goose *Branta bernicla bernicla*, Shelduck *Tadorna tadorna*, Pintail *Anas acuta*, Ringed Plover *Charadrius hiaticula*, Grey Plover *Pluvialis squatarola*, Dunlin *Calidris alpina alpina*, Avocet *Recurvirostra avosetta*, Redshank *Tringa totanus*, Curlew *Numenius arquata*, Great Crested Grebe *Podiceps cristatus*, Cormorant *Phalacrocorax carbo*, Wigeon *Anas penelope*, Teal *Anas crecca*, Oystercatcher *Haematopus ostralegus*, Lapwing *Vanellus vanellus*, Black-tailed Godwit *Limosa limosa islandica*, Whimbrel *Numenius phaeopus*.

An assessment has been made of the potential for the scheme to affect the integrity of the Medway Estuary and Marshes SPA and Ramsar site. The potential effects are considered to be limited to variations in water quality where the River Medway enters and influences the estuarine habitats. Distance and the sea wall effectively separates the qualifying features of the grazing marshes from change. Estuaries are typically high nutrient and suspended sediment systems and a small change in the quality of the freshwater input to one part of the estuary is unlikely to have a significant effect given the small scale and very high dilution envisaged. Modelling has suggested that there will be a small increase in suspended sediment and total ammonia in the river water entering the estuary, but in the context of sea water dilution and the naturally high baseline levels in the estuary, this is not expected to cause any significant change to the estuarine habitats or their ability to support the waterfowl flocks, nor therefore to have any adverse effect on the integrity of the protected sites.

Conclusion: the changes to the quality of the water in the River Medway that are predicted as a result of this proposal are not anticipated to cause any effect to the integrity of the Medway Estuary and Marshes SPA and Ramsar site. A further safeguard will be available at the project application stage when more details of this and other projects that may affect the Medway Estuary and Marshes SPA and Ramsar site will be known: an appropriate assessment of the project alone and in combination can be carried out to verify these conclusions.

In the unlikely event that the mitigated project cannot satisfy the appropriate assessment tests, a further options appraisal would be undertaken using the sustainability measures set out in the SEA, and an alternative source would be put forward for consent (with appropriate assessment if relevant).

APPENDIX B

Consultation with Natural England

The AMP4 Water Resource Investigations undertaken for the Western, Central and Eastern Areas considered engineering and environmental issues relating to a significant number of potential water resource options. These options were subjected to a multi-stage options appraisal process, with close liaison throughout the process with a steering group for each area of SWS, Environment Agency and Natural England officers. Additional technical sub-groups met regularly to discuss ecological, water quality and other issues and to review and agree reports. Separate meetings were also held with Natural England's area teams to discuss potential water resource options within their areas.

At each stage of the options appraisal process, a detailed technical report on the options was presented to the steering groups for comment. Environment Agency and Natural England officers made comments on the reports and the comments were considered and taken into account in finalising them. An SEA was undertaken as part of the Stage 3 Options Appraisal process, with the steering group again having the opportunity to comment.

In relation to Habitats Regulations assessments, Natural England officers identified in their comments that a number of the water resource options were in proximity to European sites. It was noted that HRA would be required to be considered for those sites as part of the detailed assessment and promotion of any schemes ultimately selected for development.

Throughout the WRMP process, and the water resource investigation studies underpinning the WRMP options, the comments and representations made by the various Natural England officers were considered and taken into account. The representations made by Natural England and others on the Draft WRMP have informed this appropriate assessment.

APPENDIX C

Sources of information

Southern Water: *Water Resources Management Plan (September 2009)*

Southern Water: *Water Resources Management Plan Revised Environmental Report and SEA Statement (September 2009)*

Natural England website, Nature on the Map: <http://www.natureonthemap.org.uk/map.aspx?map=sssi>

Magic website: <http://www.magic.gov.uk/>

JNCC website – Ramsar sites: <http://www.jncc.gov.uk/page-1389>

JNCC website – SPAs: <http://www.jncc.gov.uk/page-2599>

JNCC website – SACs: <http://www.jncc.gov.uk/page-1458>

Environment Agency (Hampshire & Isle of Wight Area): *Habitats Regulations (50) Review of Consents : Stage 3 – Appropriate Assessment, Solent and Southampton Water SPA (April 2005)*