DEPARTMENT OF ENERGY & CLIMATE CHANGE

Appendices to the Habitats Regulations Assessment Site Report for Sizewell

EN-6: Revised draft National Policy Statement for Nuclear Power Generation

Planning for new energy infrastructure

October 2010

Habitats Regulations Assessment of the revised draft Nuclear National Policy Statement

Habitats Regulations Assessment (HRA) screening and Appropriate Assessment (AA) of the revised draft Nuclear NPS including potentially suitable sites, has been undertaken in parallel with the Appraisal of Sustainability (AoS). These strategic assessments are part of an ongoing assessment process that will continue with project level assessments. Applications to the IPC for development consent will need to take account of the issues identified and recommendations made in the strategic, plan level HRA/AA; and include more detailed project level HRA as necessary.

The Habitats Regulations Assessment is provided in the following documents:

HRA Non-Technical Summary

Main HRA of the revised draft Nuclear NPS

Introduction
Methods
Findings
Summary of Sites
Technical Appendices

Annexes to the Main HRA Report: Reports on Sites

Site HRA Reports
Technical Appendices

All documents are available on the website of the Department of Energy and Climate Change at www.energynpsconsultation.decc.gov.uk

This document is the Appendices to the Habitats Regulations Assessment Site Report for Sizewell.

This document has been produced by the Department of Energy and Climate Change based on technical assessment undertaken by MWH UK Ltd with Enfusion Ltd and Nicholas Pearson Associates Ltd.

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Appendix 1: European Site Characterisations

Natura 2000 Site Identification				
Natura 2000 Designation	**Radius (measured from central grid reference point, MAGIC)**			
	5km	**10km**	**15km**	**20km**
SAC	• Minsmere to Walberswick Heaths and Marshes	• Alde-Ore and Butley Estuaries	• Dew's Ponds • Orfordness-Shingle Street	• Staverton Park and The Thicks, Wantisden • Benacre to Easton Bavents Lagoons
SPA	• Sandlings • Minsmere to Walberswick • Outer Thames Estuary SPA	• Alde-Ore Estuary	• None	• Benacre to Easton Bavents
Ramsar	• Minsmere to Walberswick	• Alde-Ore Estuary	• None	• None

Natura 2000 Site Characterisations

Special Areas of Conservation (SAC)[1]

1. Alde-Ore and Butley Estuaries
2. Benacre to Easton Bavents Lagoons
3. Dew's Ponds
4. Minsmere to Walberswick Heaths and Marshes
5. Orfordness-Shingle Street
6. Staverton Park and The Thicks, Wantisden

Special Protection Areas (SPA)[2]

1. Alde-Ore Estuary
2. Benacre to Easton Bavents
3. Minsmere to Walberswick
4. Sandlings
5. Outer Thames Estuary SPA[3]

[1] **Special Areas of Conservation (SACs)** are classified under the Habitats Directive and provide rare and vulnerable animals, plants and habitats with increased protection and management

[2] **Special Protection Areas (SPAs)** are classified under the Birds Directive to help protect and manage areas which are important for rare and vulnerable birds because they use them for breeding, feeding, wintering or migration. Together SAC's and SPA's make up the Natura 2000 series.

[3] In November 2009 Natural England, Countryside Council for Wales and the Joint Nature Conservation Committee launched a consultation on 10 new possible SACs and two new potential SPAs in English, Welsh and offshore waters around the UK, including Outer Thames Estuary pSPA (see http://www.naturalengland.org.uk/ourwork/marine/sacconsultation/default.aspx). The consultation closed in February 2010 and the Outer Thames Estuary was officially classified as an SPA in August 2010. There were minor revisions to the site boundary but these are not deemed to significantly affect the outcome of this assessment.

[4] **Ramsar sites** are designated under the Convention on Wetlands of International Importance. The broad objectives are to stem the loss and progressive encroachment on wetlands now and in the future. These are often coincident with SPA sites designated under the Birds Directive. Although RAMSAR sites are not considered part of the Natura 2000 network, they are treated the same way as Natura 2000 sites.

Ramsar Sites[4]
1. Alde-Ore Estuary
2. Minsmere to Walberswick

All core site specific information unless otherwise stated has been referenced from Natural England Sources (Natura 2000 Management Plans) (Nature on the Map) and the Joint Nature Conservation Committee website (Protected Sites). Information on the designation of the Outer Thames Estuary SPA has been obtained from Natural England's consultation website.

Special Areas of Conservation

Site Name: Alde, Ore and Butley Estuaries SAC

- **Location Grid Ref: 013408 E/ 520606 N**
- **JNCC Site Code UK0030076**
- **Size: 1561.53 ha**
- **Designation: SAC**

	Alde, Ore and Butley Estuaries SAC
Site Description	This **estuary**, made up of three rivers, is the only bar-built estuary in the UK with a shingle bar. This bar has been extending rapidly along the coast since 1530, pushing the mouth of the estuary progressively south-westwards. The eastwards-running Alde River originally entered the sea at Aldeburgh, but now turns south along the inner side of the Orfordness shingle spit. It is relatively wide and shallow, with extensive intertidal mudflats on both sides of the channel in its upper reaches and saltmarsh accreting along its fringes. The Alde subsequently becomes the south-west flowing River Ore, which is narrower and deeper with stronger currents. The smaller Butley River, which has extensive areas of saltmarsh and a reedbed community bordering intertidal mudflats, flows into the Ore shortly after the latter divides around Havergate Island. The mouth of the River Ore is still moving south as the Orfordness shingle spit continues to grow through longshore drift from the north. There is a range of littoral sediment and rock biotopes (the latter on sea defences) that are of high diversity and species richness for estuaries in eastern England. Water quality is excellent throughout. The area is relatively natural, being largely undeveloped by man and with very limited

<table>
<tr><th></th><th>Alde, Ore and Butley Estuaries SAC</th></tr>
<tr><td></td><td>industrial activity. The estuary contains large areas of shallow water over subtidal sediments, and extensive mudflats and saltmarshes exposed at low water. Its diverse and species-rich intertidal sand and mudflat biotopes grade naturally along many lengths of the shore into vegetated or dynamic shingle habitat, saltmarsh, grassland and reedbed.</td></tr>
<tr><td>Qualifying Features</td><td>Annex I habitats that are a primary reason for selection of this site

1130 Estuaries

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

1140 Mudflats and sandflats not covered by seawater at low tide
1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae)</td></tr>
<tr><td>Conservation Objectives</td><td>Conservation objectives for this SAC are, subject to natural change, to maintain in favourable condition:
Atlantic saltmeadows; including the following subfeatures: low/mid-marsh communities, upper marsh communities and upper marsh transitional communities;
Mudflats and sandflats not covered by the sea at low tide, including the following subfeatures: mud communities, muddy sand communities and sand and gravel communities; and
Estuaries, including the following subfeatures: Saltmarsh communities, intertidal mudflat and sandflat communities, subtidal mud communities, subtidal muddy sand communities and subtidal mixed sediment communities
Source: Posford Haskoning (2002) Suffolk Coast and Estuaries Coastal Habitat Management Plan, Living with the Sea LIFE Nature Project.</td></tr>
<tr><td>Component SSSIs</td><td>Component SSSI (45 units) condition status.

<table>
<tr><th>SAC component site</th><th>Favourable</th><th>Unfavourable recovering</th><th>Unfavourable no change</th><th>Unfavourable declining</th><th>Destroyed, part destroyed</th></tr>
<tr><td>Alde-Ore Estuary</td><td>75.96</td><td>2.10%</td><td>0.59%</td><td>21.36%</td><td>0%</td></tr>
</table></td></tr>
</table>

	Alde, Ore and Butley Estuaries SAC						
	SSSI						
Key Environmental Conditions (factors that maintain site integrity	**Estuaries** In the absence of constraints such as flood banks and hard defences, the estuary would adjust to sea level rise by inland translocation of intertidal habitats. Where constraints occur, space to accommodate greater volumes of water is compressed and the extent and quality of intertidal habitats declines. **Coastal saltmarsh** • Where saltmarshes require management this has traditionally been achieved by grazing, and previously used regimes should be continued. However, where there has not been a history of grazing, the saltmarsh will be able to maintain itself and grazing-sensitive species are likely to be present, therefore grazing should not be introduced. • There are a number of factors that are contributing to saltmarsh change that management may need to take into consideration. These include coastal erosion as a result of coastal defence works, rising sea levels, variations in sediment deposition and land claim for development. **Littoral sediments (mud and sand flats)** • Good water quality and sediment quality should be maintained, and the sediment budget within the estuarine or coastal system should not be restricted by anthropogenic influences. • The location and extent of mud or sandflats is dependent on the extent to which the estuary or coast where they occur is constrained from responding to sea level rise and changing sediment regimes. Management needs to create space to enable landward roll-back to take place in response to sea-level rise, and should also allow the system to be dynamic and retain the flexibility to respond to associated changes such as the movement of physical features within the system, i.e. migrating sub tidal communities. **Vegetated shingle** • A key management requirement is to avoid or minimise surface disturbance, especially in the more open communities. Many of the vegetation types and species associated with shingle are fragile and vulnerable to damage from trampling. This breaks up the fine humus that develops in the upper layers of the shingle that is vital for the plants to survive.						

	Alde, Ore and Butley Estuaries SAC
	• Where there is a more closed vegetation cover, light grazing, by rabbits for example, may be all that is needed to prevent scrub encroachment on areas of grassland and heath. However if there is a tradition of sheep grazing, it may be beneficial to continue this practice at a low intensity. However the introduction of grazing where it has not been traditionally practiced would not be beneficial. **All habitats** • Habitats within the SAC are highly sensitive to inorganic fertilizers and pesticides applications of which should be avoided both within the site itself and in adjacent surrounding areas. Herbicides may be useful in targeting certain invasive species, but should be used with extreme care. Access to this site and any recreational activities within, may also need to be controlled.
SAC Condition Assessment	See SSSI condition status.
Vulnerabilities (includes existing pressures and trends)	Past canalization and erosion together with sea level rise has resulted in the loss of much of the saltmarsh. There are plans for managed coastal retreat which in the long term will result in the creation of saltmarsh. **Main factors affecting all qualifying features:** **Fisheries**, including bait collecting: can result in adverse impacts on estuaries, including death or severe damage to benthos and physical disturbance to sediment structure. Intertidal eel grass beds (*Zostera* sp) on mudflats and areas of intertidal sand are potentially vulnerable to trampling by bait collectors, clam and cockle digging or raking. **Climate change**: Shoreline areas will be affected by increased storminess and windiness: the distribution of some shoreline habitats may be altered or reduced by these effects. Transport of the resultant suspended material tends to be inshore into many estuaries. **Non-indigenous Species**: Non-indigenous species (NIS) present a significant threat to the marine environment and their effects can have both economic and ecological ramifications, including biodiversity loss. Within marine systems, ships' ballast water, used to improve ship stability and trim, is one of the primary mechanisms for the transport and introduction of non-indigenous marine species to ports worldwide

	Alde, Ore and Butley Estuaries SAC
	Coastal development/coastal squeeze/Industrial impacts: Sedimentary areas protected by hard defences will suffer the greatest impact of sea level rise. Erosive forces would become more dominant and losses of fine sediment would produce narrower intertidal areas, with coarser sediment. The change of sediment characteristics would reduce the content of organic matter in the sediments and change the community structure accordingly. Taken to its conclusion, a greater proportion of estuaries on open-coasts would become marine and sandy and the brackish section would move inland and up-river. In more sheltered areas, there would be more deposition, extending areas of fine sediment and marsh. However, this process would cease once the sediment supply was reduced and ultimately erosion would become the dominant process. **Recreational impacts**: intertidal eel grass beds on mudflats and sandflats are highly vulnerable to boat anchorages and local boating activities, particularly launching across the eel grass beds. Use of vehicles on the sediment flats changes the drainage and cuts channels along which increased erosion of the eel grass rhizomes occurs. **Water Quality**: The risk of estuarine and coastal water bodies failing to achieve Good Ecological Status (GES) as defined under the Water Framework Directive (WFD) is an aggregation of the likely effects of the following: point source pollution (including effluent discharges from sewage treatment and industry); diffuse source pollution (including run-off from the land and acid rain); water abstraction and flow regulation (including the removal of water for public supplies or manufacturing and the control of river flows for hydroelectric power, navigation, water supplies or other purposes); physical or 'morphological' alteration to water bodies (including land claim for development, flood defence structures or channel modifications); and non-indigenous species. **Factors affecting Atlantic Salt Meadows (in addition to above):** **Air pollution:** Based on an assessment of relevant literature, it is considered that this habitat is potentially sensitive to air pollution. However, no assessment has been undertaken of its potential future impact based on critical loads. **Cord Grass *Spartina anglica*:** This habitat is threatened by invasion by this out-competing species.
Landowner/ Management Responsibility	Suffolk Wildlife Trust, National Trust, RSPB and Natural England

	Alde, Ore and Butley Estuaries SAC
HRA/AA Studies undertaken that address this site	**East of England Regional Spatial Strategy Habitats Directive Assessment Report**, (December 2006), ERM Ltd and **East of England Plan Review: Habitats Regulations Assessment (Incorporating Appropriate Assessment)** Scoping Report Draft (November 2008) **HRA of the Suffolk Minerals Core Strategy,** September 2007 The initial Stage 1 Appropriate Assessment has concluded that there are no likely significant impacts on the integrity of Suffolk's European sites. Whilst negative impacts have been discussed, it has been shown that policies and mitigation measures can be put in place to ensure that the appropriate species and habitats will be protected. In the long term the Minerals Core Strategy aims to have a positive impact on biodiversity through appropriate restoration schemes and beneficial after-uses. For instance, the creation of new wetland habitat could go towards meeting the County's Priority Habitat Action Plan targets of at least 445 ha of new reed-bed by 2023 and the creation of new wet woodlands. **Appropriate Assessment of the Suffolk Coast and Heaths Area of Outstanding Natural Beauty Management Plan, 2007** Because of the clearly stated aims and objectives of The Plan to conserve and enhance natural beauty (which includes biodiversity), it is forecast that there will be little in the way of negative impacts on any qualifying feature of any European site. It is possible, however, that the increasing demand for recreation recognised by The Plan could bring people into conflict with biodiversity. This possible negative impact is mitigated by the clear statement in Section 1 that "…the demand for recreation should be met so far as this is consistent with the conservation of natural beauty. There are sufficient mechanisms to ensure that this potential is examined in detail and appropriate action taken to stop adverse impacts.

Site Name: Benacre to Easton Bavents Lagoons SAC

- **Location Grid Ref: 522311 N 014237 E**
- **JNCC Site Code UK0013104**
- **Size: 366.93 ha**
- **Designation: SAC**

<table>
<tr><th></th><th>Benacre to Easton Bavents Lagoons SAC</th></tr>
<tr><td>Site Description</td><td>Benacre to Easton Bavents Lagoons is a series of percolation lagoons on the east coast of England. The lagoons (the Denes, Benacre Broad, Covehithe Broad and Easton Broad) have formed behind shingle barriers and are a feature of a geomorphologically dynamic system. Sea water enters the lagoons by percolation through the barriers, or by overtopping them during storms and high spring tides. The lagoons show a wide range of salinities, from nearly fully saline in South Pool, the Denes, to extremely low salinity at Easton Broad. This range of salinity has resulted in a series of lagoonal vegetation types, including beds of Narrow-leaved Eelgrass Zostera angustifolia in fully saline or hypersaline conditions, beds of Spiral Tasselweed Ruppia cirrhosa in brackish water, and dense beds of Common Reed Phragmites australis in freshwater. The site supports a number of specialist lagoonal species.</td></tr>
<tr><td>Qualifying Features</td><td>Annex I habitats that are a primary reason for selection of this site:

1150 Coastal lagoons * Priority feature</td></tr>
<tr><td>Conservation Objectives</td><td>Subject to natural change, to maintain, in favourable condition:
Saline lagoons.

Source: Posford Haskoning (2002) Suffolk Coast and Estuaries Coastal Habitat Management Plan, Living with the Sea LIFE Nature Project.</td></tr>
<tr><td>Component SSSIs</td><td>Component SSSI (51 units) condition status.

<table>
<tr><th>SAC component site</th><th>Favourable</th><th>Unfavourable recovering</th><th>Unfavourable no change</th><th>Unfavourable declining</th><th>Destroyed, part destroyed</th></tr>
<tr><td>Pakefield to Easton Bavents</td><td>52.52%</td><td>24.27%</td><td>6.51%</td><td>16.7%</td><td>0%</td></tr>
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<table>
<tr><th></th><th>Benacre to Easton Bavents Lagoons SAC</th></tr>
<tr><td></td><td>
<table>
<tr><td>SSSI</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Key Environmental Conditions (factors that maintain site integrity</td><td>The lagoons at the Denes were created through shingle extraction. Salinity is maintained through percolation and overtopping of the shingle barrier. No management input is required to maintain these lagoons. The lagoons at Benacre, Covehithe and Easton are natural and result from ponded streams behind shingle barriers. Sea water enters the lagoons through overtopping of the barriers during high tides. These lagoons are experiencing erosion and landwards movement of the confining barrier, leading to the reduction in the area of each lagoon. Natural processes will eventually lead to the loss of these features.

The management of the shingle features and lagoons should enable the uninterrupted continuation of active coastal processes and the consequent development of features and habitats. Management should accept changes in the distribution and abundance of habitats and species over time. Restoration of active process sites is required where human activities have significantly impeded the coastal processes.

The protection of appropriate water quality is important for maintaining the aquatic habitats and the range of species associated with them. The availability of nutrients and the maintenance of appropriate water quality within the waterbodies is dependant on catchment geology and land use and the management of the coastal strip.

Source: A statement of English Nature’s views about the management of Pakefield to Easton Bavents Site of Special Scientific Interest (SSSI).</td></tr>
<tr><td>SAC Condition Assessment</td><td>See SSSI condition assessment.</td></tr>
<tr><td>Vulnerabilities (includes existing pressures and trends)</td><td>The main threats to saline lagoons and other coastal habitats in the region are associated with sea level rise. The problem is aggravated by the gradual sinking of south eastern regions of the country caused by isostatic tilt of the UK mainland. This process is predicted to occur at a rate too rapid for coastal habitat formation to keep pace with. In addition, flooding and inundation of lagoons could occur as a result of predicted increase in erosion forces.
Bar-built sedimentary barriers, such as the ones at Benacre, Covehithe and Easton Broads tend to move</td></tr>
</table>

	Benacre to Easton Bavents Lagoons SAC
	naturally landwards over time, eventually leading to the broads being filled in by sediments. Potential management actions to reduce the rate of erosion are being addressed through the Shoreline Management Plan process. In the last decade, significant overtopping and landward movement of the shingle bar in front of Benacre Broad has resulted in a reduction in the size of the lagoon and dieback of reed at its distal arms. To combat this loss, new lagoons and bunds to landward of the existing broad were constructed in 1996. Easton Broad has also significantly reduced in size due to landward movement of the shingle barrier over the past few decades. Diffuse and point source pollution from agricultural runoff and sewage discharges can cause nutrient enrichment, which can have major detrimental effects. Coastal defence works can prevent the movement of sediments along the shore and lead to a gradual loss of natural coastal structures within which many coastal lagoons are located. Encroachment by Common Reed (*Phragmites australis).* Damage to existing lagoons by removal of material or via access routes during maintenance of coastal defence structures. *Source: Natura 2000 Standard Data Form (2006); Joint Nature Conservation Committee. 2007. Second Report by the UK under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006. Peterborough: JNCC. Available from: www.jncc.gov.uk/article17 and Suffolk Biodiversity Action Plan: Saline Lagoons Habitat Action Plan*
Landowner/ Management Responsibility	N/A
HRA/AA Studies undertaken that address this site	**East of England Regional Spatial Strategy Habitats Directive Assessment Report**, (December 2006), ERM Ltd and **East of England Plan Review: Habitats Regulations Assessment (Incorporating Appropriate Assessment)** Scoping Report Draft (November 2008) **Waveney Local Development Framework: Habitat Regulations Screening Report** to accompany the Core Strategy Submission Document (January 2008) The Waveney Core Strategy directs most new development to previously developed land within the existing boundaries of towns and larger villages. No European sites fall within development boundaries. The policies

	Benacre to Easton Bavents Lagoons SAC
	contained in the Core Strategy policies are not judged to have any significant impacts on European sites. Site Specific Allocations will be dealt with in a later Development Plan Document. A Habitats Regulations screening report will then be carried out for that document to determine whether the specific locations of development arising from the Core Strategy (for example. new housing and employment land) will have a significant impact on European sites. **HRA of the Suffolk Minerals Core Strategy,** September 2007 The initial Stage 1 Appropriate Assessment has concluded that there are no likely significant impacts on the integrity of Suffolk's European sites. Whilst negative impacts have been discussed, it has been shown that policies and mitigation measures can be put in place to ensure that the appropriate species and habitats will be protected. **Appropriate Assessment of the Suffolk Coast and Heaths Area of Outstanding Natural Beauty Management Plan, 2007** Because of the clearly stated aims and objectives of The Plan to conserve and enhance natural beauty (which includes biodiversity), it is forecast that there will be little in the way of negative impacts on any qualifying feature of any European site. It is possible, however, that the increasing demand for recreation recognised by The Plan could bring people into conflict with biodiversity. This possible negative impact is mitigated by the clear statement in Section 1 that "…the demand for recreation should be met so far as this is consistent with the conservation of natural beauty. In summary, there are sufficient mechanisms to ensure that this potential is examined in detail and appropriate action taken to stop adverse impacts.

Site Name: Dew's Ponds SAC

- **Location Grid Ref: 521731N /013002 E**
- **JNCC Site Code: UK0030133**
- **Size: 6.74 ha**
- **Designation: SAC**

<table>
<tr><th></th><th>Dew's Ponds SAC</th></tr>
<tr><td>Site Description</td><td>This site in rural East Suffolk comprises a series of 12 ponds set in an area of formerly predominantly arable land. The ponds range from old field ponds created for agricultural purposes to some constructed in recent years specifically for wildlife. Some of the land has been converted from arable to grassland, with a variety of grassland types present; other habitats include hedges and ditches. Great Crested Newts Triturus cristatus have been found in all ponds on site, though the presence of fish seems to have affected newt numbers in recent years in two ponds.</td></tr>
<tr><td>Qualifying Features</td><td>Annex II species that are a primary reason for selection of this site
1166 Great crested newt Triturus cristatus</td></tr>
<tr><td>Conservation Objectives</td><td>To maintain, in favourable condition, the habitats for the population of: great crested newt.

Source: East of England Regional Spatial Strategy Habitats Directive Assessment Report, (December 2006), ERM Ltd</td></tr>
<tr><td>Component SSSIs</td><td>SSSI component (4 units) condition status:
<table>
<tr><th>SAC component site</th><th>Favourable</th><th>Unfavourable recovering</th><th>Unfavourable no change</th><th>Unfavourable declining</th><th>Destroyed, part destroyed</th></tr>
<tr><td>Dew's Ponds SSSI</td><td>98.54%</td><td>1.46%</td><td>0%0</td><td>0%</td><td>0%</td></tr>
</table></td></tr>
<tr><td>Key Environmental Conditions (factors that maintain site integrity</td><td>Great crested newts preferentially breed in unshaded, medium-sized ponds (100-300m^2); up to 4m deep, in the vicinity of suitable terrestrial habitat and located close to other breeding ponds. Breeding pools should ideally have gently sloping sides and shallow areas that will warm up quickly in sunlight and deeper areas to provide additional cover. The most suitable pond conditions are provided by a relatively open aspect, without excessive shade from over-hanging branches. Some fringing trees or scrub can be valuable as terrestrial newt habitat but these are best limited to the northern sides of the pond. Breeding ponds should contain a medium to high cover of aquatic plants. Some ponds may dry out naturally in summer and this can be</td></tr>
</table>

	Dew's Ponds SAC
	beneficial as it prevents the build-up of aquatic predators. Fish and wildfowl are generally detrimental and should not be introduced. Any pond management work is best carried out in late autumn or early winter, after adult newts have left the pond but before ground conditions become too wet. A mosaic of different terrestrial habitats including rough grassland, scrub and woodland provide suitable foraging areas as well as important refuge habitat for the newts, which is important for providing shelter from extremes of weather and predation. Suitable habitats that provide the shelter required during hibernation include piles of stone, logs and rubble, dry stone walls, old hedgerow bases and tree roots. Hedgerows and well-vegetated ditches may be valuable in providing dispersal corridors between areas of suitable foraging and breeding habitat. It is important that barriers to newt movement are avoided, so that dispersal between breeding ponds can be maintained. *Source: A statement of English Nature's views about the management of Dew's Ponds Site of Special Scientific Interest (SSSI).*
SAC Condition Assessment	See component SSSIs
Vulnerabilities (includes existing pressures and trends)	The majority of ponds and grassland are under sympathetic conservation management from one landowner and therefore not vulnerable (for example. from water abstraction, flooding, diffuse agricultural pollution). The remaining pools, in different ownership, are vulnerable to the lack of appropriate management such as stocking with fish (there has been a decline in great crested newt ponds within 2 ponds in the last 2 years as a result of stocking with fish). Countryside Management has been applied for and a Site Management Statement will be prepared for these ponds. *Source: Natura 2000 Standard Data Form (2006)and Waveney Local Development Framework: Habitat Regulations Screening Report (January 2008)*
Landowner/ Management Responsibility	• Private landowners
HRA/AA Studies undertaken that address this site	**East of England Regional Spatial Strategy Habitats Directive Assessment Report**, (December 2006), ERM Ltd and **East of England Plan Review: Habitats Regulations Assessment (Incorporating Appropriate Assessment)** Scoping Report Draft (November 2008)

	Dew's Ponds SAC
	Waveney Local Development Framework: Habitat Regulations Screening Report to accompany the Core Strategy Submission Document (January 2008) The Waveney Core Strategy directs most new development to previously developed land within the existing boundaries of towns and larger villages. No European sites fall within development boundaries. The policies contained in the Core Strategy policies are not judged to have any significant impacts on European sites. Site Specific Allocations will be dealt with in a later Development Plan Document. A Habitats Regulations screening report will then be carried out for that document to determine whether the specific locations of development arising from the Core Strategy (for example. new housing and employment land) will have a significant impact on European sites. **HRA of the Suffolk Minerals Core Strategy,** September 2007 The initial Stage 1 Appropriate Assessment has concluded that there are no likely significant impacts on the integrity of Suffolk's European sites. Whilst negative impacts have been discussed, it has been shown that policies and mitigation measures can be put in place to ensure that the appropriate species and habitats will be protected.

Site Name: Minsmere to Walberswick Heaths and Marshes SAC

- **Location Grid Ref: 521522 N/013702 E**
- **JNCC Site Code UK0012809**
- **Size: 1265.52 ha**
- **Designation: SAC**

	Minsmere to Walberswick Heaths and Marshes SAC
Site Description	This site is one of two representatives of **Annual vegetation of drift lines** on the east coast of England. It occurs on a well-developed beach strandline of mixed sand and shingle and is the best and most extensive example of this restricted geographical type. Species include those typical of sandy shores, such as sea sandwort *Honckenya peploides* and shingle plants such as sea beet *Beta vulgaris* ssp. *maritima*. Lowland **European dry heaths** occupy an extensive area of this site on the east coast of England, which is at the extreme easterly range of heath development in the UK. The heathland is predominantly NVC type H8 *Calluna vulgaris – Ulex gallii* heath, usually more characteristic of western parts of the UK. This type is dominated by Heather *Calluna vulgaris*, Western Gorse *Ulex gallii* and Bell Heather *Erica cinerea*.
Qualifying Features	***Annex I habitats that are a primary reason for selection of this site:*** **1210 Annual vegetation of drift lines** **4030 European dry heaths** ***Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:*** **1220 Perennial vegetation of stony banks**

<table>
<tr><th></th><th>Minsmere to Walberswick Heaths and Marshes SAC</th></tr>
<tr><td>Conservation Objectives</td><td>Subject to natural change, to maintain, in favourable condition:

Annual vegetation of drift lines
Perennial vegetation of stony banks.
To maintain in favourable condition:
Dry heaths

Source: Posford Haskoning (2002) Suffolk Coast and Estuaries Coastal Habitat Management Plan, Living with the Sea LIFE Nature Project.</td></tr>
<tr><td>Component SSSIs</td><td>Component SSSIs including condition status:

<table>
<tr><th>SAC component site</th><th>Favourable</th><th>Unfavourable recovering</th><th>Unfavourable no change</th><th>Unfavourable declining</th><th>Destroyed, part destroyed</th></tr>
<tr><td>Minsmere-Walberswick Heaths and Marshes SSSI</td><td>42.88%</td><td>48.83%</td><td>0.62%</td><td>7.67%</td><td>0%</td></tr>
</table>
</td></tr>
<tr><td>Key Environmental Conditions (factors that maintain site integrity</td><td>Annual vegetation of drift lines

This habitat type occurs on deposits of shingle lying at or above mean high-water spring tides. The types of deposits involved are generally at the lower end of the size range of shingle (2-200 mm diameter), with varying amounts of sand interspersed in the shingle matrix. These shingle deposits occur as fringing beaches that are subject to periodic displacement or overtopping by high tides and storms. The distinctive vegetation, which may form only sparse cover, is therefore ephemeral and composed of annual or short-lived perennial species

The mobility of shingle foreshores is an overriding consideration, and colonising species are able to tolerate periodic disturbance, which may involve the total removal of the surface and subsequent recolonisation with vegetation. Species are also tolerant of saltwater inundation, as the beaches are often over-topped by the tide or subject to spray from waves breaking over the beach. Level or gently-sloping, high-level mobile beaches, with limited human disturbance, support the best examples of this vegetation.</td></tr>
</table>

	Minsmere to Walberswick Heaths and Marshes SAC
	European dry heaths European dry heaths typically occur on freely-draining, acidic to circumneutral soils with generally low nutrient content. These heaths were formed through and are dependant upon active management. Without grazing or cutting of the heather, scrub and tree invasion onto the heaths can be extensive. Bracken can also dominate large areas if suitable management has not been undertaken over the past decade. The heathland of Minsmere forms part of a RSPB reserve. The site management plan includes actions to ensure that open heathland is maintained and areas of scrub and bracken are cleared from former heath. The rare silver-studded blue butterfly present on this site requires the maintenance of a very short heather turf and warm ground conditions associated with pioneer heath communities. Grazing is usually a suitable means of managing dry heath and can extend the time that the heath is in the pioneer phase. However, it is not usually capable on its own of maintaining the open conditions required by the silver-studded blue. These conditions are best achieved by either regular mowing to prevent the build up of mature vegetation, or by cutting patches or strips of vegetation on rotation. Low intensity grazing is a suitable means of managing areas of dry heath. Heathland supporting this rare butterfly should not be burnt. **Perennial vegetation of stony banks** Shingle structures develop when a sequence of foreshore beaches is deposited at the limit of high tide. More permanent ridges are formed as storm waves throw pebbles high up on the beach, from where the backwash cannot remove them. Several beaches may be piled against each other and extensive structures can form. The ecological variation in this habitat type depends on stability, the amount of fine material accumulating between pebbles, climatic conditions, width of the foreshore, and past management of the site. The ridges and lows formed also influence the vegetation patterns, resulting in characteristic zonations of vegetated and bare shingle. A key management requirement is to avoid or minimise surface disturbance, especially in the more open communities. Many of the vegetation types and species associated with shingle are fragile and vulnerable to damage from trampling. This breaks up the fine humus that develops in the upper layers of the shingle that is vital for the plants to survive. Where recreational pressures are significant enough to result in the loss of vegetation cover, or prevent its recovery, it may be necessary to take steps to manage access. Disturbance

	Minsmere to Walberswick Heaths and Marshes SAC
	of areas important for breeding birds should be minimised during the breeding season. Where there is more closed vegetation cover, light grazing, by rabbits for example, may be all that is needed to prevent scrub encroachment on areas of grassland and heath. However, if there is a tradition of sheep grazing; it may be beneficial to continue this practice at a low intensity. In some cases grazing is not necessary, because of the low rates of plant growth on shingle structures, and can even be damaging, due to the fragility of shingle habitats. The introduction of grazing where it has not been traditionally practiced would not be beneficial. *Source: A statement of English Nature's views about the management of Minsmere-Walberswick Heaths and Marshes Site of Special Scientific Interest (SSSI). JNCC Habitat Accounts (http://www.jncc.gov.uk/ProtectedSites/SACselection/SAC_habitats.asp)*
SAC Condition Assessment	See component SSSIs
Vulnerabilities (includes existing pressures and trends)	**Annual vegetation of drift lines / Perennial vegetation of stony banks** This habitat is maintained through the action of natural coastal processes upon the shoreline. The requirement for management is limited and is restricted to ensuring that significant human disturbance of the vegetated shore zone does not occur. This aspect of management is addressed through the RSPB visitor management plan. Shingle features are rarely stable in the long term. Many structures exhibit continuous longshore drift with shingle being transported and sorted by wave action. This dynamic nature is an important aspect of the habitat. Threat from development causing damage to fragile coastal vegetated shingle features. This has occurred in Suffolk most obviously at Sizewell (nuclear power station), Landguard (port development) and Orford Ness (military test site). The annual vegetation of drift line is considered moderately vulnerable to smothering and highly vulnerable to removal. Deterioration or disturbance by physical removal or smothering can be the result of either one-off

	Minsmere to Walberswick Heaths and Marshes SAC
	events or the cumulative effect of continuous activities. Coastal defence measures have the potential to change erosional and depositional patterns of the shoreline and so could impact on this type of vegetation. The shingle bank between Walberswick and Dunwich breaches on a regular basis resulting in loss of areas of annual vegetation. When this happens, the Environment Agency repair the breaches in order to protect the freshwater SPA behind the shingle bank from inundation with saltwater, and to protect properties from flooding. The works are carried out under supervision from English Nature site staff and damage to the annual vegetation from this work is kept to a minimum. The stretch between Dunwich Cliffs and Sizewell is more stable and only breaches on an occasional basis. When this occurs the Environment Agency will carry out repairs. The removal of the substrate through coastal defence measures, such as those described above, may also lead to a reduction in the extent of the interest feature through the eradication of the seed bank. This will also have an impact on the recolonisation of adjacent areas. In addition, smothering can prevent seed germination and interrupt the annual cycle of vegetation. This vegetation type is particularly sensitive to excessive long term trampling and other physical disturbance to the shingle. Trampling is particularly acute near the car parks at Walberswick, Dunwich and Dunwich Cliffs where there is high recreational pressure and this results in a high vulnerability score for this category of operation. Annual vegetation of drift lines is considered moderately vulnerable to the introduction of non-synthetic compounds. Oil or chemical spills could have a direct impact on this low growing vegetation which occurs at the top of the shore. The dispersants which are sometimes used in oil spills would also be likely to cause damage to growth and recovery rates. Changes in salinity and nutrient availability could reduce the ability of this type of vegetation to out-compete more vigorous plant growth of more common species. However, current levels do not present a risk of this occurring.

	Minsmere to Walberswick Heaths and Marshes SAC
	European Dry Heaths Neglect is the main threat to lowland heathland; lack of management leads to encroachment by trees and scrub. Recreational pressures: some heathland species are susceptible to disturbance and are not compatible with public access. Summer fires Inappropriate grazing: although grazing is generally beneficial some practices can be damaging such as under or over grazing and supplementary feeding. Run-off from agricultural land and spray-drift can contain high levels of nutrients. Atmospheric deposition of nitrogen *Source: Natura 2000 Standard Data Form (2006) and Suffolk Biodiversity Action Plan: Vegetated Shingle Habitat Action Plan ,Lowland Heathland Habitat Action Plan*
Landowner/ Management Responsibility	RSPB / Natural England / National Trust / Suffolk Wildlife Trust
HRA/AA Studies undertaken that address this site	**East of England Regional Spatial Strategy Habitats Directive Assessment Report**, (December 2006), ERM Ltd and **East of England Plan Review: Habitats Regulations Assessment (Incorporating Appropriate Assessment)** Scoping Report Draft (November 2008) **Waveney Local Development Framework: Habitat Regulations Screening Report** to accompany the Core Strategy Submission Document (January 2008) The Waveney Core Strategy directs most new development to previously developed land within the existing boundaries of towns and larger villages. No European sites fall within development boundaries. The policies contained in the Core Strategy policies are not judged to have any significant impacts on European sites. Site Specific Allocations will be dealt with in a later Development Plan Document. A Habitats Regulations screening report will then be carried out for that document to determine whether the specific locations of development arising from the Core Strategy (for example. new housing and employment land) will have a

	Minsmere to Walberswick Heaths and Marshes SAC
	significant impact on European sites. **HRA of the Suffolk Minerals Core Strategy,** September 2007 The initial Stage 1 Appropriate Assessment has concluded that there are no likely significant impacts on the integrity of Suffolk's European sites. Whilst negative impacts have been discussed, it has been shown that policies and mitigation measures can be put in place to ensure that the appropriate species and habitats will be protected. **Appropriate Assessment of the Suffolk Coast and Heaths Area of Outstanding Natural Beauty Management Plan, 2007** Because of the clearly stated aims and objectives of The Plan to conserve and enhance natural beauty (which includes biodiversity), it is forecast that there will be little in the way of negative impacts on any qualifying feature of any European site. It is possible, however, that the increasing demand for recreation recognised by The Plan could bring people into conflict with biodiversity. This possible negative impact is mitigated by the clear statement in Section 1 that "…the demand for recreation should be met so far as this is consistent with the conservation of natural beauty. In summary, there are sufficient mechanisms to ensure that this potential is examined in detail and appropriate action taken to stop adverse impacts.

Site Name: Orfordness-Shingle Street

- **Location Grid Ref: 520453 N / 013341 E**
- **JNCC Site Code: UK0014780**
- **Size: 901.19 ha**
- **Designation: SAC**

	Orfordness- Shingle Street SAC
Site Description	Orfordness – Shingle Street encompasses a series of percolation **lagoons**, and, together with Benacre to Easton Bavents and The Wash and North Norfolk Coast, forms a significant part of the percolation lagoon resource concentrated in this part of the UK. The lagoons at this site have developed in the shingle bank adjacent to the shore at the mouth of the Ore estuary. The salinity of the lagoons is maintained by percolation through the shingle, although at high tides sea water can overtop the shingle bank. The fauna of these lagoons includes typical lagoon species, such as the Cockle *Cerastoderma glaucum*, the ostracod *Cyprideis torosa* and the gastropods *Littorina saxatilis tenebrosa* and *Hydrobia ventrosa*. The nationally rare Starlet Sea Anemone *Nematostella vectensis* is also found at the site. Orfordness is an extensive shingle spit some 15 km in length and is one of two sites representing **Annual vegetation of drift lines** on the east coast of England. In contrast to Minsmere to Walberswick Heaths and Marshes, drift-line vegetation occurs on the sheltered, western side of the spit, at the transition from shingle to saltmarsh, as well as on the exposed eastern coast. The drift-line community is widespread on the site and comprises Sea Beet *Beta vulgaris* ssp. *maritima* and orache *Atriplex* spp. in a strip 2-5 m wide. Orfordness is an extensive shingle structure on the east coast of England and consists of a foreland, a 15 km-long spit and a series of recurves running from north to south on the Suffolk coast. This spit has been selected as it supports some of the largest and most natural sequences in the UK of shingle vegetation affected by salt spray. The southern end of the spit has a particularly fine series of undisturbed ridges, with zonation of communities determined by the ridge pattern. Pioneer communities with Sea Pea *Lathyrus japonicus* and False Oat-grass *Arrhenatherum elatius* grassland occur. Locally these are nutrient-enriched by the presence of a gull colony; elsewhere they support rich lichen communities. The northern part of Orfordness has suffered considerable damage from defence-related activities but a restoration programme for the shingle vegetation is underway.
Qualifying Features	Annex I habitats primary reason for selection: **1150 Coastal lagoons** * Priority feature

<table>
<tr><th></th><th>Orfordness- Shingle Street SAC</th></tr>
<tr><td></td><td>1210 Annual vegetation of drift lines

Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:
1220 Perennial vegetation of stony banks</td></tr>
<tr><td>Conservation Objectives</td><td>Subject to natural change, to maintain in favourable condition:
Coastal lagoons,
Annual vegetation of drift lines
Perennial vegetation of stony banks.</td></tr>
<tr><td>Component SSSIs</td><td>Component SSSI (45 units) condition status.
<table>
<tr><th>SAC component site</th><th>Favourable</th><th>Unfavourable recovering</th><th>Unfavourable no change</th><th>Unfavourable declining</th><th>Destroyed, part destroyed</th></tr>
<tr><td>Alde-Ore Estuary SSSI</td><td>75.96</td><td>2.10%</td><td>0.59%</td><td>21.36%</td><td>0%</td></tr>
</table></td></tr>
<tr><td>Key Environmental Conditions (factors that maintain site integrity</td><td>Coastal Lagoons

There are three areas of saline lagoons within the Orfordness-Shingle Street site. Former clay extraction areas on the western side of Orfordness (Lantern Marsh and Kings Marsh) support a relatively diverse fauna and flora, although some are impoverished, possibly due to nutrient enrichment related to the presence of the very large breeding gull colonies. In those lagoons away from the main gull colonies the flora is dominated by the tasselweed Ruppia, with which many of the lagoonal animals are associated. Recorded species include the Lagoon Cockle Cerastoderma glaucum, Lagoon Winkle Littorina saxatalis lagunae and the Spire Shell Hydrobia neglecta. On the eastern side of the ness, a series of former gravel extraction areas which are now fed through percolation and rainfall support a varied and diverse fauna and flora with large populations of N. vectensis, Lagoon Cockle and Lagoon Winkle present.

Any management needs to be carefully tailored to the needs of each individual lagoon and should be based on an understanding of the natural features of importance and the external factors affecting the lagoon. Indeed, where a lagoon is in a good and stable condition, active management is unlikely to be necessary. Maintaining salinity and water depths can be a key management priority, particularly where some lagoons become increasingly separated from the sea as a result of natural coastal processes - the balance between</td></tr>
</table>

	Orfordness- Shingle Street SAC
	freshwater (for example. from rainfall, streams or artificial outputs) and saline (i.e. sea water) inputs may change as a result. It may be necessary to actively manage freshwater and seawater input to favour certain species or communities. Whilst freshwater input is not essential to the conservation of lagoons, some connectivity with seawater is. The water depth is also critical to many of the lagoonal specialist species with a depth between 0.5 and 1m being desirable. Some deeper water refuges are also beneficial. Siltation from surrounding land run-off may need to be addressed. Water quality, and any direct and/or diffuse inputs from the surrounding land, can have a profound effect upon the productivity of lagoons and well-being of specialist species. Saline lagoons can show extreme reactions to a build up of some types of nutrients and therefore it may be necessary to actively manage inputs, especially where in close proximity to farmland. **Annual vegetation of drift lines** Driftline vegetation occurs on the sheltered, western side of the spit at this site, at the transition from shingle to saltmarsh. The driftline community is widespread and comprises sea beet *Beta vulgaris* subsp *maritima* and orache *Atriplex* spp. in a strip 2-5m wide. This habitat type occurs on deposits of shingle lying at or above mean high-water spring tides. The types of deposits involved are generally at the lower end of the size range of shingle (2-200 mm diameter), with varying amounts of sand interspersed in the shingle matrix. These shingle deposits occur as fringing beaches that are subject to periodic displacement or overtopping by high tides and storms. The distinctive vegetation, which may form only sparse cover, is therefore ephemeral and composed of annual or short-lived perennial species The mobility of shingle foreshores is an overriding consideration, and colonising species are able to tolerate periodic disturbance, which may involve the total removal of the surface and subsequent recolonisation with vegetation. Species are also tolerant of saltwater inundation, as the beaches are often over-topped by the tide or subject to spray from waves breaking over the beach. Level or gently-sloping, high-level mobile beaches,

	Orfordness- Shingle Street SAC
	with limited human disturbance, support the best examples of this vegetation. **Perennial vegetation of stony banks** Shingle structures develop when a sequence of foreshore beaches is deposited at the limit of high tide. More permanent ridges are formed as storm waves throw pebbles high up on the beach, from where the backwash cannot remove them. Several beaches may be piled against each other and extensive structures can form. The ecological variation in this habitat type depends on stability, the amount of fine material accumulating between pebbles, climatic conditions, width of the foreshore, and past management of the site. The ridges and lows formed also influence the vegetation patterns, resulting in characteristic zonations of vegetated and bare shingle. A key management requirement is to avoid or minimise surface disturbance, especially in the more open communities. Many of the vegetation types and species associated with shingle are fragile and vulnerable to damage from trampling. This breaks up the fine humus that develops in the upper layers of the shingle that is vital for the plants to survive. Where recreational pressures are significant enough to result in the loss of vegetation cover, or prevent its recovery, it may be necessary to take steps to manage access. Disturbance of areas important for breeding birds should be minimised during the breeding season. The vegetation of Orfordness tends to be restricted to the shingle ridges, associated with the presence of fine shingle rather than exposure or elevation. Newly accreted ridges are colonised by pioneer species such as Sea Kale, Yellow-horned Poppy, Sea Pea and Yellow Vetch *Vicia lutea*. The most widespread pioneer species is Sea Campion *Silene uniflora*, which is abundant at Orfordness. The extensive woody, branched rootstock of this species makes it an important species in stabilising mobile shingle. Its wide distribution across Orfordness produces a microenvironment in which many less well adapted species can establish. Orfordness contains the second largest area of acid shingle heath in Britain. The best preserved section is within the old National Nature Reserve south of the former Atomic Weapons Research Establishment fenceline on the spit itself, but there are also good patches on Shingle Street and on the main bulk of the Ness where disturbance has been limited. Most of this vegetation is linear in pattern, coinciding with the finer shingle of the old ridge crests and cover is low or non-existent in the coarser shingle lows. Considerable amounts of bare ground are present over much of the site. Ultimately, the successional development of the flora on the undisturbed areas is curtailed by the overriding maritime influence at Orfordness. Nowhere is

	Orfordness- Shingle Street SAC
	there undisturbed shingle further than 250m from the sea. Wind and salt spray have limited the number of species which can colonise and establish. Probably, as a result, Orfordness has virtually no established communities of woody species on pure shingle. *Source: A statement of English Nature's views about the management of Alde-Ore Estuary Site of Special Scientific Interest (SSSI). JNCC Habitat Accounts (http://www.jncc.gov.uk/ProtectedSites/SACselection/SAC_habitats.asp) and Posford Haskoning (2002) Suffolk Coast and Estuaries Coastal Habitat Management Plan, Living with the Sea LIFE Nature Project.*
SAC Condition Assessment	See component SSSI condition summary
Vulnerabilities (includes existing pressures and trends)	Geomorphological sites where the natural processes that produced the important scientific features are still occurring are referred to as 'active process sites'. The primary management principle is to avoid interfering with these natural processes and the features they produce. Any development or activity that restricts natural processes is likely to damage the interest features of the site. Direct damage can be caused by activities such as the construction of structures and defences, or the removal of material such as sand and gravel. In some instances, sites are likely to be damaged by tree planting which can restrict natural processes by stabilising the soil. Changes in drainage patterns can also damage active process sites. Developments do not necessarily have to take place within the boundary of a site to cause damage. Natural systems can be complex. For example, development in one area can disrupt active processes in a site many miles away by altering rates of erosion. As processes within a site can be affected by developments beyond the site boundary, it is important to take a broad and integrated approach to the management of active process sites. In general, active management of these sites is often only necessary if human activities have affected the natural processes. For example, management may involve removal of man-made barriers which restrict the natural movement of geological features, clearance of rubbish or planted trees.

	Orfordness- Shingle Street SAC
	Coastal Lagoons The main threats to saline lagoons and other coastal habitats in the region are associated with sea level rise. The problem is aggravated by the gradual sinking of south eastern regions of the country caused by isostatic tilt of the UK mainland. This process is predicted to occur at a rate too rapid for coastal habitat formation to keep pace with. Bar-built sedimentary barriers, such as the ones at Benacre, Covehithe and Easton Broads tend to move naturally landwards over time, eventually leading to the broads being filled in by sediments. Diffuse and point source pollution from agricultural runoff and sewage discharges can cause nutrient enrichment, which can have major detrimental effects. Coastal defence works can prevent the movement of sediments along the shore and lead to a gradual loss of natural coastal structures within which many coastal lagoons are located. Encroachment by Common Reed (*Phragmites australis).* Damage to existing lagoons by removal of material or via access routes during maintenance of coastal defence structures. **Annual vegetation of drift lines / Perennial vegetation of stony banks** This habitat is maintained through the action of natural coastal processes upon the shoreline. The requirement for management is limited and is restricted to ensuring that significant human disturbance of the vegetated shore zone does not occur. This aspect of management is addressed through the RSPB visitor management plan. Shingle features are rarely stable in the long term. Many structures exhibit continuous longshore drift with shingle being transported and sorted by wave action. This dynamic nature is an important aspect of the habitat. In recent years approaches to erosion protection and flood defence on shingle beaches have significantly changed from predominately hard defences to beach recharge and maintenance. Shingle areas have high wildlife interest and important coast protection functions, however, when coupled with economic value these

	Orfordness- Shingle Street SAC
	are often in conflict. Threat from development causing damage to fragile coastal vegetated shingle features. This has occurred in Suffolk most obviously at Sizewell (nuclear power station), Landguard (port development) and Orford Ness (military test site). Coastal vegetated shingle habitats are extremely fragile; the effects of access on foot and particularly by vehicles have degraded many sites with loss of vegetation and lack of regeneration. Vehicle access to beaches by is also an issue, and recreational use. *Source: A statement of English Nature's views about the management of Alde-Ore Estuary Site of Special Scientific Interest (SSSI); Suffolk Biodiversity Action Plan: Saline Lagoons Habitat Action Plan and Vegetated Shingle Habitat Action Plan.*
Landowner/ Management Responsibility	National Trust
HRA/AA Studies undertaken that address this site	**East of England Regional Spatial Strategy Habitats Directive Assessment Report**, (December 2006), ERM Ltd and **East of England Plan Review: Habitats Regulations Assessment (Incorporating Appropriate Assessment)** Scoping Report Draft (November 2008) **Waveney Local Development Framework: Habitat Regulations Screening Report** to accompany the Core Strategy Submission Document (January 2008) The Waveney Core Strategy directs most new development to previously developed land within the existing boundaries of towns and larger villages. No European sites fall within development boundaries. The policies contained in the Core Strategy policies are not judged to have any significant impacts on European sites. Site Specific Allocations will be dealt with in a later Development Plan Document. A Habitats Regulations screening report will then be carried out for that document to determine whether the specific locations of development arising from the Core Strategy (for example. new housing and employment land) will have a significant impact on European sites. **HRA of the Suffolk Minerals Core Strategy,** September 2007

	Orfordness- Shingle Street SAC
	The initial Stage 1 Appropriate Assessment has concluded that there are no likely significant impacts on the integrity of Suffolk's European sites. Whilst negative impacts have been discussed, it has been shown that policies and mitigation measures can be put in place to ensure that the appropriate species and habitats will be protected. **Appropriate Assessment of the Suffolk Coast and Heaths Area of Outstanding Natural Beauty Management Plan, 2007** Because of the clearly stated aims and objectives of The Plan to conserve and enhance natural beauty (which includes biodiversity), it is forecast that there will be little in the way of negative impacts on any qualifying feature of any European site. It is possible, however, that the increasing demand for recreation recognised by The Plan could bring people into conflict with biodiversity. This possible negative impact is mitigated by the clear statement in Section 1 that "…the demand for recreation should be met so far as this is consistent with the conservation of natural beauty. In summary, there are sufficient mechanisms to ensure that this potential is examined in detail and appropriate action taken to stop adverse impacts.

Site Name: Staverton Park and the Thicks

- **Location Grid Ref: 520621 N / 012627 E**
- **JNCC Site Code: UK0012741**
- **Size: 81.45 ha**
- **Designation: SAC**

	Staverton Park and The Thicks, Wantisden SAC
Site Description	This site is representative of **old acidophilous oak woods** in the eastern part of its range, and its ancient oaks *Quercus* spp. have rich invertebrate and epiphytic lichen assemblages. Despite being in the most 'continental' part of southern Britain, the epiphytic lichen flora of this site includes rare and Atlantic species, such as *Haemotomma elatinum*, *Lecidea cinnabarina*, *Thelotrema lepadinum*, *Graphis elegans* and *Stenocybe septata*. Part of the site includes an area of Old Holly *Ilex aquifolium* trees that are probably the largest in Britain. The site has a very well-documented history and good conservation of woodland structure and function.

<table>
<tr><th></th><th>Staverton Park and The Thicks, Wantisden SAC</th></tr>
<tr><td>Qualifying Features</td><td>Annex I habitats that are a primary reason for selection of this site:

9190 Old acidophilous oak woods with Quercus robur on sandy plains</td></tr>
<tr><td>Conservation Objectives</td><td>To maintain, in favourable condition, old acidophilous oakwoods with Quercus robur on sandy plains.
Source: East of England Regional Spatial Strategy Habitats Directive Assessment Report, (December 2006), ERM Ltd</td></tr>
<tr><td>Component SSSIs</td><td>Component SSSI (3 units) condition status.
<table>
<tr><th>SAC component site</th><th>Favourable</th><th>Unfavourable recovering</th><th>Unfavourable no change</th><th>Unfavourable declining</th><th>Destroyed, part destroyed</th></tr>
<tr><td>Staverton Park and The Thicks, Wantisden</td><td>100%</td><td>0%</td><td>0%</td><td>0%</td><td>0%</td></tr>
</table></td></tr>
<tr><td>Key Environmental Conditions (factors that maintain site integrity</td><td>Old acidophilous oak woods are found on highly acidic and impoverished soils derived from siliceous sedimentary rocks or very often from aeolian, fluvio-glacial or morainic deposits across the Baltic and North Sea plain. Many examples are secondary, having developed on, for example, former heathland.

Wood pastures are typically mosaics of scattered old trees, often pollards, relatively extensive open areas (often acid heath or grass) with patches of scrub and young growth; the whole being maintained in this mixed state by higher levels of grazing than are common in woods with a coppice or high forest history.

Source: A statement of English Nature’s views about the management of Staverton Park and the Thicks, Wantisden Site of Special Scientific Interest (SSSI). JNCC Habitat Accounts (http://www.jncc.gov.uk/ProtectedSites/SACselection/SAC_habitats.asp)</td></tr>
<tr><td>SAC Condition Assessment</td><td>See SSSI Condition Assessment</td></tr>
<tr><td>Vulnerabilities (includes existing pressures and trends)</td><td>Inappropriate grazing - Over-grazing is likely to remain a major threat to H9190 woodlands, at least until deer numbers and impacts can be substantially reduced. Under-grazing is likely to remain a problem in H9190 wood-pasture sites, albeit that measures have been put in place at some sites to rectify this problem. Excessive grazing is an issue in the New Forest, where combined levels of grazing are generally very high.</td></tr>
</table>

	Staverton Park and The Thicks, Wantisden SAC
	Fires – this site is especially vulnerable to fire as there is a dense ground cover dominated by bracken. Unsympathetic and insufficient management Habitat fragmentation and isolation Fragmentation and isolation are likely to remain as significant threats to the conservation of H9190 oak woodland, though expansion and restoration of the habitat will help reduce their impact. Development - H9190 is likely to remain under threat from development, as the habitat occurs in the south-east and east of England where pressure from development is high. Agricultural practices -The habitat is likely to remain under threat from agricultural intensification and associated practices as it occurs in the south-east and east of England where intensification has been very widespread. Loss of veteran trees, especially where there is a shortage of replacement trees. In order to maintain the age-structure of the woodland in the very long term, the collection of indigenous seed and replanting of seedlings is ongoing. Invasion by non-native species **-** Invasion by *Rhododendron* will remain as a threat to such woodland growing on acidic sites. However, although established in one small area of the Thicks, *Rhododendron* does not seem to be spreading at this site. Air pollution - based on an assessment of the exceedence of relevant critical loads (see technical note III), air pollution is considered to be a potentially significant threat to the future condition of this habitat.
Landowner/ Management Responsibility	• N/A
HRA/AA Studies undertaken that address this site	**East of England Regional Spatial Strategy Habitats Directive Assessment Report**, (December 2006), ERM Ltd and **East of England Plan Review: Habitats Regulations Assessment (Incorporating Appropriate Assessment)** Scoping Report Draft (November 2008) . **HRA of the Suffolk Minerals Core Strategy,** September 2007 The initial Stage 1 Appropriate Assessment has concluded that there are no likely significant impacts on the integrity of Suffolk's European sites. Whilst negative impacts have been discussed, it has been shown that policies and mitigation measures can be put in place to ensure that the appropriate species and habitats will

	Staverton Park and The Thicks, Wantisden SAC
	be protected. **Appropriate Assessment of the Suffolk Coast and Heaths Area of Outstanding Natural Beauty Management Plan, 2007** Because of the clearly stated aims and objectives of The Plan to conserve and enhance natural beauty (which includes biodiversity), it is forecast that there will be little in the way of negative impacts on any qualifying feature of any European site. It is possible, however, that the increasing demand for recreation recognised by The Plan could bring people into conflict with biodiversity. This possible negative impact is mitigated by the clear statement in Section 1 that "…the demand for recreation should be met so far as this is consistent with the conservation of natural beauty. In summary, there are sufficient mechanisms to ensure that this potential is examined in detail and appropriate action taken to stop adverse impacts.

Special Protection Areas

Site Name: Alde-Ore Estuary

- **Location Grid Ref: 520458 N / 013303 E**
- **JNCC Site Code: UK9009112**
- **Size: 2416.87ha**
- **Designation: SPA**

	Alde- Ore Estuary SPA
Site Description	The Alde-Ore Estuary is located on the Suffolk coast in eastern England. It comprises the estuarine complex of the rivers Alde, Butley and Ore, including Havergate Island and Orfordness. There is a variety of habitats including intertidal mud-flats, saltmarsh, vegetated shingle (including the second-largest and best-preserved area in Britain at Orfordness), saline lagoons and semi-intensified grazing marsh. The Orfordness/Shingle Street land form is geomorphologically unique within the UK in combining a shingle spit with a cuspate foreland. The diversity of wetland habitat types present is of particular significance to the birds occurring on the site as these provide a range of opportunities for feeding, roosting and nesting within the site complex. At different times of the year, the site supports notable assemblages of wetland birds including seabirds, wildfowl and waders. As well as being an important wintering area for waterbirds, the Alde-Ore Estuary provides important breeding habitat for several species of seabird, wader and raptor. During the breeding season, gulls and terns feed substantially outside the SPA.
Qualifying Features	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*, 104 pairs representing at least 17.6% of the breeding population in Great Britain (5 year mean, 1990-1994) **Little Tern** *Sterna albifrons*, 48 pairs representing at least 2.0% of the breeding population in Great Britain (5 count mean, 1993-4,1996-8)

	Alde- Ore Estuary SPA
	Marsh Harrier *Circus aeruginosus*, 3 pairs representing at least 1.9% of the breeding population in Great Britain (5 year mean, 1993-1997) **Sandwich Tern** *Sterna sandvicensis*, 169 pairs representing at least 1.2% of the breeding population in Great Britain (5 year mean 1991-1995) Over winter; **Avocet** *Recurvirostra avosetta*, 766 individuals representing at least 60.3% 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: During the breeding season; **Lesser Black-backed Gull** *Larus fuscus*, 21,700 pairs representing at least 17.5% of the breeding Western Europe/Mediterranean/Western Africa population (Count as at 1998) Over winter; **Redshank** *Tringa totanus*, 1,919 individuals representing at least 1.3% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6). **Assemblage qualification: A seabird assemblage of international importance** The area qualifies under **Article 4.2** of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds During the breeding season, the area regularly supports 59,118 individual seabirds (Count period ongoing) including: Herring Gull *Larus argentatus*, Black-headed Gull *Larus ridibundus*, Lesser Black-backed Gull *Larus fuscus*, Little Tern *Sterna albifrons*, Sandwich Tern *Sterna sandvicensis*.

<table>
<tr><th></th><th>Alde- Ore Estuary SPA</th></tr>
<tr><td></td><td>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 24,962 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: Black-tailed Godwit Limosa limosa islandica, Dunlin Calidris alpina alpina, Lapwing Vanellus vanellus, Shoveler Anas clypeata, Teal Anas crecca, Wigeon Anas penelope, Shelduck Tadorna tadorna, White-fronted Goose Anser albifrons albifrons, Redshank Tringa totanus, Avocet Recurvirostra avosetta.</td></tr>
<tr><td>Conservation Objectives</td><td>Conservation objectives have been set out for bird species of European importance within the following categories: Annex I species, migratory waterfowl and wintering waterfowl. The conservation objectives state that, subject to natural change, the habitats listed should be maintained in favourable condition. For the SSSI, only habitats in addition to those covered by the European Marine site (i.e. objectives stated in the Reg. 33 guidance) are listed.

<table>
<tr><th></th><th>Annex 1 (Avocet, Little tern, Sandwich Tern)</th><th>Annex 1 (Marsh Harrier)</th><th>Migratory Species (Lesser Black-backed Gull, Redshank)</th></tr>
<tr><td>SPA (Regulation 33)</td><td>- Shingle
- Shallow coastal waters
- Intertidal mudflats and sandflats
- Saltmarsh communities</td><td></td><td>- Saltmarsh
- Shallow coastal waters
- Intertidal mudflats and sandflats</td></tr>
<tr><td>SPA / SSSI</td><td>N/A</td><td>- Grazing marsh</td><td>- Shingle areas above MHW</td></tr>
</table>
Favourable Condition Targets for regularly occurring Annex 1 species:

Disturbance: no significant reduction in numbers or displacement from an established baseline, subject to</td></tr>
</table>

	Alde- Ore Estuary SPA
	natural change. Extent and distribution of habitat: No decrease in extent from an established baseline, subject to natural change. Shingle: vegetation cover less than 10% and the remainder bare during the breeding season, subject to natural change. Saltmarsh: Vegetation height throughout areas used for roosting should not deviate from an established baseline, subject to natural change (vegetation of <10cm is required at roost sites by Avocets and Ruffs). Intertidal mudflat: average biomass (fish, insects, worms, crustaceans and molluscs) during the winter should not deviate significantly from an established baseline level, subject to natural change. No increase in obstruction to existing bird viewlines, subject to natural change. Shallow coastal waters: presence and abundance of prey species should not deviate significantly from an established baseline, subject to natural change. **Favourable Condition Targets for regularly occurring migratory species:** Disturbance: No significant reduction in numbers or displacement from an established baseline, subject to natural change. Extent and distribution of habitat: No decrease in extent from an established baseline, subject to natural change. Food availability: presence and abundance of prey species should not deviate significantly from an established baseline, subject to natural change (voles, waders, sandeel, cod, herring and invertebrates are an important food source for Lesser Black-backed Gulls whilst worms, crustaceans and molluscs form an important food source for Redshank) Saltmarsh: Vegetation height throughout areas used for roosting should not deviate from an established baseline, subject to natural change (vegetation of <10cm is required at roost sites by Redshanks). No increase in obstruction to existing bird view lines, subject to natural change. *Source: English Nature's advice for the Alde-Ore Estuary European Marine Site given under Regulation 33(2) of the Conservation (Natural Habitats and c.) Regulations 1994*
Component SSSIs	Component SSSI (45 units) condition status.

<table>
<tr><th></th><th>Alde- Ore Estuary SPA</th></tr>
<tr><td></td><td>
<table>
<tr><th>SPA component site</th><th>Favourable</th><th>Unfavourable recovering</th><th>Unfavourable no change</th><th>Unfavourable declining</th><th>Destroyed, part destroyed</th></tr>
<tr><td>Alde-Ore Estuary SSSI</td><td>75.96</td><td>2.10%</td><td>0.59%</td><td>21.36%</td><td>0%</td></tr>
</table>
</td></tr>
<tr><td>Key Environmental Conditions (factors that maintain site integrity</td><td>The important bird populations and assemblages at this site require a functional estuary which is capable of supporting intertidal habitat for feeding and roosting. The most important factors related to this are:

Current extent and distribution of suitable feeding and roosting habitat (for example saltmarsh, mudflats);
Sufficient prey availability (for example small fish, crustaceans and worms);
Levels of disturbance consistent with maintaining conditions for bird feeding and roosting;
Water quality necessary to maintain intertidal plant and animal communities; and
Water quantity and salinity gradients necessary to maintain saltmarsh conditions suitable for bird feeding and roosting.

Key supporting habitats for Annex I species (Avocet, Little tern, Sandwich Tern and Marsh Harrier)

Shingle areas
Little tern require bare and sparsely vegetated shingle to nest. The main nesting areas are along the spit of Orfordness on the seaward side in the splash zone. Little Terns which nest in a shallow scrape in the sand or shingle, prefer areas with little vegetation so that they can see approaching predators but will nest around the transient annual vegetation such as Yellow Horned-Poppy and Sea Pea which they sometimes use as a marker.

Shallow coastal water
Provide an important feeding area for Little and Sandwich Terns (main prey items include sprats, sandeels and the small fry of other fish).The terns feed both within the estuary and along the coastal strip within the European marine site. They also feed further out to sea along the coast. Little Terns will also feed on small crustaceans, molluscs and marine worms.

Intertidal mudflat</td></tr>
</table>

	Alde- Ore Estuary SPA
	Provide an important feeding and roosting area for Avocet which feeds on the ragworm *Nereis diversicolor* along the estuary from Snape to North Weir Point. **Saltmarsh communities** Provide important roosting areas for Avocet. **Other habitats** Within the estuary Marsh Harriers breed in locally abundant areas of rough vegetation on dyke edges and river walls **Key supporting habitats for populations of regularly occurring migratory species (Lesser Black-backed Gull and Redshank)** **Shallow coastal water:** Lesser Black-backed Gulls are generalist feeders and the shallow waters within the site form an important feeding ground for this species. **Intertidal mudflat** The mudflats provide an important feeding and roosting area for Redshank and Lesser Black-backed Gulls. The Redshank feed in the estuary and in Stony Ditch. They feed predominantly on ragworm and lugworm, largely on the tideline, following the tide in and out. The Lesser Black-backed Gulls feed throughout the estuary on various prey items. **Saltmarsh communities** Saltmarsh (including higher saltmarsh grading into neutral grassland) provide important breeding and roosting areas for Redshank (compared to other wading birds, Redshank will feed on the higher areas of intertidal mudflat, in muddy creeks found within saltmarsh and on the saltmarsh itself). Saltmarsh will also occasionally be used by feeding Lesser Black-backed Gulls. *Source: English Nature's advice for the Alde-Ore Estuary European Marine Site given under Regulation 33(2) of the Conservation (Natural Habitats and c.) Regulations 1994*
SPA Condition	See SSSI condition summary

	Alde- Ore Estuary SPA
Assessment	
Vulnerabilities (includes existing pressures and trends)	**Internationally important populations of regularly occurring Annex 1 species (Avocet, Little tern, Sandwich Tern and Marsh Harrier):** **Physical Loss / Damage** • The Alde-Ore Estuary provides roosting and feeding habitats for internationally important populations of Avocets and Ruff. The estuary also provides roosting, feeding and nesting habitats for internationally important populations of Sandwich and Little Tern. Birds are sensitive to habitat loss through removal and current exposure levels are considered to be high for saltmarsh and medium for mudflats. Operations or activities such as shingle recycling that result in the physical loss of the shingle habitat may adversely affect the Annex 1 species. The shingle is used by the birds as a roosting area and as a nesting site by the Little Terns. However, the exposure score to removal of the shingle habitat has been described as low due to the limited area where shingle recycling is occurring. These exposures, combined with the high sensitivity scores leads to high and moderate vulnerabilities. • Much of the saltmarsh in the estuary has been lost due to erosion, possibly as a result of sea level rise and this is being investigated by the Environment Agency. • The Environment Agency has recently produced a flood defence strategy for the estuary which proposes managed realignment in several areas. Careful consideration will be required before this is implemented to ensure that it will not further increase erosion of the intertidal areas. The Environment Agency, as a competent authority is required to consult English Nature under Regulation 48 in relation to possible effects on the European site of any proposals for managed retreat in the estuaries. • The habitats of Alde-Ore Estuary and their associated food supplies, support the Avocet, Sandwich Tern, and Little Tern and Ruff populations. Any operations or activities that would adversely affect these habitats may be detrimental to the species. The current exposure levels to physical damage for the whole estuary are considered to be low. However, there are a small number of areas where this category of operation is occurring, mainly through abrasion from trampling by people and dogs. Also, nest destruction by vandals, particularly when off road bikes are driven over nests has been a problem at this site. However, it now appears to be minimal, but will require continued monitoring and control. The high sensitivity of the shingle

	Alde- Ore Estuary SPA
	area leads to a moderate vulnerability. This high sensitivity, along with the moderate sensitivity of the saltmarsh to abrasion means that this activity will need continued monitoring. **Disturbance (noise/ visual)** • Avocets, Sandwich and Little Tern are disturbed by unpredictable movements of objects and increases in noise disturbance. This can displace the birds from their nesting, roosting or feeding grounds. Disturbance can prevent the birds from feeding and in response they either a) decrease their energy intake at their present (disturbed) feeding site through displacement activity, or b) move to an alternative less favoured feeding site. Such a response affects energy budgets and thus survival. Breeding terns are particularly vulnerable to disturbance. The Little Terns are a target for egg thieves and also vandals who have been known to drive off-road bikes over the nests. During the breeding season this may result in disturbance to the nesting Little Terns causing eggs or chicks to be abandoned. Boats sailing up and down the estuary are not considered a problem in terms of visual disturbance to the birds. At present, the issues contributing to the high vulnerabilities of the birds to this category of operation appear to be boats landing and taking off on Orfordness and associated disturbance from people and uncontrolled dogs. There may also be some disturbance from military helicopters flying over the site. The impact of all these activities needs further investigation. • Marsh Harriers often breed within winter cereals outside of designations and so are at risk of coming into conflict with farmers as well as being disturbed / injured if crops are harvested before the young have fledged. **Toxic Contamination** • Avocets, Little Terns and Sandwich Terns are sensitive to the accumulation of toxins through the food chain or through direct contact with toxic substances when feeding. Their ability to feed can also be affected by changes in the palatability or abundance of prey items caused by toxic contamination. It is recognised that diffuse agricultural pollution occurs in the Alde-Ore and so there is a possibility of synthetic compounds such as pesticides entering the estuary via this route. Although there is no evidence to suggest this is having a detrimental affect on bird numbers it is an issue which will need to be assessed. • Birds can also be exposed to another source of toxic contamination through the re-mobilisation of

	Alde- Ore Estuary SPA
	contaminants such as TBT in the mudflats/sandflats. Activities such as bait digging which could contribute to this category of operation will need further investigation. Avocet, Little Tern, Sandwich Tern and Ruff are moderately sensitive to toxic contamination and the exposure is currently believed to be medium. This results in a moderate vulnerability score for the introduction of synthetic and non-synthetic compounds. **Non-toxic contamination** • Organic or nutrient enrichment can reduce the availability of food for birds by increasing growth of algal mats on the intertidal area. It can also cause a reduction in water clarity, thereby reducing the visibility of prey items. On the other hand, a reduction in nutrient levels may cause a reduction in the biomass of invertebrates. There is a perception amongst estuary users (anecdotal) that agricultural run-off particularly that associated with pigs is a problem. Birds are moderately sensitive to changes in nutrient and organic levels in the intertidal mudflats and shallow coastal waters. The mudflats used by the birds have a medium exposure to changes in organic and nutrient levels, thus leading to a moderate vulnerability score. This will require ongoing assessment. **Biological disturbance** • Bait digging can result in the selective extraction of species from the intertidal area. This may result in a localised reduction of food availability for feeding birds. The quantitative impacts of bait collection are unclear at present. • Wildfowling also occurs on the estuary but is, to a large extent well managed and unlikely to be impacting on the Annex 1 species. • Little Terns nest on the shingle and are highly sensitive to the site specific activities of egg collection. Although the exposure score is low, it combines with the high sensitivity to give a moderate vulnerability score.

	Alde- Ore Estuary SPA
	Internationally important populations of regularly occurring migratory species (Redshank, Lesser Black-backed Gull): **Physical loss** • The populations of Lesser Black-backed Gull and Redshank are sensitive to any habitat loss through removal and current exposure levels are considered to be high for saltmarsh and medium for intertidal mudflats. These exposures combined with the high sensitivity leads to high vulnerability scores for these sub-features. • Much of the saltmarsh in the estuary has been lost due to erosion, possibly as a result of sea level rise and this is being investigated by the Environment Agency. • The Environment Agency has recently produced a flood defence strategy for the estuary which proposes managed realignment in several areas. Careful consideration will be required before this is implemented to ensure that it will not further increase erosion of the intertidal areas. The Environment Agency, as a competent authority is required to consult English Nature under Regulation 48 in relation to possible effects on the European site of any proposals for managed retreat in the estuaries. **Physical Damage** • The habitats of Alde-Ore Estuary and their associated food supplies support internationally important populations of Lesser Black-backed Gull and Redshank. Therefore, any operations or activities that would adversely affect these habitats may be detrimental to the species. The current exposure levels to physical damage for the whole estuary are considered to be low. However, there are a small number of areas where this category of operations is occurring, mainly through abrasion from trampling by people and dogs and this will require further investigation. • The moderate sensitivity of the saltmarsh and intertidal mudflats to physical damage mean these activities

	Alde- Ore Estuary SPA
	will need continued monitoring. **Non-physical Disturbance** • Water birds are disturbed by unpredictable movements of objects and increases in noise disturbance. This can displace the birds from their roosting or feeding grounds. Disturbance can prevent the birds from feeding and in response they either a) decrease their energy intake at their present (disturbed) feeding site through displacement activity, or b) move to an alternative less favoured feeding site. Such a response affects energy budgets and thus survival. At present, the issues contributing to the medium exposures on the intertidal mudflats and saltmarsh to noise and visual disturbance, appear to be boats landing and taking off on Orfordness, and associated disturbance from people and uncontrolled dogs. There may also be some disturbance from military helicopters flying over the site. The impact of all these activities needs further investigation. Boats sailing up and down the estuary are not considered a problem in terms of visual disturbance to the birds. The exposure scores, together with the high sensitivities result in high vulnerability scores for noise and visual disturbance. **Toxic contamination** • Water birds are sensitive to the accumulation of toxins through the food chain or through direct contact with toxic substances when feeding. Their ability to feed can also be affected by changes in the palatability or abundance of prey items caused by toxic contamination. It is recognised that diffuse agricultural pollution occurs in the Alde-Ore Estuary, and so there is a large possibility of synthetic compounds such as pesticides and other chemicals entering the estuary via this route. Although there is no evidence to suggest this is having a detrimental affect on bird numbers it is an issue which requires ongoing assessment. • Birds can also be exposed to another source of toxic contamination through the re-mobilisation of contaminants such as TBT in the mudflats/sandflats. Activities such as bait digging which could contribute to this category of operation will need further investigation. • Redshank and Lesser Black-backed Gulls are moderately sensitive to toxic contamination and the exposure is currently believed to be medium. This gives a moderate vulnerability score for the introduction

	Alde- Ore Estuary SPA
	of synthetic and non-synthetic compounds for all sub-features. **Non-toxic contamination** • Organic or nutrient enrichment can reduce the availability of food for birds by increasing growth of algal mats on the intertidal area. It can also cause a reduction in water clarity, thereby reducing the visibility of prey items. There is a perception amongst estuary users (anecdotal) that agricultural run-off, particularly that associated with pigs, is a problem, although there are currently no pigs in the area as a result of the recent swine fever outbreak. On the other hand, a reduction in nutrient levels may cause a reduction in the biomass of invertebrates Birds are moderately sensitive to changes in nutrient and organic levels in the intertidal mudflats and shallow coastal waters. The intertidal mudflats used by the birds have a medium exposure to this type of non-toxic contamination, thus leading to moderate vulnerability scores. This will require ongoing assessment. **Biological disturbance** • Bait digging can result in the selective extraction of species from the intertidal area. This may result in a localised reduction of food availability for feeding birds and the intertidal mudflats are moderately sensitive to this operation. The quantitative impacts of bait collection are unclear at present. There is also well established mariculture on the Butley River but this is not perceived as a problem. • Wildfowling occurs on the estuary but neither the gulls nor the Redshank are target species. *Source: English Nature's advice for the Alde-Ore Estuary European Marine Site given under Regulation 33(2) of the Conservation (Natural Habitats and c.) Regulations 1994*
Landowner/ Management Responsibility	Suffolk Wildlife Trust, National Trust, RSPB and Natural England
HRA/AA Studies undertaken that address this site	**East of England Regional Spatial Strategy Habitats Directive Assessment Report**, (December 2006), ERM Ltd and **East of England Plan Review: Habitats Regulations Assessment (Incorporating Appropriate Assessment)**

	Alde- Ore Estuary SPA
	Scoping Report Draft (November 2008) **Waveney Local Development Framework: Habitat Regulations Screening Report** to accompany the Core Strategy Submission Document (January 2008) The Waveney Core Strategy directs most new development to previously developed land within the existing boundaries of towns and larger villages. No European sites fall within development boundaries. The policies contained in the Core Strategy policies are not judged to have any significant impacts on European sites. Site Specific Allocations will be dealt with in a later Development Plan Document. A Habitats Regulations screening report will then be carried out for that document to determine whether the specific locations of development arising from the Core Strategy (for example. new housing and employment land) will have a significant impact on European sites. **HRA of the Suffolk Minerals Core Strategy,** September 2007 The initial Stage 1 Appropriate Assessment has concluded that there are no likely significant impacts on the integrity of Suffolk's European sites. Whilst negative impacts have been discussed, it has been shown that policies and mitigation measures can be put in place to ensure that the appropriate species and habitats will be protected. **Appropriate Assessment of the Suffolk Coast and Heaths Area of Outstanding Natural Beauty Management Plan, 2007** Because of the clearly stated aims and objectives of The Plan to conserve and enhance natural beauty (which includes biodiversity), it is forecast that there will be little in the way of negative impacts on any qualifying feature of any European site. It is possible, however, that the increasing demand for recreation recognised by The Plan could bring people into conflict with biodiversity. This possible negative impact is mitigated by the clear statement in Section 1 that "…the demand for recreation should be met so far as this is consistent with the conservation of natural beauty. In summary, there are sufficient mechanisms to ensure that this potential is examined in detail and appropriate action taken to stop adverse impacts.

Site Name: Benacre to Easton Bavents

- **Location Grid Ref: 522311 N / 014237 E**
- **JNCC Site Code UK9009291**
- **Size: 516.83 ha**
- **Designation: SPA**

	Benacre to Easton Bavents SPA
Site Description	Benacre to Easton Bavents is located on the North Sea coast of East Suffolk, between the coastal towns of Kessingland (to the north) and Southwold (to the south). The coast here is low-lying and consists of shingle beach in the northern part and low cliffs around Easton Bavents and Covehithe. Benacre Broad is a natural brackish lagoon separated from the sea by a shingle bar, reed-fringed on the landward side and then grading into deciduous woodland on the rising ground behind. The smaller Covehithe and Easton Broads have developed similarly, with fringing reedbeds. Elsewhere, grazing marsh fields include unimproved meadows, which are separated by ditches rich in water plants and invertebrates. The area supports important populations of breeding birds, which are particularly associated with reedbed and shingle beach habitats. The reedbeds also support important numbers of Bittern *Botaurus stellaris* in winter. Little Terns *Sterna albifrons* feed substantially outside the SPA in adjacent marine waters.
Qualifying Features	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; **Bittern** *Botaurus stellaris*, 1 individuals representing at least 5.0% of the breeding population in Great Britain (Count as at 1998) **Little Tern** *Sterna albifrons*, 53 pairs representing at least 2.2% of the breeding population in Great Britain (Count as at 1997) **Marsh Harrier** *Circus aeruginosus*, 6 pairs representing at least 3.8% of the breeding population in Great Britain (5 year mean 1993-1997)

<table>
<tr><th></th><th>Benacre to Easton Bavents SPA</th></tr>
<tr><td></td><td>Over winter;

Bittern Botaurus stellaris, 2 individuals representing at least 2.0% of the wintering population in Great Britain (Count, as at 1998).</td></tr>
<tr><td>Conservation Objectives</td><td>The conservation objectives developed for the above site state that, subject to natural change, the habitats listed in the table below should be maintained in favourable condition. Objectives have been set out for bird species of European importance within the following categories: Annex I species. For the SSSI, only habitats in addition to those covered by the European Marine site (i.e. objectives stated in the Reg. 33 guidance) are listed.

<table>
<tr><th></th><th>Annex 1 (Little Tern)</th><th>Annex 1 (Marsh Harrier and Bittern)</th></tr>
<tr><td>SPA (Regulation 33)</td><td>- Shingle
- Shallow coastal waters</td><td>N/A</td></tr>
<tr><td>SPA / SSSI</td><td>N/A</td><td>Grazing marsh
Marginal and inundation
Standing water</td></tr>
</table>

Posford Haskoning (2002) Suffolk Coast and Estuaries Coastal Habitat Management Plan, Living with the Sea LIFE Nature Project.</td></tr>
<tr><td>Component SSSIs</td><td>Component SSSI (51 units) condition status.

<table>
<tr><th>SPA component site</th><th>Favourable</th><th>Unfavourable recovering</th><th>Unfavourable no change</th><th>Unfavourable declining</th><th>Destroyed, part destroyed</th></tr>
<tr><td>Pakefield to Easton Bavents SSSI</td><td>52.52</td><td>24.27%</td><td>6.51%</td><td>16.7%</td><td>0%</td></tr>
</table></td></tr>
<tr><td>Key Environmental</td><td>Marsh Harrier and Bittern</td></tr>
</table>

	Benacre to Easton Bavents SPA
Conditions (factors that maintain site integrity	Marsh Harriers and Bittern depend on areas of open water and their associated marginal habitats - reedbeds. As the availability of open water is a key factor, so it is important that the dykes and pools receive appropriate management to ensure their continued use. The floodplain fen and reed need to be managed by periodic cutting or in places grazing, and by the management of water levels. Wet woodland and scrub will need to be controlled to ensure its spread does not significantly alter the proportions of the mosaic. The protection of appropriate water quality is important for maintaining the aquatic habitats: the availability of nutrients and the maintenance of appropriate water quality is dependent on catchment geology and land use. **Little tern** The shingle bars fronting Benacre Broad and Covhithe Broad are utilized as a breeding site by Little Tern. Little tern requires unrestricted views over greater than 200m with vegetation cover of less than 10% and the remainder bare during the breeding season. The shallow water of the intertidal area within the SPA is an important feeding area for this species which will pick prey items (for example small fish, crustaceans, worms) from the surface of the water with the majority of feeding occurring outside of the SPA in adjacent marine waters. *Source: Posford Haskoning (2002) Suffolk Coast and Estuaries Coastal Habitat Management Plan, Living with the Sea LIFE Nature Project and English Nature (2001) English Nature's advice for the Benacre to Easton Bavents European Marine given under Regulation 33(2) of the Conservation (Natural Habitats and c.) Regulations 1994*
SPA Condition Assessment	See condition assessment for SSSI component unit.
Vulnerabilities (includes existing pressures and trends)	**Physical Damage** Shingle habitat used by nesting Little Terns is highly sensitive to physical damage from abrasion. The nesting areas at Benacre to Easton Bavents are particularly popular areas for recreation and are therefore prone to damage by trampling and have been given a high exposure score. Combined with the high sensitivity this

	Benacre to Easton Bavents SPA
	gives a high vulnerability. Bitterns are particularly vulnerable to loss of suitable breeding and feeding areas in fens and reedbeds through natural succession and lack of appropriate management (particularly cutting and water management) and loss of appropriate open water/reedbed interface. Equally, Bitterns are vulnerable to severe winters and can suffer high levels of mortality. Sea level rise and policies for flood defence and the impact of managed retreat can also impact on Bittern habitat and Little Tern colonies as can unseasonal freshwater flooding, especially during the nesting season. Bitterns, Marsh Harriers and Little Tern are all adversely impacted through degradation of habitat and fisheries through eutrophication. **Non-physical Disturbance** Breeding Little Terns are highly sensitive to non-physical disturbance. Noise and visual disturbance may cause nesting Little Terns to abandon eggs or chicks. There is a high exposure score as nesting sites are subject to non-physical disturbance from egg collectors and vandals, particularly when off road bikes may be driven through the nesting colony. The high sensitivity and high exposure results in a high vulnerability score. **Biological Disturbance** Nesting Little Terns are highly sensitive to the site specific activities of egg collection and nest destruction by vandals, particularly when off road bikes may be driven over the site. The exposure score is high and combines with the high sensitivity, resulting in a high vulnerability score. Marsh Harriers often breed within winter cereals outside of designations and so are at risk of coming into conflict with farmers as well as being disturbed / injured if crops are harvested before the young have fledged. Food availability for Bitterns, especially eels, can be affected by inappropriate management of watercourses. Bitterns and Little Terns are particularly susceptible to the effects of predators. The natural defence of Little

	Benacre to Easton Bavents SPA
	Terns is to live in ephemeral colonies. Colonies are often successful in their first few years but local predators (foxes, rats, birds of prey, gulls and corvids) soon learn to exploit them. When predators get too high, they move on if they can find a new site. *Source: Suffolk Biodiversity Action Plan: Bittern Species Action Plan and Little tern Species Action Plan and English Nature (2001) English Nature's advice for the Benacre to Easton Bavents European Marine given under Regulation 33(2) of the Conservation (Natural Habitats and c.) Regulations 1994*
Landowner/ Management Responsibility	• Various/ private.
HRA/AA Studies undertaken that address this site	**East of England Regional Spatial Strategy Habitats Directive Assessment Report**, (December 2006), ERM Ltd and **East of England Plan Review: Habitats Regulations Assessment (Incorporating Appropriate Assessment)** Scoping Report Draft (November 2008) **Waveney Local Development Framework: Habitat Regulations Screening Report** to accompany the Core Strategy Submission Document (January 2008) The Waveney Core Strategy directs most new development to previously developed land within the existing boundaries of towns and larger villages. No European sites fall within development boundaries. The policies contained in the Core Strategy policies are not judged to have any significant impacts on European sites. Site Specific Allocations will be dealt with in a later Development Plan Document. A Habitats Regulations screening report will then be carried out for that document to determine whether the specific locations of development arising from the Core Strategy (for example. new housing and employment land) will have a significant impact on European sites. **HRA of the Suffolk Minerals Core Strategy,** September 2007 The initial Stage 1 Appropriate Assessment has concluded that there are no likely significant impacts on the integrity of Suffolk's European sites. Whilst negative impacts have been discussed, it has been shown that policies and mitigation measures can be put in place to ensure that the appropriate species and habitats will be protected.

	Benacre to Easton Bavents SPA
	Regulation 48 Appropriate Assessment for Suffolk Minerals Site Allocations – Preferred Options, February 2009 The proposed increase in the existing sand and gravel extractions from Henham Park Quarry, as outline in Suffolk County Council's Minerals Specific Site Development Plan Consultation Document, required an Appropriate Assessment in relation to potential impacts on Minsmere to Walberswick SPA and Ramsar site as well as Benacre to Easton Bavents SPA. This concluded that subject to working hours and methods, there is a small possibility that overwintering birds in this area could suffer from disturbance in their flight patterns to and from their feeding grounds as well as a possible loss in some foraging habitat. Based upon the assumption that there will be no interception of water flowing into any of the designated sites it was concluded that it is unlikely that there will be any readily identifiable negative impacts (not mentioned above upon the Minsmere to Walberswick SPA and Ramsar Site and the Benacre to Easton Bavents SPA. **Appropriate Assessment of the Suffolk Coast and Heaths Area of Outstanding Natural Beauty Management Plan, 2007** Because of the clearly stated aims and objectives of The Plan to conserve and enhance natural beauty (which includes biodiversity), it is forecast that there will be little in the way of negative impacts on any qualifying feature of any European site. It is possible, however, that the increasing demand for recreation recognised by The Plan could bring people into conflict with biodiversity. This possible negative impact is mitigated by the clear statement in Section 1 that "…the demand for recreation should be met so far as this is consistent with the conservation of natural beauty. In summary, there are sufficient mechanisms to ensure that this potential is examined in detail and appropriate action taken to stop adverse impacts. **Regulation 48 Appropriate Assessment for Suffolk Minerals Site Allocations – Preferred Options: Extension of Henham Park Quarry,** February 2009 The proposed increase in the existing sand and gravel extractions from Henham Park Quarry, as outline in Suffolk County Council's Minerals Specific Site Development Plan Consultation Document, required an Appropriate Assessment in relation to potential impacts on Minsmere to Walberswick SPA and Ramsar site as well as Benacre to Easton Bavents SPA. This concluded that subject to working hours and methods, there is

	Benacre to Easton Bavents SPA
	a small possibility that overwintering birds in this area could suffer from disturbance in their flight patterns to and from their feeding grounds as well as a possible loss in some foraging habitat. Based upon the assumption that there will be no interception of water flowing into any of the designated sites it was concluded that it is unlikely that there will be any readily identifiable negative impacts (not mentioned above upon the Minsmere to Walberswick SPA and Ramsar Site and the Benacre to Easton Bavents SPA.

Site Name: Minsmere to Walberswick SPA

- **Location Grid Ref: 521855 N / 013802 E**
- **JNCC Site Code UK9009101**
- **Size: 2018.92 ha**
- **Designation: SPA**

	Minsmere to Walberwisck SPA
Site Description	Minsmere – Walberswick is located on the Suffolk coast south of Southwold in eastern England. It comprises two large marshes, the tidal Blyth estuary and associated habitats. This composite coastal site contains a complex mosaic of habitats, notably areas of marsh with dykes, extensive reedbeds, mud-flats, lagoons, shingle, woodland and areas of lowland heath. It supports the largest continuous stand of Common Reed *Phragmites australis* in England and Wales and demonstrates the nationally rare transition in grazing marsh ditch plants from brackish to fresh water. There are nationally important numbers of breeding and wintering birds. In particular, the reedbeds are of major importance for breeding Bittern *Botaurus stellaris* and Marsh Harrier *Circus aeruginosus*. A range of breeding waders (*for example.* Avocets *Recurvirostra avosetta*) and heathland birds occur in other areas of the SPA. The shingle beaches support important numbers of breeding Little Tern *Sterna albifrons*, which feed substantially outside the SPA in adjacent marine waters. The site is also important for wintering Bitterns and raptors.
Qualifying Features	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*, 91 pairs representing at least 15.4% of the breeding population in Great Britain (RBBP 1996) **Bittern** *Botaurus stellaris*, 7 individuals representing at least 35.0% of the breeding population in Great Britain (5 year mean, 1993-1997) **Little Tern** *Sterna albifrons*, 28 pairs representing at least 1.2% of the breeding population in Great Britain (5 year mean, 1992-1996)

<table>
<tr><th></th><th>Minsmere to Walberwisck SPA</th></tr>
<tr><td></td><td>
Marsh Harrier Circus aeruginosus, 16 pairs representing at least 10.0% of the breeding population in Great Britain (5 year mean, 1993-1997)

Nightjar Caprimulgus europaeus, 24 pairs representing at least 0.7% of the breeding population in Great Britain (Count, as at 1990)

Woodlark Lullula arborea, 20 pairs representing at least 1.3% of the breeding population in Great Britain (RSPB, 5 year mean 95-99)

Over winter;

Avocet Recurvirostra avosetta, 278 individuals representing at least 21.9% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6)

Bittern Botaurus stellaris, 14 individuals representing at least 14.0% of the wintering population in Great Britain (Count as at 1998)

Hen Harrier Circus cyaneus, 15 individuals representing at least 2.0% of the wintering population in Great Britain (5 year peak mean, 1985/6-1989/90)
</td></tr>
<tr><td>Conservation Objectives</td><td>
The conservation objectives developed for the above site state that, subject to natural change, the habitats listed in the table below should be maintained in favourable condition. Objectives have been set out for bird species of European importance within the following categories: Annex I species. For the SSSI, only habitats in addition to those covered by the European Marine site (i.e. objectives stated in the Reg. 33 guidance) are listed.
<table>
<tr><th></th><th>Annex 1 (Little tern)</th><th>Annex 1 (Avocet, Bittern, Marsh Harrier, Nightjar, Woodlark and Hen Harrier)</th></tr>
<tr><td>SPA (Regulation 33)</td><td>- Shingle
- Shallow coastal waters</td><td>N/A</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th></th><th>Minsmere to Walberwisck SPA</th></tr>
<tr><td></td><td>
<table>
<tr><td></td><td>-</td><td></td></tr>
<tr><td>SPA / SSSI</td><td>N/A</td><td>Swamp
Marginal and inundation
Standing water
Grassland
Coastal lagoons
Marsh
Heathland</td></tr>
</table>
Posford Haskoning (2002) Suffolk Coast and Estuaries Coastal Habitat Management Plan, Living with the Sea LIFE Nature Project.
</td></tr>
<tr><td>Component SSSIs</td><td>Component SSSIs including condition status:
<table>
<tr><th>SPA component site</th><th>Favourable</th><th>Unfavourable recovering</th><th>Unfavourable no change</th><th>Unfavourable declining</th><th>Destroyed, part destroyed</th></tr>
<tr><td>Minsmere-Walberswick Heaths and Marshes SSSI</td><td>42.88%</td><td>48.83%</td><td>0.62%</td><td>7.67%</td><td>0%</td></tr>
</table>
</td></tr>
<tr><td>Key Environmental Conditions (factors that maintain site integrity</td><td>Key supporting habitats for Annex I species (Avocet, Little Tern, Bittern, Woodlark, Nightjar, hen harrier and Marsh Harrier)

Shingle areas - Little Tern require bare and sparsely vegetated shingle to nest. The main nesting areas are within the shingle bank adjacent to Minsmere RSPB reserve. Little Terns and Avocet also nest behind the shingle bank at Walberswick. Little Terns which nest in a shallow scrape in the sand or shingle and require unrestricted views over greater than 200m with vegetation cover of less than 10% and the remainder bare during the breeding season.

Shallow coastal water –The artificial lagoons forming part of the RSPB reserve at Minsmere support a</td></tr>
</table>

	Minsmere to Walberwisck SPA
	significant number of breeding Avocet as well as numerous species of waterfowl (breeding Shoveler, Gadwall, Teal and Shelduck) as well as feeding Little Tern. **Intertidal mudflat** – Provide an important feeding and roosting area for Avocet which feeds on the ragworm *Nereis diversicolor.* **Saltmarsh communities** – Provide important roosting areas for Avocet. **Swamp** – The site supports the largest continuous stand of Common Reed in England and Wales (Westwood Marshes) and this habitat is of major importance for breeding and wintering Bittern, marsh and hen harrier. The floodplain fen and reed need to be managed by periodic cutting or in places grazing, and by the management of water levels. Wet woodland and scrub will need to be controlled to ensure its spread does not significantly alter the proportions of the mosaic. **Heathland** – The heathland within the SPA (Dunwich-Westleton) supports important breeding populations of Nightjar, Woodlark as well as Dartford warbler. Both Nightjar and Woodlark require open areas of heathland, devoid of invading scrub and trees and also require an absence of disturbance from humans and dogs etc. **Standing water** - Marsh Harriers and Bittern depend on areas of open water and their associated marginal habitats - reedbeds. As the availability of open water is a key factor, so it is important that the dykes and pools receive appropriate management to ensure their continued use. **Wet grassland** – This habitat occurs on land that is subject to periodic flooding or has a seasonally high water table and is waterlogged for much of the year and is an important habitat for breeding waders (for example. Avocet) and wintering wildfowl. This habitat requires active management to maintain its conservation interest: each year's growth must be removed to prevent the sward from becoming dominated by tall vigorous grasses – this can be achieved by grazing (cows, sheep or horses) between late spring and early autumn; a mosaic of winter flooded grassland and permanently un-flooded grassland. **Other habitats (for example. grassland)** - Within the estuary Marsh Harriers breed in locally abundant areas of rough vegetation on dyke edges and river walls. Nightjars will forage over a variety of different habitats including deciduous or mixed woodlands, orchards, gardens, riparian habitats and freshwater wetlands,

	Minsmere to Walberwisck SPA
	heathland and young plantations. *Source: Posford Haskoning (2002) Suffolk Coast and Estuaries Coastal Habitat Management Plan, Living with the Sea LIFE Nature Project and English Nature (2001) English Nature's advice for the Benacre to Easton Bavents European Marine given under Regulation 33(2) of the Conservation (Natural Habitats and c.) Regulations 1994*
SPA Condition Assessment	See condition assessment for SSSI component unit.
Vulnerabilities (includes existing pressures and trends)	**Physical Damage** Shingle habitat used by nesting Little Terns is highly sensitive to physical damage from abrasion. The nesting areas at Minsmere are particularly popular areas for recreation and are therefore prone to damage by trampling and have been given a high exposure score. Combined with the high sensitivity this gives a high vulnerability. Bitterns are particularly vulnerable to loss of suitable breeding and feeding areas in fens and reedbeds through natural succession and lack of appropriate management (particularly cutting and water management) and loss of appropriate open water/reedbed interface. Sea level rise and policies for flood defence and the impact of managed retreat can also impact on Bittern habitat and Little Tern colonies as can unseasonal freshwater flooding, especially during the nesting season. All Annex 1 species are adversely impacted through degradation of habitat and fisheries through eutrophication. Woodlark and Nightjar are prone to the effects of heathland habitat degradation and require areas devoid of invading scrub, bracken and trees. **Non-physical Disturbance** Breeding Little Terns are highly sensitive to non-physical disturbance. Noise and visual disturbance may cause nesting Little Terns to abandon eggs or chicks. There is a high exposure score as nesting sites are subject to non-physical disturbance from egg collectors and vandals, particularly when off road bikes may be driven through the nesting colony. The high sensitivity and high exposure results in a high vulnerability score. Woodlarks and Nightjar are prone to the effects of human disturbance, especially when accompanied by dogs.

	Minsmere to Walberwisck SPA
	Biological Disturbance Nesting Little Terns are highly sensitive to the site specific activities of egg collection and nest destruction by vandals, particularly when off road bikes may be driven over the site. The exposure score is high and combines with the high sensitivity, resulting in a high vulnerability score. Marsh Harriers often breed within winter cereals outside of designations and so are at risk of coming into conflict with farmers as well as being disturbed / injured if crops are harvested before the young have fledged. Hen harriers may also be vulnerable to direct persecution. Food availability for Bitterns, especially eels, can be affected by inappropriate management of watercourses. Bitterns, Little Terns, Woodlark and Nightjar are all particularly at risk of predation. The natural defence of Little Terns is to live in ephemeral colonies. Colonies are often successful in their first few years but local predators (foxes, rats, birds of prey, gulls and corvids) soon learn to exploit them. When predators get too high, they move on if they can find a new site. Bitterns and Woodlarks are vulnerable to severe winters and can suffer high levels of mortality. **Toxic contamination** There may be some toxic contamination through the introduction of radionuclides from Sizewell nuclear power station. The extent and effects of this on bird and fish populations are likely to be low and thus a low vulnerability score has been given but this will require further investigation. Toxic contamination may also affect bird populations indirectly by affecting the abundance of their food items. Birds can also be exposed to another source of toxic contamination through the re-mobilisation of contaminants such as TBT in the mudflats/sandflats. This may then in turn affect prey items and will require further investigation. Marsh Harriers and hen harriers are both susceptible to the effects of toxins through bioaccumulation. **Non-toxic Contamination** There may be some changes in thermal regime from the discharges from the power station but the effects of this on the prey items of the Little Terns is likely to be low and thus a low vulnerability score has been given but this will require further investigation. *Source: Suffolk Biodiversity Action Plan: Bittern Species Action Plan, Little tern Species Action Plan, Woodlark Species Action Plan, Nightjar Species Action Plan and English Nature (2001) English Nature's advice for the Benacre to Easton Bavents European Marine given under Regulation 33(2) of the Conservation*

	Minsmere to Walberwisck SPA
	(Natural Habitats and c.) Regulations 1994
Landowner/ Management Responsibility	RSPB / Natural England
HRA/AA Studies undertaken that address this site	**East of England Regional Spatial Strategy Habitats Directive Assessment Report**, (December 2006), ERM Ltd and **East of England Plan Review: Habitats Regulations Assessment (Incorporating Appropriate Assessment)** Scoping Report Draft (November 2008) **Waveney Local Development Framework: Habitat Regulations Screening Report** to accompany the Core Strategy Submission Document (January 2008) The Waveney Core Strategy directs most new development to previously developed land within the existing boundaries of towns and larger villages. No European sites fall within development boundaries. The policies contained in the Core Strategy policies are not judged to have any significant impacts on European sites. Site Specific Allocations will be dealt with in a later Development Plan Document. A Habitats Regulations screening report will then be carried out for that document to determine whether the specific locations of development arising from the Core Strategy (for example. new housing and employment land) will have a significant impact on European sites. **HRA of the Suffolk Minerals Core Strategy,** September 2007 The initial Stage 1 Appropriate Assessment has concluded that there are no likely significant impacts on the integrity of Suffolk's European sites. Whilst negative impacts have been discussed, it has been shown that policies and mitigation measures can be put in place to ensure that the appropriate species and habitats will be protected. **Appropriate Assessment of the Suffolk Coast and Heaths Area of Outstanding Natural Beauty Management Plan, 2007** Because of the clearly stated aims and objectives of The Plan to conserve and enhance natural beauty (which includes biodiversity), it is forecast that there will be little in the way of negative impacts on any qualifying feature of any European site. It is possible, however, that the increasing demand for recreation recognised by

	Minsmere to Walberwisck SPA
	The Plan could bring people into conflict with biodiversity. This possible negative impact is mitigated by the clear statement in Section 1 that "…the demand for recreation should be met so far as this is consistent with the conservation of natural beauty. In summary, there are sufficient mechanisms to ensure that this potential is examined in detail and appropriate action taken to stop adverse impacts. **Regulation 48 Appropriate Assessment for Suffolk Minerals Site Allocations – Preferred Options: Extension of Henham Park Quarry,** February 2009 The proposed increase in the existing sand and gravel extractions from Henham Park Quarry, as outline in Suffolk County Council's Minerals Specific Site Development Plan Consultation Document, required an Appropriate Assessment in relation to potential impacts on Minsmere to Walberswick SPA and Ramsar site as well as Benacre to Easton Bavents SPA. This concluded that subject to working hours and methods, there is a small possibility that overwintering birds in this area could suffer from disturbance in their flight patterns to and from their feeding grounds as well as a possible loss in some foraging habitat. Based upon the assumption that there will be no interception of water flowing into any of the designated sites it was concluded that it is unlikely that there will be any readily identifiable negative impacts (not mentioned above upon the Minsmere to Walberswick SPA and Ramsar Site and the Benacre to Easton Bavents SPA. **Strategic Appropriate Assessment for the Blyth Estuary Strategy (not yet published)** An appropriate assessment of the potential impacts of the Blyth Estuary flood defence strategy is required and is in preparation.

Site Name: Sandlings SPA

- **Location Grid Ref: 521114 N / 013057 E**
- **JNCC Site Code UK9020286**
- **Size: TBC**
- **Designations: SPA**

	Sandlings SPA
Site Description	The Sandlings SPA lies near the Suffolk coast between the Deben Estuary and Leiston. In the 19th century, the area was dominated by heathland developed on glacial sandy soils. During the 20th century, large areas of heath were planted with blocks of commercial conifer forest and others were converted to arable agriculture. Lack of traditional management has resulted in the remnant areas of heath which have survived successional changes and the consequent spread of bracken *Pteridium aquilinum*, shrubs and trees. The recent conservation management work, however, is resulting in their restoration. The heaths support both acid grassland and heather-dominated plant communities with dependent invertebrate and bird communities of conservation value. Woodlark *Lullula arborea* and Nightjar *Caprimulgus europaeus* have also adapted to breeding in the large blocks of conifer forest, using areas that have recently been felled and recent plantation, as well as areas managed as open ground.
Qualifying Features	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; **Nightjar** *Caprimulgus europaeus*, 109 pairs representing at least 3.2% of the breeding population in Great Britain (Count as at 1992) **Woodlark** *Lullula arborea*, 154 pairs representing at least 10.3% of the breeding population in Great Britain (Count as at 1997)
Conservation Objectives	To maintain, in favourable condition, the habitats for the populations of *Annex 1* bird species (Woodlark and Nightjar) of European importance, with particular reference to:

	Sandlings SPA
	lowland heathland; and coniferous woodland. **Favourable Condition Targets for Woodlark:** Extent of habitat: no significant decrease in overall extent of young plantation or other open areas with a mosaic of habitat including plantation of 0-6 age class, or other open areas. No decrease in size of individual clear fell areas within the plantation. Vegetation characteristics: no significant decrease from reference level (frequent bare patches of <0.5ha within mosaic of short (<5cm) to medium (10-20cm) ground vegetation and small clumps of shrubs or trees. Plantations usually provide suitable habitat for 6 years after planting. Food availability: abundance of ground surface invertebrates (spiders, weevils and caterpillars) should not decrease significantly from reference level. Disturbance: no significant displacement of birds attributable to human disturbance from reference level. **Favourable Condition Targets for Nightjar:** Extent of habitat: no significant decrease in overall extent of young plantation or other open areas with a mosaic of vegetation types including plantation less than 5 years old (ideal habitat) and 5-15 years old (suitable habitat). Vegetation characteristics: no significant decrease in extent of open ground with predominantly low vegetation (feeding) and bare patches (nesting) with sparse woodland / scrub cover (feeding / roosting). Plantations provide the best habitat up to 5 years after planting. Food availability: abundance of night flying insects (moths and beetles are important for Nightjars) should not decrease significantly from reference level. Disturbance: no significant displacement of birds attributable to human disturbance from reference level. *Source: East of England Regional Spatial Strategy Habitats Directive Assessment Report, (December 2006), ERM Ltd.*
Component SSSIs	Component SSSI condition status.

<table>
<tr><th></th><th colspan="6">Sandlings SPA</th></tr>
<tr><td></td><td colspan="6"><table>
<tr><th>SPA component site</th><th>Favourable</th><th>Unfavourable recovering</th><th>Unfavourable no change</th><th>Unfavourable declining</th><th>Destroyed, part destroyed</th></tr>
<tr><td>Blaxhall Heath SSSI</td><td>100%</td><td>0%</td><td>0%</td><td>0%</td><td>0%</td></tr>
<tr><td>Leiston – Aldeburgh SSSI</td><td>48.87%</td><td>51.13%</td><td>0%</td><td>0%</td><td>0%</td></tr>
<tr><td>Sandlings Forest SSSI</td><td>100%</td><td>0%</td><td>0%</td><td>0%</td><td>0%</td></tr>
<tr><td>Snape Warren SSSI</td><td>100%</td><td>0%</td><td>0%</td><td>0%</td><td>0%</td></tr>
<tr><td>Sutton and Hollesley Heaths SSSI</td><td>0%</td><td>80.44%</td><td>2.44%</td><td>17.12%</td><td>0%</td></tr>
<tr><td>Tunstall Common SSSI</td><td>100%</td><td>0%</td><td>0%</td><td>0%</td><td>0%</td></tr>
</table></td></tr>
<tr><td>Key Environmental Conditions (factors that maintain site integrity</td><td colspan="6">Key supporting habitats for Annex I species (Woodlark and Nightjar)

Coniferous woodland

Young plantation and rotational clearfell provides suitable nesting habitat for both Nightjar and Woodlark and due to the reduction and fragmentation of their native heathland these species have become increasing reliant on cleared areas of coniferous forest. The most important measure is to maintain a diversity of age ranges within the forest and to ensure a constant supply of clearfell from year to year (ideally cleared areas should be 2 to 8ha). Sandlings Forest SSSI, the largest of these, is dominated by commercial forestry. Within the forest, large areas of open ground suitable for Woodlark and Nightjar were created by storm damage in 1987.

All cleared areas and also open ground adjacent to the forest edge, should consist of predominantly low vegetation (grass, heather) 20-60cm with frequent bare areas (greater than 2 m^2) for nesting and roosting. The presence of scattered trees and open scrub not exceeding 15% cover overall will provide suitable nesting habitat and song posts for Nightjar and Woodlark. Low intensity grazing, cutting or mowing may be needed to</td></tr>
</table>

	Sandlings SPA
	maintain open conditions. Some additional management may be required to remove any dense bracken or scrub invasions or to control tree encroachment where this begins to impact on the open nature of the heath. Disturbance should be kept to a minimum; especially in clear felled areas which may support ground nesting birds. Management should ensure that necessary measures are undertaken to control recreational and other activities such as fire setting and vehicle scrambling. Suitable measures may include a system to allow for the effective control of fires, such as fire breaks, access for fire-fighting vehicles and emergency water, as well as the careful management of public access. **Heathland** Management should seek to maintain the open nature of the heath and promote a varied structure of uneven-aged stands of native heathers and other characteristic plants. Without such management, heathland becomes progressively dominated by bracken, gorse and eventually trees will invade. Low intensity grazing and cutting / mowing can both be used to suppress scrub encroachment and encourage a diversity of age structures. Disturbance should be kept to a minimum to avoid impacts on nesting Woodlark and Nightjar. **Other** Nightjar forage several kilometres from nest site, a matrix of habitats including coniferous woodland, scrub, wet woodland and areas of continuous cover are important for feeding. *Source: A statement of English Nature's views about the management of Snape Warren Site of Special Scientific Interest (SSSI) and A statement of English Nature's views about the management of Sandlings Forest Site of Special Scientific Interest (SSSI)*
SPA Condition Assessment	See condition assessment for SSSI component units.
Vulnerabilities (includes existing pressures and trends)	Maintenance of open areas in the future relies on clear felling as the main silvicultural practice and the maintenance of some areas earmarked for Woodlark and Nightjar habitat. These objectives are included in the East Anglia Forest District Strategic Plan.

	Sandlings SPA
	On the heathland SSSIs, lack of traditional management has resulted in the heathland being subjected to sucessional changes with the consequent spread of bracken, shrubs and trees. This is being addressed through habitat management work under the Countryside Stewardship Scheme and Tomorrows Heathland Heritage, and is resulting in the restoration of more typical heathland habitat favourable to both Nightjar and Woodlark. Human influences on the site include the frequent presence of travellers' caravans. This is a longstanding problem, and a variety of mechanisms are utilised to keep them from the heathland; the digging of trenches and construction of earth barriers around the borders of sites is proving effective. *Source: Natura 2000 Standard Data Form*
Landowner/ Management Responsibility	• Various/ private, RSPB, Suffolk Wildlife Trust, Suffolk Sandlings Group
HRA/AA Studies undertaken that address this site	**East of England Regional Spatial Strategy Habitats Directive Assessment Report**, (December 2006), ERM Ltd and **East of England Plan Review: Habitats Regulations Assessment (Incorporating Appropriate Assessment)** Scoping Report Draft (November 2008) Initial review concluded that only a relatively small number of the Plan's policies would or could have adverse effects on a small number of European sites, not including this site. **Waveney Local Development Framework: Habitat Regulations Screening Report** to accompany the Core Strategy Submission Document (January 2008) The Waveney Core Strategy directs most new development to previously developed land within the existing boundaries of towns and larger villages. No European sites fall within development boundaries. The policies contained in the Core Strategy policies are not judged to have any significant impacts on European sites. Site Specific Allocations will be dealt with in a later Development Plan Document. A Habitats Regulations screening report will then be carried out for that document to determine whether the specific locations of development arising from the Core Strategy (for example. new housing and employment land) will have a significant impact on European sites.

	Sandlings SPA
	HRA of the Suffolk Minerals Core Strategy, September 2007 The initial Stage 1 Appropriate Assessment has concluded that there are no likely significant impacts on the integrity of Suffolk's European sites. Whilst negative impacts have been discussed, it has been shown that policies and mitigation measures can be put in place to ensure that the appropriate species and habitats will be protected. **Appropriate Assessment of the Suffolk Coast and Heaths Area of Outstanding Natural Beauty Management Plan, 2007** Because of the clearly stated aims and objectives of The Plan to conserve and enhance natural beauty (which includes biodiversity), it is forecast that there will be little in the way of negative impacts on any qualifying feature of any European site. It is possible, however, that the increasing demand for recreation recognised by The Plan could bring people into conflict with biodiversity. This possible negative impact is mitigated by the clear statement in Section 1 that "…the demand for recreation should be met so far as this is consistent with the conservation of natural beauty. In summary, there are sufficient mechanisms to ensure that this potential is examined in detail and appropriate action taken to stop adverse impacts. **Regulation 48 Appropriate Assessment for Suffolk Minerals Site Allocations – Preferred Options: Extension of Henham Park Quarry,** February 2009 The proposed increase in the existing sand and gravel extractions from Henham Park Quarry, as outline in Suffolk County Council's Minerals Specific Site Development Plan Consultation Document, required an Appropriate Assessment in relation to potential impacts on Minsmere to Walberswick SPA and Ramsar site as well as Benacre to Easton Bavents SPA. This concluded that subject to working hours and methods, there is a small possibility that overwintering birds in this area could suffer from disturbance in their flight patterns to and from their feeding grounds as well as a possible loss in some foraging habitat. Based upon the assumption that there will be no interception of water flowing into any of the designated sites it was concluded that it is unlikely that there will be any readily identifiable negative impacts (not mentioned above upon the Minsmere to Walberswick SPA and Ramsar Site and the Benacre to Easton Bavents SPA.

Site Name: Outer Thames Estuary

- **Location: 1154431E/51342546N**
- **JNCC Site Code: Not yet allocated**
- **Size: 393734.18 ha**
- **Designation: SPA**

The majority of information for the Outer Thames SPA has been obtained from Natural England Consultation documents found at the following location: http://www.naturalengland.org.uk/ourwork/marine/sacconsultation/default.aspx

	Outer Thames Estuary SPA
Site Description	The Outer Thames Estuary SPA is located in the southern part of the North Sea on the east coast of England between the counties of Essex (on the north side) and Kent (on the south) and extends as a broad opening into the North Sea. The site is the most important site in the UK for Red-throated Divers (*Gavia stellata)* that are not breeding (the estuary supports on average 38% of the British wintering population) and comprises areas of shallow and deeper water, high tidal current streams and a range of mobile sediments (mud, silt, sand and gravel), including sandbanks and channels. As most of the SPA lies beyond the mean low water mark, it is likely to be in a relatively natural state, other than localised impacts of maintenance dredging, oil and gas exploration, wind farm construction and commercial fishing. The sandbanks of the estuary provide important nursery and feeding grounds for many fish species, including herring and sprats, which are among the main prey species of the Red-throated Diver.
Qualifying Features	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: Over winter; **Red-throated Diver** - 6486 individuals wintering between 1989-2006/07. The site is the most important wintering site for this species in the UK and represents at least 1% of the GB wintering population.

	Outer Thames Estuary SPA
Conservation Objectives	Subject to natural change, maintain in favourable condition the internationally important populations of the regularly occurring Birds Directive Annex I Species: Red-throated Diver – and its supporting habitats and species. Relevant habitats include shallow coastal waters and areas in the vicinity of sub-tidal sandbanks.
Component SSSIs	None
Key Environmental Conditions (factors that maintain site integrity	Wintering Red-throated Divers occur mainly in waters between 0-20m deep (less frequently in depths of around 30m) and in areas with extensive sandy substrate. Sublittoral, shallow (<20m) sandbank habitat is therefore very important for this species. There is also some evidence of association with areas of salinity change (for example, where low salinity river water meets higher salinity sea level water). Such areas tend to fluctuate with state of tide, volume of river flow and wind conditions. The diet of the Red-throated Diver is principally small fish of a variety of species (particularly of the cod family, herring and sprats) and there is evidence to suggest that, in some areas, the higher numbers of birds are associated with shoals of sprats.
SPA Condition Assessment	N/A
Vulnerabilities (includes existing pressures and trends)	Red-throated Divers in the Outer Thames Estuary are sensitive to the following: **Physical loss of supporting habitat (**for example, offshore development, disposal of dredge spoil) Physical loss by removal or smothering of any of the habitats on which Red-throated Divers depend may result in the loss of foraging sites and, therefore, the reduction of a food resource for the overwintering population. **Physical damage to habitat** (for example, siltation, abrasion, selective extraction) Red-throated Divers are known to associate with sandbank features and, although benthic sandbank communities are in general relatively resilient to physical damage, repeated damage to the habitats on which

	Outer Thames Estuary SPA
	the species depends may result in a reduction in their value as foraging sites for the overwintering population. **Non physical disturbance** Red-throated Divers are highly sensitive to non-physical disturbance by noise and visual presence during the winter. Feeding can be disturbed by movements of objects (for example, boats, wind turbine rotors) and increases in noise disturbance displacing birds from their feeding grounds. This can cause birds to cease feeding or fly away and, in response, they could a) increase their energy requirements at their present (disturbed) feeding sites or b) move to an alternative less favoured feeding or roosting site. Such a response affects energy budgets and food intake and possibly survival. Over-wintering birds, which are frequently subject to harsh weather conditions and must lay down fat reserves in order to migrate to breeding grounds, are particularly susceptible to adverse effects resulting from disturbance. **Toxic contamination of Red-throated Divers and their supporting habitats** A number of operators will discharge effluent upstream into the Thames Estuary and into the adjacent coastal waters (including low levels of radionuclides and heavy metals). Significant dilution of these low inputs together with high energy environments associated with sandbanks mean that the habitat has a moderate sensitivity to toxic contamination from these sources. In the case of the Red-throated Diver, the sensitivity to synthetic chemicals such as PCBs is moderate. PCBs accumulate through the food chain in the tissues of marine organisms and could be considerable once they reach the fish on which Red-throated Divers feed. If marine pollution were to occur there is the potential for exposure to PCBs to change. Large oil and chemical spills affecting shallow sandbank habitats can have a detrimental effect on bird populations by significantly affecting food sources and presenting a threat to diving and feeding seabirds. Birds are particularly vulnerable when moulting. Dispersants used to disperse the oil may also be harmful to the species. Princes Channel, which runs through the southern area of the Outer Thames SPA, carries a significant amount of vessel traffic in and out of the ports of the Thames Estuary. In addition, Fisherman's Gat is an active commercial shipping channel and smaller vessels use the shallower inshore channels across the site. The risk of contamination by accidental spillages of fuel or cargo is therefore increased and a small level of contamination will exist as a result of normal shipping activities. Large ports in the area also increase the risk of exposure.

	Outer Thames Estuary SPA
	Non-toxic contamination of Red-Throated Divers and their supporting habitats Non-toxic contamination through nutrient loading, organic loading and changes to thermal regime could impact upon prey species and distribution. Non toxic contamination through the impact from an oil spill could be significant. Oil on the feathers of birds could lead to loss of insulation, reduced buoyancy and possible drowning. **Selective extraction of prey species** Removal of fish species and larger molluscs, for example, can have significant impacts upon the structure and functioning of benthic communities over and above the physical effects of fishing methods, particularly as some fish species fill upper roles in the trophic web. In addition, it has the potential to directly remove prey species. The mechanisms for these pressures to impact upon Red-throated Divers may be a direct or indirect reduction in food availability for the overwintering population. **Non-selective extraction of Red-throated Divers** Non-selective extraction can occur through entanglement in nets or through bird strike. Static nets can be considered a significant risk to the species through entanglement and reduction of food availability. Entanglement in static nets is a major cause of known mortality in Red-throated Divers. Impacts may also occur from collision with wind turbines if birds fly at a height above 20m. However, it has been observed that they generally fly below this height.
Landowner/ Management Responsibility	Crown Estate. Activities within SPA (as noted in Departmental Brief: Outer Thames Estuary pSPA November 2009) include: • Commercial fisheries (approximately 180 commercial fishing boats operate within the area, fishing for sole, cod, bass, ray, sprats, plaice, herring and eels); • Shellfish harvesting (the cockle industry is the largest in the UK). • The Port of London is one of the UK's largest ports, with over 80 terminals handling cargo along the Thames (Port of London Authority (PLA)is the body responsible for navigation in the tidal Thames. • Aggregate extraction – occurs from a number of licensed areas operating under the umbrellas of the Anglian Offshore Dredging Association and the Thames Estuary Dredging Association;

	Outer Thames Estuary SPA
	• Windfarms and associated on-shore cabling for connections to the National Grid. Scroby Sands Wind Array comprising 30 turbines off the Norfolk Coast has been operational since 2004 and the southern end of the wind farm is within the SPA area. • Recreation – marine activities include sailing, boat trips, bird watching, sea angling, water sports and scuba diving (majority of these activities occur within the inshore waters).
HRA/AA Studies undertaken that address this site	No specific HRA/AA studies have been found in relation to the effects of development plans or projects on the Outer Thames Estuary SPA designation, but various Environmental Impact Assessments and Strategic Environmental Assessments are also relevant: • Aggregate Application Areas – Crown Estate data (www.thecrownestate.co.uk/dredge_areas_statistics) indicate that the industry is investigating potential for extraction in areas located partially in the SPA. Marine aggregate extraction is a heavily regulated activity (on-going and new plans or projects) • Gas Storage Pipeline –A number of pipe routes have been reviewed for transporting the CO_2 from The Thames Cluster to the Hewett Gas Field, including an off-shore route which would pass through the SPA for approximately 143km (Capturing carbon, tackling climate change: A vision for a CCS cluster in the South East, E-ON, April 2009). No environmental supporting information was available for the above proposal; however, it is likely that vessels used to maintain, supply or construct structures in the SPA could result in potentially significant levels of disturbance on the Red-throated Divers. In addition if the gas pipe lines within the site were to leak, this could potentially cause toxic contamination of the site (though this is likely to be a temporary impact). • Gunfleet Sands Wind Farm (Round 2). The proposed GS2 extension is a 64MW offshore wind farm comprising up to 22 turbines and associated inter-turbine cables off the coast at Clacton-on-Sea. An Environmental Statement for GS Round 2 was prepared in June 2007 and took into account the possible future designation of the Outer Thames SPA. Extensive surveys showed that GS2 is located in an area of relatively low bird density although species are present that are of conservation importance, including Red-throated Diver. A systematic assessment of the potential impacts on birds arising from the proposed construction, operation and decommissioning of the wind farm, alone and in-combination with other developments in the Thames Estuary has been undertaken. Potential impacts assessed included displacement from the wind farm site due to the presence of turbines, collision mortality, habitat loss and the risk of creating a `barrier` to migratory birds. Possible effects upon the Thames Estuary SPA were also assessed and it was predicted that GS2, either alone or in-

	Outer Thames Estuary SPA
	combination with other developments or activities, will have no impact upon the SPA. • London Array Wind Farm. Phase 1 will consist of up to 175 turbines covering an area of approximately 100km^2. Phase 2 of the London Array Project has consent but permission to construct is dependent on the results of the monitoring from Phase 1 demonstrating no significant impact on the Red-throated Diver population. The Environmental Statement for the London Array Wind Farm is not available. HRA/AA would not have been carried out as the SPA had not been identified at that time of the project being proposed. The noise from pile driving the monopiles and the noise and visual presence of vessels used for construction are likely to disturb and displace Red-throated Divers (Outer Thames pSPA Draft Consultation Impact Assessment, November 2009). There is a licence condition for the development which specifies that from 1st November to 31st March al vessels involved in construction operations must approach the site from the south using main shipping channels and leave by the same route to minimise any potential disturbance to Red-throated Divers. • Fisheries. The impacts of the fisheries industry on the SPA is difficult to predict given the paucity of information on the likely intensity of fishing over the next ten years. The presence of vessels fishing in the site could potentially disturb and displace Red-throated Divers, particularly in the areas where there are more productive fisheries. In addition, fishing could directly reduce the abundance of fish that the designated species feed upon, both through extraction of target species and as by-catch

Ramsar Sites

Site Name: Alde - Ore

- **Location: 520458 N/ 013303 W**
- **JNCC Site Code: UK11002**
- **Size: 2546.99 ha**
- **Designation: Ramsar**

	Alde-Ore Ramsar
Site Description	The site comprises the estuary complex of the rivers Alde, Butley and Ore, including Havergate Island and Orfordness. There are a variety of habitats including, intertidal mudflats, saltmarsh, vegetated shingle (including the second-largest and best-preserved area in Britain at Orfordness), saline lagoons and grazing marsh. The Orfordness/Shingle Street landform is unique within Britain in combining a shingle spit with a cuspate foreland. The site supports nationally-scarce plants, British Red Data Book invertebrates, and notable assemblages of breeding and wintering wetland birds.
Qualifying Features	Ramsar criterion 2 The site supports a number of nationally-scarce plant species and British Red Data Book invertebrates. Ramsar criterion 3 The site supports a notable assemblage of breeding and wintering wetland birds. Ramsar criterion 6 – species/populations occurring at levels of international importance. Qualifying Species/populations (as identified at designation): Species regularly supported during the breeding season: Lesser Black-backed Gull, *Larus fuscus graellsii*,: W Europe/Mediterranean/W Africa 5790 apparently occupied nests, representing an average of 3.9% of the breeding population (Seabird 2000 Census) Species with peak counts in winter: Pied Avocet, *Recurvirostra avosetta*, Europe/Northwest Africa 1187 individuals, representing an average of 1.6% of the population (5 year peak mean 1998/9-2002/3) Common Redshank, *Tringa totanus totanus*, 2368 individuals, representing an average of 2% of the GB population (5 year peak mean 1998/9-2002/3) Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.

<table>
<tr><th></th><th>Alde-Ore Ramsar</th></tr>
<tr><td>Conservation Objectives</td><td>• No conservation objectives currently available for this site.</td></tr>
<tr><td>Component SSSIs</td><td>Component SSSI (45 units) condition status.
<table>
<tr><th>SAC component site</th><th>Favourable</th><th>Unfavourable recovering</th><th>Unfavourable no change</th><th>Unfavourable declining</th><th>Destroyed, part destroyed</th></tr>
<tr><td>Alde-Ore Estuary SSSI</td><td>75.96</td><td>2.10%</td><td>0.59%</td><td>21.36%</td><td>0%</td></tr>
</table></td></tr>
<tr><td>Key Environmental Conditions (factors that maintain site integrity</td><td>Key supporting habitats for qualifying features:

Estuaries

In the absence of constraints such as flood banks and hard defences, the estuary would adjust to sea level rise by inland translocation of intertidal habitats. Where constraints occur, space to accommodate greater volumes of water is compressed and the extent and quality of intertidal habitats declines.
Lesser Black-backed Gulls are generalist feeders and the shallow waters within the site form an important feeding ground for this species.
Saltmarsh (including higher saltmarsh grading into neutral grassland) provide important breeding and roosting areas for Redshank (compared to other wading birds, Redshank will feed on the higher areas of intertidal mudflat, in muddy creeks found within saltmarsh and on the saltmarsh itself). Saltmarsh will also occasionally be used by feeding Lesser Black-backed Gulls.

Coastal saltmarsh

• Where saltmarshes require management this has traditionally been achieved by grazing, and previously used regimes should be continued. However, where there has not been a history of grazing, the saltmarsh will be able to maintain itself and grazing-sensitive species are likely to be present, therefore grazing should not be introduced.

• There are a number of factors that are contributing to saltmarsh change that management may need to take into consideration. These include coastal erosion as a result of coastal defence works, rising sea levels,</td></tr>
</table>

	Alde-Ore Ramsar
	variations in sediment deposition and land claim for development. **Littoral sediments (mud and sand flats)** • Good water quality and sediment quality should be maintained, and the sediment budget within the estuarine or coastal system should not be restricted by anthropogenic influences. • The location and extent of mud or sandflats is dependent on the extent to which the estuary or coast where they occur is constrained from responding to sea level rise and changing sediment regimes. Management needs to create space to enable landward roll-back to take place in response to sea-level rise, and should also allow the system to be dynamic and retain the flexibility to respond to associated changes such as the movement of physical features within the system, i.e. migrating sub tidal communities. Littoral sediments provide an important feeding and roosting area for Avocet which feeds on the ragworm *Nereis diversicolor* along the estuary from Snape to North Weir Point. The mudflats provide an important feeding and roosting area for Redshank and Lesser Black-backed Gulls. The Redshank feed in the estuary and in Stony Ditch. They feed predominantly on ragworm and lugworm, largely on the tideline, following the tide in and out. The Lesser Black-backed Gulls feed throughout the estuary on various prey items. **Vegetated shingle** • A key management requirement is to avoid or minimise surface disturbance, especially in the more open communities. Many of the vegetation types and species associated with shingle are fragile and vulnerable to damage from trampling. This breaks up the fine humus that develops in the upper layers of the shingle that is vital for the plants to survive. • Where there is a more closed vegetation cover, light grazing, by rabbits for example, may be all that is needed to prevent scrub encroachment on areas of grassland and heath. However if there is a tradition of sheep grazing, it may be beneficial to continue this practice at a low intensity. However the introduction of grazing where it has not been traditionally practiced would not be beneficial.

	Alde-Ore Ramsar
	All habitats • Habitats within the SAC are highly sensitive to inorganic fertilizers and pesticides applications of which should be avoided both within the site itself and in adjacent surrounding areas. Herbicides may be useful in targeting certain invasive species, but should be used with extreme care. Access to this site and any recreational activities within, may also need to be controlled.
Ramsar Condition Assessment	• N/A
Vulnerabilities (includes existing pressures and trends)	• **Physical loss of supporting habitats through removal** - The physical loss of areas of intertidal habitats may be caused directly through change of land use or indirectly as a consequence of changes to sedimentation processes (for example. coastal defences) as well as via the effects of smothering by artificial structures (for example. jetties) or the disposal of spoils. Activities or developments resulting in physical loss of the intertidal supporting habitats are likely to reduce the availability of feeding and roosting habitats. The intertidal mudflats and sandflats and the saltmarsh are highly sensitive to removal by land reclamation and barrage construction. Much of the saltmarsh in the estuary has been lost due to erosion, possibly as a result of sea level rise and this is being investigated by the Environment Agency. • **Noise or visual disturbance** - Water birds are disturbed by unpredictable movements of objects and increases in noise disturbance. This can displace the birds from their roosting or feeding grounds. Disturbance can prevent the birds from feeding and in response they either a) decrease their energy intake at their present (disturbed) feeding site through displacement activity, or b) move to an alternative less favoured feeding site. Such a response affects energy budgets and thus survival. At present, the issues contributing to the medium exposures on the intertidal mudflats and saltmarsh to noise and visual disturbance, appear to be boats landing and taking off on Orfordness, and associated disturbance from people and uncontrolled dogs. There may also be some disturbance from military helicopters flying over the site. The impact of all these activities needs further investigation. Boats sailing up and down the estuary are not considered a problem in terms of visual disturbance to the birds. The exposure scores, together with the high sensitivities result in high vulnerability scores for noise and visual disturbance. **Physical damage through abrasion -**The current exposure levels to physical damage for the whole estuary are

	Alde-Ore Ramsar
	considered to be low. However, there are a small number of areas where this category of operations is occurring, mainly through abrasion from trampling by people and dogs and this will require further investigation. Saltmarsh may also be physically damaged from overgrazing or eroded when boats are moored on it and when paths are worn through it to reach moored boats on foot or via vehicles. • **Contamination by synthetic and/or non-synthetic toxic compounds** - Water birds are sensitive to the accumulation of toxins through the food chain or through direct contact with toxic substances when feeding. Their ability to feed can also be affected by changes in the palatability or abundance of prey items caused by toxic contamination. It is recognised that diffuse agricultural pollution occurs in the Alde-Ore Estuary, and so there is a large possibility of synthetic compounds such as pesticides and other chemicals entering the estuary via this route. Although there is no evidence to suggest this is having a detrimental affect on bird numbers it is an issue which requires ongoing assessment. Birds can also be exposed to another source of toxic contamination through the re-mobilisation of contaminants such as TBT in the mudflats/sandflats. Activities such as bait digging which could contribute to this category of operation will need further investigation. Redshank and Lesser Black-backed Gulls are moderately sensitive to toxic contamination and the exposure is currently believed to be medium. This gives a moderate vulnerability score for the introduction of synthetic and non-synthetic compounds for all sub-features. • **Changes in nutrient and/or organic loading** - Organic or nutrient enrichment can reduce the availability of food for birds by increasing growth of algal mats on the intertidal area. It can also cause a reduction in water clarity, thereby reducing the visibility of prey items. There is a perception amongst estuary users (anecdotal) that agricultural run-off, particularly that associated with pigs, is a problem, although there are currently no pigs in the area as a result of the recent swine fever outbreak. On the other hand, a reduction in nutrient levels may cause a reduction in the biomass of invertebrates Birds are moderately sensitive to changes in nutrient and organic levels in the intertidal mudflats and shallow coastal waters. The intertidal mudflats used by the birds have a medium exposure to this type of non-toxic contamination, thus leading to moderate vulnerability scores. • **Biological disturbance through the selective extraction of species** - Bait digging can result in the selective extraction of species from the intertidal area. This may result in a localised reduction of food availability for feeding birds and the intertidal mudflats are moderately sensitive to this operation. The quantitative impacts of bait collection are unclear at present. There is also well established mariculture on the Butley River but this is

	Alde-Ore Ramsar
	not perceived as a problem.
Landowner/ Management Responsibility	• N/A
HRA/AA Studies undertaken that address this site	**East of England Regional Spatial Strategy Habitats Directive Assessment Report**, (December 2006), ERM Ltd and **East of England Plan Review: Habitats Regulations Assessment (Incorporating Appropriate Assessment)** Scoping Report Draft (November 2008) **HRA of the Suffolk Minerals Core Strategy,** September 2007 The initial Stage 1 Appropriate Assessment has concluded that there are no likely significant impacts on the integrity of Suffolk's European sites. Whilst negative impacts have been discussed, it has been shown that policies and mitigation measures can be put in place to ensure that the appropriate species and habitats will be protected. In the long term the Minerals Core Strategy aims to have a positive impact on biodiversity through appropriate restoration schemes and beneficial after-uses. For instance, the creation of new wetland habitat could go towards meeting the County's Priority Habitat Action Plan targets of at least 445 ha of new reed-bed by 2023 and the creation of new wet woodlands. **Appropriate Assessment of the Suffolk Coast and Heaths Area of Outstanding Natural Beauty Management Plan, 2007** Because of the clearly stated aims and objectives of The Plan to conserve and enhance natural beauty (which includes biodiversity), it is forecast that there will be little in the way of negative impacts on any qualifying feature of any European site. It is possible, however, that the increasing demand for recreation recognised by The Plan could bring people into conflict with biodiversity. This possible negative impact is mitigated by the clear statement in Section 1 that "…the demand for recreation should be met so far as this is consistent with the conservation of natural beauty. There are sufficient mechanisms to ensure that this potential is examined in detail and appropriate action taken to stop adverse impacts.

Site Name: Minsmere to Walberswick

- **Location Grid Ref: 521855 N / 013802E**
- **JNCC Site Code UK11044**
- **Size: 2018.92 ha**
- **Designation: Ramsar**

	Minsmere to Walberswick Ramsar
Site Description	This composite, Suffolk coastal site contains a complex mosaic of habitats, notably, areas of marsh with dykes, extensive reedbeds, mudflats, lagoons, shingle and driftline, woodland and areas of lowland heath. The site supports the largest continuous stand of reed in England and Wales and demonstrates the nationally rare transition in grazing marsh ditch plants from brackish to fresh water. The combination of habitats create an exceptional area of scientific interest supporting nationally scarce plants, British Red Data Book invertebrates and nationally important numbers of breeding and wintering birds.
Qualifying Features	Ramsar criterion 1 The site contains a mosaic of marine, freshwater, marshland and associated habitats complete with transition areas in between. Contains the largest continuous stand of reedbeds in England and Wales and rare transition in grazing marsh ditch plants from brackish to fresh water. Ramsar criterion 2 This site supports nine nationally scarce plants and at least 26 red data book invertebrates. Supports a population of the mollusc narrow-mouthed whorl snail *Vertigo angustior* (Habitats Directive Annex II; British Red Data Book Endangered), recently discovered on the Blyth estuary river walls. An important assemblage of rare breeding birds associated with marshland and reedbeds including: Bittern *Botaurus stellaris,* Gadwall *Anas strepera,* Teal *Anas crecca,* Shoveler *Anas clypeata,* Marsh Harrier *Circus aeruginosus,* Avocet *Recurvirostra avosetta* and Bearded Tit *Panurus biarmicus*
Conservation Objectives	• N/A
Component SSSIs	Component SSSIs including condition status:

<table>
<tr><th></th><th>Minsmere to Walberswick Ramsar</th></tr>
<tr><td></td><td>
<table>
<tr><th>SPA component site</th><th>Favourable</th><th>Unfavourable recovering</th><th>Unfavourable no change</th><th>Unfavourable declining</th><th>Destroyed, part destroyed</th></tr>
<tr><td>Minsmere-Walberswick Heaths and Marshes SSSI</td><td>42.88%</td><td>48.83%</td><td>0.62%</td><td>7.67%</td><td>0%</td></tr>
</table>
</td></tr>
<tr><td>Key Environmental Conditions (factors that maintain site integrity</td><td>
Key supporting habitats for qualifying features:

Vegetated shingle -This habitat type occurs on deposits of shingle lying at or above mean high-water spring tides. These shingle deposits occur as fringing beaches that are subject to periodic displacement or overtopping by high tides and storms. The distinctive vegetation, which may form only sparse cover, is therefore ephemeral and composed of annual or short-lived perennial species. Little tern require bare and sparsely vegetated shingle to nest. The main nesting areas are within the shingle bank adjacent to Minsmere RSPB reserve. Little Terns and Avocet also nest behind the shingle bank at Walberswick.

Heathland -The heathland of Minsmere forms part of a RSPB reserve. The site management plan includes actions to ensure that open heathland is maintained and areas of scrub and bracken are cleared from former heath. The rare Silver-studded Blue Butterfly present on this site requires the maintenance of a very short heather turf and warm ground conditions associated with pioneer heath communities. This habitat also supports important populations of breeding Nightjar and Woodlark.

Shallow coastal water –The artificial lagoons forming part of the RSPB reserve at Minsmere support a significant number of breeding Avocet as well as large numbers of waterfowl (breeding Shoveler, Gadwall, Teal and Shelduck) as well as feeding Little Tern.

Intertidal mudflat – Provide an important feeding and roosting area for Avocet which feeds on the ragworm Nereis diversicolor.

Saltmarsh communities – Provide important roosting areas for Avocet.
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</table>

	Minsmere to Walberswick Ramsar
	Swamp – The site supports the largest continuous stand of Common Reed in England and Wales (Westwood Marshes) and this habitat is of major importance for breeding and wintering Bittern, Marsh and Hen Harriers as well as Bearded Tit. The floodplain fen and reed need to be managed by periodic cutting or in places grazing, and by the management of water levels. Wet woodland and scrub will need to be controlled to ensure its spread does not significantly alter the proportions of the mosaic. **Wet grassland** – This habitat occurs on land that is subject to periodic flooding or has a seasonally high water table and is waterlogged for much of the year and is an important habitat for breeding waders (for example. Avocet, Gadwall, and Shoveler) and wintering wildfowl. This habitat requires active management to maintain its conservation interest: each year's growth must be removed to prevent the sward from becoming dominated by tall vigorous grasses – this can be achieved by grazing (cows, sheep or horses) between late spring and early autumn; a mosaic of winter flooded grassland and permanently un-flooded grassland. **Other habitats** - Within the estuary Marsh Harriers breed in locally abundant areas of rough vegetation on dyke edges and river walls. *V. angustior* is found primarily in open, damp habitats on friable soils that are kept moist by shading from moderately tall herbaceous or grassy vegetation. Although it requires microhabitats with high humidity levels it is not tolerant of deep or prolonged inundation. Drought causes the snails to retreat to within the soil and they are generally absent from habitats that have dry substrates for long periods of the summer. The vegetation may be grazed by livestock, although over-grazing can be detrimental. The snails have an annual lifecycle and probably feed on micro-fungi growing on decaying plant material in the litter layer.
Ramsar Condition Assessment	See SSSI condition.
Vulnerabilities (includes existing pressures and trends)	Key issues facing the site and its qualifying interest features include: Shingle habitat is highly sensitive to physical damage from abrasion. The areas at Minsmere are particularly popular areas for recreation and are therefore prone to damage by trampling and have been given a high exposure score. Combined with the high sensitivity this gives a high vulnerability. Lack of appropriate management -Bitterns are particularly vulnerable to loss of suitable breeding and feeding

	Minsmere to Walberswick Ramsar
	areas in fens and reedbeds through natural succession and lack of appropriate management (particularly cutting and water management) and loss of appropriate open water/reedbed interface. *V. angustior* is also vulnerable to the effects of under-grazing / lack of management in salt marsh and fen habitats as it cannot tolerate over-shading. Sea level rise and policies for flood defence and the impact of managed retreat can also impact on Bittern habitat as can unseasonal freshwater flooding, especially during the nesting season. *V. angustior* is also vulnerable to loss of habitat through sea level rise. Marsh Harriers often breed within winter cereals outside of designations and so are at risk of coming into conflict with farmers as well as being disturbed / injured if crops are harvested before the young have fledged. Hen harriers may also be vulnerable to direct persecution. Food availability for Bitterns, especially eels, can be affected by inappropriate management of watercourses. There may be some toxic contamination through the introduction of radionuclides from Sizewell nuclear power station. The extent and effects of this on bird and fish populations are likely to be low and thus a low vulnerability score has been given but this will require further investigation. Toxic contamination may also affect bird populations indirectly by affecting the abundance of their food items. Birds can also be exposed to another source of toxic contamination through the re-mobilisation of contaminants such as TBT in the mudflats/sandflats. This may then in turn affect prey items and will require further investigation. Marsh Harriers and Hen Harriers are both susceptible to the effects of toxins through bioaccumulation. There may be some changes in thermal regime from the discharges from the power station but the effects of this on the prey items of the Little Terns is likely to be low and thus a low vulnerability score has been given but this will require further investigation. *Source: Suffolk Biodiversity Action Plan: Bittern Species Action Plan, Little tern Species Action Plan, Woodlark Species Action Plan, Nightjar Species Action Plan and English Nature (2001) English Nature's*

	Minsmere to Walberswick Ramsar
	advice for the Benacre to Easton Bavents European Marine given under Regulation 33(2) of the Conservation (Natural Habitats and c.) Regulations 1994
Landowner/ Management Responsibility	Various/ private
HRA/AA Studies undertaken that address this site	**East of England Regional Spatial Strategy Habitats Directive Assessment Report**, (December 2006), ERM Ltd and **East of England Plan Review: Habitats Regulations Assessment (Incorporating Appropriate Assessment)** Scoping Report Draft (November 2008) **Waveney Local Development Framework: Habitat Regulations Screening Report** to accompany the Core Strategy Submission Document (January 2008) The Waveney Core Strategy directs most new development to previously developed land within the existing boundaries of towns and larger villages. No European sites fall within development boundaries. The policies contained in the Core Strategy policies are not judged to have any significant impacts on European sites. Site Specific Allocations will be dealt with in a later Development Plan Document. A Habitats Regulations screening report will then be carried out for that document to determine whether the specific locations of development arising from the Core Strategy (for example. new housing and employment land) will have a significant impact on European sites. **HRA of the Suffolk Minerals Core Strategy,** September 2007 The initial Stage 1 Appropriate Assessment has concluded that there are no likely significant impacts on the integrity of Suffolk's European sites. Whilst negative impacts have been discussed, it has been shown that policies and mitigation measures can be put in place to ensure that the appropriate species and habitats will be protected. **Appropriate Assessment of the Suffolk Coast and Heaths Area of Outstanding Natural Beauty Management Plan, 2007** Because of the clearly stated aims and objectives of The Plan to conserve and enhance natural beauty (which

	Minsmere to Walberswick Ramsar
	includes biodiversity), it is forecast that there will be little in the way of negative impacts on any qualifying feature of any European site. It is possible, however, that the increasing demand for recreation recognised by The Plan could bring people into conflict with biodiversity. This possible negative impact is mitigated by the clear statement in Section 1 that "…the demand for recreation should be met so far as this is consistent with the conservation of natural beauty. In summary, there are sufficient mechanisms to ensure that this potential is examined in detail and appropriate action taken to stop adverse impacts. **Regulation 48 Appropriate Assessment for Suffolk Minerals Site Allocations – Preferred Options: Extension of Henham Park Quarry,** February 2009 The proposed increase in the existing sand and gravel extractions from Henham Park Quarry, as outline in Suffolk County Council's Minerals Specific Site Development Plan Consultation Document, required an Appropriate Assessment in relation to potential impacts on Minsmere to Walberswick SPA and Ramsar site as well as Benacre to Easton Bavents SPA. This concluded that subject to working hours and methods, there is a small possibility that overwintering birds in this area could suffer from disturbance in their flight patterns to and from their feeding grounds as well as a possible loss in some foraging habitat. Based upon the assumption that there will be no interception of water flowing into any of the designated sites it was concluded that it is unlikely that there will be any readily identifiable negative impacts (not mentioned above upon the Minsmere to Walberswick SPA and Ramsar Site and the Benacre to Easton Bavents SPA.

Appendix 2: Plans and Programmes Review

Regional

Plan	Potential impacts that could cause 'in-combination' effects
Suffolk Structure Plan (2001)	• Increased disturbance from recreational walkers, use of the rivers (for example yachts, jet skis etc.), • Housing and employment growth may lead to increased transport movements - the potential for in-combination effect is greater where housing sites are in proximity to European sites. • Disturbance from construction processes including infrastructure needed to support new development • Disturbance from new street lighting and other artificial illumination • Increased risk of pollution of water courses • Potential damaging affects upon hydrology including flow levels • Increased atmospheric pollution from construction, use, recreational impacts.

Suffolk County Council Minerals Core Strategy (2008)	• The potential sources of impact to the European sites that may arise from the construction or operation of these types of facility are as follows:
	  ◦ Physical disturbance of sites;
	  ◦ Flooding and water quality, including extraction below the water table;
	  ◦ Noise from road traffic and operation of the plants;
	  ◦ Air emissions from road traffic (including dust); and
	  ◦ Human presence.
	• A Habitat Regulations assessment of the of the Minerals Core Strategy Preferred Options has been conducted and concludes that there will not be any significant impacts, so there is therefore no requirement for an Appropriate Assessment to be carried out. It has been shown that policies and mitigation measures can be put in place to ensure that the appropriate species and habitats will be protected.
	• In the long term the Minerals Core Strategy aims to have a positive impact on biodiversity

Plan	Potential impacts that could cause 'in-combination' effects
	through appropriate restoration schemes and beneficial after-uses. For instance, the creation of new wetland habitat could go towards meeting the County's Priority Habitat Action Plan targets of at least 445 ha of new reed-bed by 2023 and the creation of new wet woodlands.
Suffolk County Council: Minerals and Waste Development Framework – Waste Core Strategy Waste Issues and Options Part II (for consultation, 2008)	• Potential impacts include land take; increased transport movements; dust/noise and odour associated with industrial processes; contamination/accumulation of toxic substances; waste water; topography alteration; and aggregates removal. • An ecological assessment of all the sites proposed by Suffolk County Council and included for the location of residual waste treatment facilities has been undertaken as part of the aforementioned consultants studies to determine the need for Appropriate Assessment (AA) in line with the Conservation (Natural Habitats, and c.) Regulations 1994. • Site 2 Sproughton and Site 26 Shepherds Grove were identified as likely to require an AA. It was considered that Site 28 Masons Quarry might require an AA, whereas Site 27 Eye and Site 29 SCC Depot Gt Blakenham were considered unlikely to require an AA. Dialogue has been initiated with Natural England with a view to carrying out AA where required and confirming where AA is not required. However, none of the Natura sites in question are relevant to this report.
Suffolk County Council Local Transport Plan (2006)	• Potential impacts include increased transport movements; dust/noise/odour associated with transport; landtake; impacts on surface water run-off; and construction such as laying pipes/cables.
Lowestoft Ness to Languard Point Subcell 3C Draft Policy Summary PDZ4 – Dunwich Cliffs to Thorpeness	• Options for managed realignment being considered for more sustainable, longer term management of this section of coastline. The strategy for the sections of coast to the north (Minsmere South) and south (Sizewell Cliffs) is to have 'No Active Intervention' whilst the defences will be maintained at Sizewell. • Potential for large scale habitat loss, notably from saline inundation of freshwater habitats for example extensive reedbeds within Minsmere-Walberswick SPA as well as disturbance to shingle ridges.
East Suffolk Catchment Abstraction Management Strategy (2008)	• Under the Habitats Regulations1 EA (as competent authority) have to assess the effects of existing abstraction licences and any new applications to make sure they are not impacting on internationally important nature conservation sites. • If an assessment shows that a new application could have an impact on an SAC/SPA the EA

Plan	Potential impacts that could cause 'in-combination' effects
	follow strict rules in setting a time limit for that licence. These are: • if it cannot be determined that your application will not affect the site EA have to either put conditions on the licence so that it cannot affect the site or refuse the application; • EA may be able to grant the licence but only with a short time limit so we can be confident it is not having an effect on the site; • in some instances it may be possible to issue the licence with additional conditions. This may include monitoring the impact of licence and altering licence if necessary. • Water related European sites and the relevant WRMU / GWMU: • Alde-Ore Estuary SAC / SPA / Ramsar: GWMU 9 – Coastal crag associated with the Alde/Ore and Deben Estuaries: (currently over-abstracted) • Benacre to Easton Bavents Lagoon SAC / SPA: WRMU 1 – Lothingland Hundred Lagoon (currently water available) / GWMU 8 – Northern Coastal Crag (currently over-licensed) • Dews Pond SAC: WRMU 2 – River Wang and Blyth Estuary Coastal Crag (currently no water available) • Minsmere to Walberswick Heaths and Marshes SAC / SPA / Ramsar: WRMU 2 – River Wang and Blyth Estuary Coastal Crag (currently no water available) / WRMU 3 – River Blyth (currently water available) / WRMU 4 – River Yox (currently no water available).

Local

Plan	Potential impacts that could cause 'in-combination' effects
Suffolk Coastal Local Development Framework (2008)	• Increased disturbance from recreational walkers, use of the rivers (for example yachts, jet skis etc.), • Housing and employment growth may lead to increased transport movements - the potential for in-combination effect is greater where housing sites are in proximity to European sites. • Disturbance from construction processes including infrastructure needed to support new development • Disturbance from new street lighting and other artificial illumination • Increased risk of pollution of water courses • Potential damaging affects upon hydrology including flow levels • Increased atmospheric pollution from construction, use, recreational impacts. The following policies have been screened as likely to require an Appropriate Assessment, and are of relevance to this HRA: • Policy SP5 – Improving tourism could lead to increased pressures on Sandlings SPA and Alde /Ore Estuary SAC / SPA / Ramsar. • Policy SP7 – Further development in and around Leiston could result in increased pressures upon nearby sites including Minsmere – Walberswick SAC / SPA / Ramsar and Sandlings SPA. • Policy SP9 – Increased development is likely to increase pressure on all European sites within the study area. • Policy SP10 – Increased tourist activity is likely to result in negative impacts upon nearby European sites, namely Sandlings SPA and Alde – Ore Estuary SPA / SAC / Ramsar.
Waveney District Council Local Development Framework (2008)	Generic effects related to development/ growth scenarios include: • Potential for land take/ habitat fragmentation • Increased demand for water resources/ abstraction/ hydrological impacts • Increased traffic movements, contributions to atmospheric pollution loading

Plan	Potential impacts that could cause 'in-combination' effects
	• Growth in requirements for waste management facilities, increased demand for minerals • Increased recreational pressure from existing/ new populations • The policies in the Waveney Core Strategy are not considered to have any significant impact on European sites, either alone or in combination with other plans and strategies. This conclusion has been reached in consultation with Natural England. Therefore it has not been necessary to carry out a full Appropriate Assessment of the Core Strategy document.

Other plans and programmes

Plan	Potential impacts that could cause 'in-combination' effects
Suffolk Coast and Heaths AONB Management Plan (2007)	Potential impacts on European sites relevant to this study could arise as a result of the following objectives: • Climate change mitigation: This is an open ended objective in that the actual actions are currently unknown and will depend on future research. However, it could be possible for proposed actions to create significant impacts on European sites through changes to habitats. • Naturalistic habitats between Alde and Deben: The Action is to devise a strategic approach to an area of land to further its overall landscape, biodiversity and heritage value. Strategically it may be best to alter habitat management that may impact on key species for example changes to the forest and underlying heathland. • Annual access festival: A general action that seeks to increase access to all parts of the AONB could bring increased disturbance for birds that feature in the special qualities of European sites. • Sandlings Forest recreational strategy: The recreational strategy has identified at the strategic level the opportunities for changes to land management and especially increasing visitors to the forest. As the Strategy is taken forward, proposals may arise that have particular impacts on European sites. • Increase non car access: Although access by means other than cars is likely to have low level impacts, it is however and objective to increase visitor numbers and this in turn may bring disturbance pressures
Suffolk Estuarine Flood Management Strategies	**Blyth Estuary Draft Strategy**: • Potential impacts of the strategy on Minsmere – Walberswick Heaths and Marshes SAC / SPA / Ramsar include: • Over the next 5-20 years, the agricultural defences fronting Reydon and Tinkers Marshes are likely to fail to the point where they could not be repaired, and this will result in significant change to the estuary. Where this happens, inundated farmland will become tidal. Tidal inundation will reduce the freshwater grazing marsh and reedbed within the site and reduce the available habitat for bittern, bearded tit and marsh harrier

Plan	Potential impacts that could cause 'in-combination' effects
	as well as other populations of breeding and migratory waders and wildfowl. • Loss of Hen Reedbeds with associated loss of habitat for Bittern, Bearded Tit, Marsh Harrier. • Potential mitigation for the loss of freshwater and non-tidal habitats include: • Areas of farmland upstream of the A12, where low defences have already failed will be more frequently flooded in the future, and is likely to become a mixture of saltmarsh and mudflat in the lower areas, with some freshwater habitats further upstream. • A new area of reedbed will be created to replace the area that will be lost as a result of flooding of Hen Reedbed. **The Aldeburgh Coast and Estuary Strategy** • The purpose of the Aldeburgh Coast and Estuary Strategy is to produce a flood and erosion risk management plan for the study area over the next 100 years. However, flood risk management options are currently the subject of a detailed study and therefore no information on the preferred option was available. Potential impacts of the strategy on Orfordness SAC, Alde-Ore and Butley Estuaries SAC and Alde-Ore Estuary SPA, Ramsar include: • Water quality impacts during the construction of any new sea defences; • Direct habitat loss / fragmentation should the option of 'advance the line' be chosen or through the construction of new sea defences. • Indirect habitat loss as a result of coastal squeeze.
Decommissioning of Sizewell A	Possible adverse impacts on Natura sites and their qualifying interest features could arise as a result of the following mechanisms listed below. Mitigation for all of the potential impacts are described in Sizewell A Nuclear Power Station Environmental Management Plan Issue 2 (2007): • Dust Emissions (from on site): Increase in site dust emissions due to construction, demolition and waste/materials handling operations etc which could impact on residential and industrial receptors. • Inadvertent or uncontrolled disturbance or spreading of existing contaminated soils, including movement by windblown dust, entrainment in runoff, attachment to vehicles and/or inappropriate soil handling operations.

Plan	Potential impacts that could cause 'in-combination' effects
	• Mobilisation of existing contamination by direct rainwater infiltration due to changes in ground coverage and the creation of temporary open excavations. • The potential contamination of ground and groundwater due to contaminated water entering those external drains that run to soakaways. • Creation of new contaminant migration pathways (eg due to the creation of boreholes, piles or excavations connecting previously unconnected geological strata). • Inadvertent contamination of soils and/or groundwater arising from temporary storage of contaminated soils, wastes or materials. • Changes in groundwater flow/water table regime beneath nearby sites designated for their ecological value due to on site dewatering operations, if any. • Changes in North Sea water quality due to the potential release of turbid and/or contaminated water from decommissioning activities on the site.
Sandlings Forest Recreation Management Strategy	• Improved access will encourage greater visitor numbers and is likely to result in increased disturbance, especially with regards ground-nesting qualifying interest species of birds for Sandlings SPA and Minsmere to Walberswick SPA / Ramsar • Small scale habitat loss and fragmentation as a result of improved access and visitor facilities.

Plan	Potential impacts that could cause 'in-combination' effects
Plans/Programmes relating to the Outer Thames Estuary SPA	'In-combination' effects are unknown at the current time, as no other plans or programmes were noted that address this site. In combination impacts from the following current and proposed economic activities in the Outer Thames Estuary could, however, arise:[5] **Aggregate extraction** The Anglian Offshore (East Coast) region and the Thames region, within which the SPA lies, are both strategically important areas for this industry. Despite a decrease in extraction levels from the East Coast region there remain large quantities of primary aggregate indicating that ongoing extraction is likely over the next ten years. The Thames region is increasing steadily since production from newly discovered large resources started in 2005. Depending on local demand and depletion of land-won aggregates, intensity may increase in the next ten years. **Oil and Gas** It has been proposed to construct a gas interconnector between the UK and the Netherlands to import gas from Europe, which would run across the North Sea and into the Thames Estuary across the southern part of the SPA. The pipeline has not yet been consented. In addition, a gas storage pipeline has been proposed that would connect the Kingsnorth Power Station (located to the south of the SPA) to the Hewett gas field (to the north of the SPA). Of the proposed preliminary route, 143km would pass through the SPA. This has not yet been consented. In the long term, routes for transport of CO_2 to strategic carbon storage capacity could pass through the site making a significant contribution to achievement of UK carbon reduction targets. It is estimated that 190km of new pipeline to transport CO_2 could be installed in the SPA in the next 10 years. **Renewables** Two operating wind farms (Kentish Flats and Scroby Sands) are fully and partially located within

[5] The majority of information for the Outer Thames pSPA has been obtained from Natural England consultation documents found at the following location: http://www.naturalengland.org.uk/ourwork/marine/sacconsultation/default.aspx

Plan	Potential impacts that could cause 'in-combination' effects
	the site respectively. The Gunfleet Sands wind farm (which is located fully within the site) consists of a Round 1 project and a Round 2 project and is currently under construction off the Essex Coast at Clacton-on-Sea. Potential impacts on Red-throated Divers associated with the Outer Thames SPA were assessed as part of the Environmental Statement and included displacement from the wind farm site due to the presence of turbines, collision mortality, habitat loss and the risk of creating a 'barrier'. It was predicted that GS2, either alone or in-combination with other developments or activities, will have no impact upon the SPA. Construction on Phase 1 of the London Array wind farm project is likely to start in spring 2011. Phase 2 of the London Array project has consent, but permission to construct is dependent on the results of monitoring from Phase 1 demonstrating no significant impact on the Red-throated Diver population. London Array Phases I and 2 are both fully within the SPA. The noise from pile driving the monopiles and the noise and visual presence of vessels used for construction are likely to disturb and displace Red-throated Divers associated with the Outer Thames Estuary SPA (Outer Thames pSPA Draft Consultation Impact Assessment, November 2009). There is a licence condition for the development which specifies that from 1 November to 31 March all vessels involved in construction operations must approach the site from the south using main shipping channels and leave by the same route to minimise any potential disturbance to Red-throated Divers. In terms of other future development, the Crown Estate has issued an Invitation to Tender to developers for the Round 3 offshore wind farm leasing programme for the delivery of up to 25 Giga Watt (GW) in capacity of potential new offshore wind farm sites by 2020. Round 3 overlaps with 7.8% of the total area of the SPA. **Cables** A number of operational telecommunication cables pass through the site amounting to a total length of 225km. Most planned cable laying activity is replacement or upgrading of existing cables.

Plan	Potential impacts that could cause 'in-combination' effects
	Fisheries The Thames Estuary supports important commercial fisheries, as well as estuarine and marine recreational angling. Approximately 180 commercial fishing boats operate within the area of the estuary. Fishing intensity may change over the next ten years. However, it is not clear what impacts may arise as a result. **Shipping (including dredging of channels)** The Port of London is one of the UK's largest ports and the Port of London Authority (PLA) is the body responsible for ensuring safe navigation in the tidal Thames. Part of the PLA's operations is to ensure that shipping channels and berths are maintained or, in some limited cases, created. This requires occasional maintenance dredging of existing channels that have suffered from siltation or capital dredging where a new channel or berth is required. The port of Felixstowe is the UK's largest container port and is capable of handling the world's largest container ships. It is currently undergoing considerable expansion. In addition, new port capacity at Great Yarmouth is currently under construction and is expected to accommodate container traffic in various forms. **Recreation** There is a high level of use of the SPA by all forms of recreational vessels. The majority of these activities are restricted to inshore waters of the estuaries and coast, although there are a large number of yacht clubs within the SPA, which use waters further offshore. **Land based sources of pollution** Toxic and non-toxic pollutants enter the Thames Estuary and adjacent coastal waters from direct point source discharges of effluents or diffuse sources, such as agricultural run-off via rivers. These are both continuous and intermittent in nature, but are mostly highly diluted. Point source discharges are currently controlled through licensing by the Environment Agency.

Appendix 3: Likely Significant Effect (LSE) Screening Table

SIGNIFICANT EFFECTS SCREENING (INCORPORATING IN-COMBINATION ASSESSMENT)

European Sites within a 20km radius of the nominated site

	Designation	Distance from nominated site
Alde-Ore and Butley Estuaries	**SAC**	**5.5km**
Alde-Ore Estuary	**SPA**	**5.5km**
Alde-Ore Estuary	**Ramsar**	**5.5km**
Benacre to Easton Bavents Lagoons	**SAC**	**14.5km**
Benacre to Easton Bavents Lagoons	**SPA**	**14.5km**
Dew's Ponds	**SAC**	**11km**
Minsmere to Walberswick Heaths and Marshes	**SAC**	**Adjacent**
Minsmere to Walberswick	**SPA**	**Adjacent**
Minsmere to Walberswick	**Ramsar**	**Adjacent**
Orfordness-Shingle Street	**SAC**	**8km**
Staverton Park and The Thicks, Wantisden	**SAC**	**16km**
Sandlings	**SPA**	**0.7km**
Outer Thames Estuary	**SPA**	**Adjacent**

The likely significant effects of the development of the nominated site on the above listed European sites located within a 20km radius of the nominated site have been assessed. Some of these European sites have been screened out for the reasons given below. For the remaining European sites, the assessment of the likely significant effects of the construction, operation and decommissioning phases of a new nuclear power station development are presented in tabular form.

European Sites within a 20km radius of the nominated site for which likely significant impacts are not considered not to arise:

- **Dew's Ponds SAC**: This site is designated for its large breeding population of Great Crested Newt *Triturus cristatus* and comprises a series of 12 ponds set in an area of 6.74ha of predominantly arable land. The ponds range from old field ponds created for agricultural purposes to

some constructed in recent years specifically for wildlife. Some of the land has been converted from arable to grassland, with a variety of grassland types present; other habitats include hedges and ditches. Few vulnerabilities have been identified for this site, mainly due to the fact that the majority of ponds fall within a single landownership and are subject to conservation management. Key pressures at this site relate to changes in management, water quality and stocking of the ponds with fish. There are no identified 'cause-effect' pathways between the identified impacts arising from the proposed development and the known environmental conditions (and vulnerabilities) at this site which could lead to an impact on the integrity of the site. The nominated site is 11km away from the SAC (beyond the dispersal distance for Great Crested Newts) and falls within a different water catchment and as such there is no hydrological connectivity between the two areas which could potentially result in any impacts on water quality within the SAC.

- **Staverton Park and The Thicks, Wantisden SAC**: This site is representative of old acidophilous oak woods in the eastern part of its range, and its ancient oaks *Quercus* spp. have rich invertebrate and epiphytic lichen assemblages. Vulnerabilities of the oak woods include inappropriate grazing (over-grazing in particular), fires due to dense bracken cover in ground layer and unsympathetic / insufficient management, loss of veteran trees where there is a shortage of replacement trees, invasion by non-native species for example Rhododendron and air pollution. The only potential 'cause-effect' pathway between the identified impacts arising from the proposed development and the known environmental conditions (and vulnerabilities) at this site which could lead to an impact on the site relate to air quality. However, given the high level of regulatory control regarding emissions, it is considered that the SAC is sufficiently far enough away (16km to the south west of the nominated site) for any of the predicted localised air quality impacts arising as a result of the construction, operation and decommissioning of the proposed nuclear development to have dispersed sufficiently to not result in a significant effect on the integrity of the site.

- **Benacre to Easton Bavents Lagoons SAC:** This site is designated for its mixture of manmade (from shingle extraction) and natural saline lagoons comprising the Denes, Benacre Broad, Covehithe Broad and Easton Broad. These lagoons have formed behind shingle barriers and are a feature of a geomorphologically dynamic system. The main threat to the integrity of the lagoons is sea level rise, exacerbated through isostatic tilt as well as the predicted increase in erosional forces as a result of climate change. Naturally there is a landward movement of the shingle bar and this has reduced the size of the lagoons in recent years. Diffuse and point source pollution from agricultural runoff and sewage discharges can cause nutrient enrichment, which can have major detrimental effects. Coastal defence works can prevent the movement of sediments along the shore and lead to a gradual loss of natural coastal structures within which many coastal lagoons are located. Given the distance of the SAC from the nominated site (14.5km) as well as the direction (the SAC is located north along the coastline from the nominated site and studies show that there is a net movement of sediments in a north – south direction) it is considered that there are no potential 'cause-effect' pathways between the identified impacts arising from the proposed development and the known environmental conditions (and vulnerabilities) at this site which could lead to an impact on the integrity of the site.

- **Benacre to Easton Bavents Lagoons SPA:** Benacre to Easton Bavents SPA supports important populations of breeding birds, which are particularly associated with reedbed and shingle beach habitats. The reedbeds also support important numbers of Bittern Botaurus stellaris in winter. Little Terns Sterna albifrons feed substantially outside the SPA in adjacent marine waters. Marsh Harriers Circus aeruginosus and

Bittern depend on areas of open water and their fringing reedbeds. As the availability of open water is a key factor, so it is important that the dykes and pools receive appropriate management to ensure their continued use. In addition the reed needs periodic management and scrub / woodland encroachment needs to be controlled. The protection of appropriate water quality is also important, as is controlling disturbance. Given the distance and direction of the SPA from the nominated site (14.5km to the north) it is considered that there are no potential 'cause-effect' pathways between the identified impacts arising from the proposed development and the known environmental conditions (and vulnerabilities) at this site which could lead to an impact on the integrity of the site.

- **Alde-Ore and Butley Estuaries SAC, Minsmere to Walberswick Heaths and Marshes SAC** and **Orfordness-Shingle Street SAC:** 'Disturbance' effects are not considered relevant, as these SACs are designated for their habitats rather than species and therefore are not vulnerable to non-physical disturbance.

Minsmere to Walberswick Heaths and Marshes SAC

Authorities: Suffolk

Source: Construction (duration approx 5 years)

Minsmere to Walberswick Heaths and Marshes SAC Construction (duration approx 5 years)	
Water Quality	
Potential Impacts: Pathway	Potential effects on water quality and drainage from earthworks/ excavations and infrastructure provision (sedimentation, pollution incidents through water courses and cycles).
Potential effects on the SAC: Receptor	Changes in organic and nutrient loading as well as salinity can change the species composition of shingle plant communities through increased competition from other species with a more vigorous growth form. Annual vegetation of drift lines is considered moderately vulnerable to the introduction of non-synthetic compounds. Oil or chemical spills could have a direct impact on this low growing vegetation whilst the dispersants which are sometimes used in oil spills would also be likely to cause damage to growth and recovery rates. Plants of these habitats are also vulnerable to the effects of smothering through sedimentation.
Risk of Likely Significant Effect (LSE)?	Water quality has been identified as a vulnerability for this site and there is the potential for significant effects, particularly at a local level.
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Waveney District Council Local Development Framework** (water abstraction, increased effluent discharges as a result of housing / employment growth) Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks

Minsmere to Walberswick Heaths and Marshes SAC Construction (duration approx 5 years)	
Water Quality	
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Minsmere to Walberswick Heaths and Marshes SAC Construction (duration approx 5 years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth, and the emissions arising from construction activity. Likely to be restricted to a local level for example, dust/ particulates.
Potential effects on the SAC: Receptor	Air quality (nitrogen deposition) is an identified vulnerability for heathland within the SAC. Nitrogen deposition can lead to eutrophication with resulting changes to the species composition of heathland and reduced cover of ericaceous plants. Shingle communities are vulnerable to smothering from airborne particulates and suffer reduced rates of growth.
Risk of Likely Significant Effect (LSE)?	Air quality is an identified vulnerability for the SAC, and the potential effects of increased nutrient loading from air borne pollutants and smothering from dust particulates have the potential to result in a significant effect and should be considered further.
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk, Waveney District Council) increases in air borne pollutants arising from housing/ economic development, infrastructure, increase in transport.
Risk from 'In Combination' Effects?	**Waveney District Council Local Development Framework**: housing/ employment and infrastructure provision

Minsmere to Walberswick Heaths and Marshes SAC Construction (duration approx 5 years)	
Air Quality	
	could lead to habitat loss and fragmentation. Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks (in particular Blyth Estuary Strategy)
AA Required?	Yes

Minsmere to Walberswick Heaths and Marshes SAC Construction (duration approx 5 years)	
Habitat Loss and Fragmentation	
Potential Impacts: Pathway	Construction of infrastructure, extension of site into 'buffer' habitats, construction of marine landing facility and coastal and flood protection measures.
Potential effects on the SAC: Receptor	Tidal regime and natural erosional forces are critical to maintenance of SAC features. Any coastal defence or marine landing structures which impede sediment flows along the coastline could change erosion / depositional patterns affecting SAC features (for example, smothering of shingle communities through accretion). Construction works within foreshore in front of The nominated site would lead to loss of 'buffer' area adjacent to SAC. This could lead to eradication of adjacent seed bank and prevent of recolonisation of shingle habitat in nearby areas within the SAC. Other impacts could include shading of adjacent plant communities within SAC from construction of reactor buildings although this is likely to be a localised impact.
Risk of Likely Significant Effect (LSE)?	Changes to the tidal processes along this stretch of coastline could arise from construction on the coastal fringe. This impact is an identified vulnerability for the SAC and has the potential to result in a significant effect.
Potential Impacts - other Plans and Programmes	**Waveney District Council Local Development Framework**: housing/ employment and infrastructure provision could lead to habitat loss and fragmentation.. Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks (in particular Blyth Estuary Strategy)
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Source: Operation (duration approx 60 years)

Minsmere to Walberswick Heaths and Marshes SAC Operation (duration approx 60 years)	
Water resources/Quality	
Potential Impacts: Pathway	Potential impacts on water quality and drainage from planned and accidental discharges (radioactive and non-radioactive), and from the abstraction and discharge of water for cooling (heated water up to 10^{o}c warmer than the receiving environment).
Potential effects on the SAC: Receptor	Changes to water quality and of water temperature can impact species composition/ encourage excessive algal growth. The latter could result in smothering of the vegetated shingle plant communities.
Risk of Likely Significant Effect (LSE)?	Potential for operation effects of changes to water quality and temperature to result in adverse effects on water quality need further investigation to determine whether changes are likely to be significant. Accidental radioactive discharges are unlikely given the level of regulatory control. Risk of significant effects of this is therefore unlikely.
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Waveney District Council Local Development Framework**: – housing/ employment allocations: Water quality (abstraction, pollution) Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Minsmere to Walberswick Heaths and Marshes SAC Operation (duration approx 60 years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth (nitrogen oxides, sulphur dioxide). Potential impacts from planned (argon-41, krypton-85 and tritium) and accidental radioactive emissions.
Potential effects on the SAC: Receptor	An increase in airborne pollutants can lead to nutrient loading and changes to water quality from aerial deposition. Changes in air quality can impact upon sensitive designated communities within the SAC (heathland and single communities). Potential local impacts from increased development/ traffic growth. Air quality is an identified vulnerability for SAC
Risk of Likely Significant Effect (LSE)?	Air quality is an identified vulnerability for the SAC, and the potential effects of increased nutrient loading from airborne pollutants have the potential to result in a significant effect and should be considered further.
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk, Waveney District Council) increases in air borne pollutants arising from housing/ economic development, infrastructure, increase in transport.
Risk from 'In Combination' Effects?	Unlikely
AA Required?	Yes

Minsmere to Walberswick Heaths and Marshes SAC Operation (duration approx 60 years)	
Habitat Loss and Fragmentation	
Potential Impacts: Pathway	Changes to footprint of site through operation, for example to accommodate waste storage, develop infrastructure may lead to the loss of supporting or buffer habitats. The construction and maintenance of permanent infrastructure such as roads, compound sites and waste storage facilities may result in fragmentation of habitats and reduce/alter available corridors for the movement of species across habitats and resources.
Potential effects on the SAC: Receptor	Potential for fragmentation of habitat through further loss of buffer habitats (land between designated areas) that will be accommodated by the proposed site, access road and off-site facilities. Further changes to coastal habitats could result from long term sea defence structures.
Risk of Likely Significant Effect (LSE)?	Loss and modification of buffer habitats have the potential to result in significant effects and should be considered further.
Potential Impacts - other Plans and Programmes	**Waveney District Council Local Development Framework** Habitat disturbance (recreation, infrastructure development) Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks (in particular Blyth Estuary Strategy)
Risk from 'In Combination' Effects?	Unlikely
AA Required?	Yes

Source: Decommissioning (duration approx 30 years)

Minsmere to Walberswick Heaths and Marshes SAC Decomissioning (duration approx 30 years)	
Water Quality	
Potential Impacts: Pathway	Potential effects on water quality and drainage from [de]construction activities, earthworks, infrastructure, waste storage.
Potential effects on the SAC: Receptor	Changes in organic and nutrient loading as well as salinity can change the species composition of shingle plant communities through increased competition from other species with a more vigorous growth form. Annual vegetation of drift lines is considered moderately vulnerable to the introduction of non-synthetic compounds. Oil or chemical spills could have a direct impact on this low growing vegetation whilst the dispersants which are sometimes used in oil spills would also be likely to cause damage to growth and recovery rates. Plants of these habitats are also vulnerable to the effects of smothering through sedimentation.
Risk of Likely Significant Effect (LSE)?	Water quality is an identified vulnerability for this site and there is the potential for significant effect, particularly at a local level.
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Waveney District Council Local Development Framework** housing/ employment allocations: Water quality (abstraction, pollution) Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Unlikely
AA Required?	Yes

Minsmere to Walberswick Heaths and Marshes SAC Decomissioning (duration approx 30 years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth associated with decommissioning and the emissions arising from [de]construction activity. Likely to be restricted to a local level for example dust/ particulates.
Potential effects on the SAC: Receptor	Air quality (nitrogen deposition) is an identified vulnerability for heathland within the SAC. Nitrogen deposition can lead to eutrophication with resulting changes to the species composition of heathland and reduced cover of ericaceous plants. Shingle communities are vulnerable to smothering from airborne particulates and suffer reduced rates of growth.
Risk of Likely Significant Effect (LSE)?	Air quality is an identified vulnerability for the SAC, and the potential effects of increased nutrient loading from air borne pollutants and smothering from dust particulates could result in a significant effect and should be considered further.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk, Waveney District Council) increases in air borne pollutants arising from housing/ economic development, infrastructure, increase in transport.
Risk from 'In Combination' Effects?	Unlikely
AA Required?	Yes

Minsmere to Walberswick SPA/Ramsar

Source: Construction (duration approx 5 years)

Minsmere to Walberswick, SPA / Ramsar Construction (duration approx 5 years)	
Water Quality	
Potential Impacts: Pathway	Potential effects on water quality and drainage from earthworks/ excavations, infrastructure provision (sedimentation, pollution incidents through water courses and cycles).
Potential effects on the SPA/Ramsar: Receptor	Waterfowl are subject to accumulation of toxins through the food chain, and vulnerable to changes in palatability and abundance of prey caused by toxic contamination. There may be some existing contamination through the introduction of radionuclides from the existing power station, although NE has given this a low vulnerability score (whilst noting that it will require further investigation).
Risk of Likely Significant Effect (LSE)?	There is the potential for a significant effect, particularly at a local level and water quality is a key vulnerability for some of the interest features as well as their supporting habitats.
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Waveney District Council Local Development Framework** housing/ employment allocations: Water quality (abstraction, pollution) Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain

Minsmere to Walberswick, SPA / Ramsar Construction (duration approx 5 years)	
Water Quality	
AA Required?	Yes

Minsmere to Walberswick, SPA / Ramsar Construction (duration approx 5 years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth, and the emissions arising from construction activity. Likely to be restricted to a local level for example, dust/ particulates.
Potential effects on the SPA/Ramsar: Receptor	Air quality is a vulnerability for key supporting habitats for example, heathland which supports Nightjar and Woodlark is vulnerable to nitrogen deposition; shingle which supports Little Terns is vulnerable to smothering by airborne particulates.
Risk of Likely Significant Effect (LSE)?	Air quality is an identified vulnerability for the supporting habitats within the SPA/ Ramsar, and the potential effects of increased nutrient loading from air borne pollutants could be significant
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk, Waveney District Council) increases in air borne pollutants arising from housing/ economic development, infrastructure, increase in transport.
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Minsmere to Walberswick, SPA / Ramsar Construction (duration approx 5 years)	
Habitats and Species (Loss and Fragmentation)	
Potential Impacts: Pathway	Construction of cooling water infrastructure, extension of site into 'buffer' habitats, possible development at the coastal fringes
Potential effects on the SPA/Ramsar: Receptor	SPA designated species are particularly vulnerable to physical changes to / loss of supporting habitats: indirect effects could potentially include changes to the vegetation structure and species composition within the vegetated shingle communities as a result of nutrient loading, smothering etc., impacting upon, for example, the colony of nesting Little Terns (qualifying feature for the SPA / Ramsar). Little Terns require specific conditions for nesting: unrestricted views over 0.2km and vegetation cover of less than 10%. Other impacts could include loss of buffer habitats for the construction of access roads, storage facilities etc. which may occasionally be used for feeding and roosting by qualifying interest features such as marsh harriers, Nightjar and Woodlark.
Risk of Likely Significant Effect (LSE)?	SPA designated species are particularly vulnerable to the physical loss of supporting habitats, especially in the intertidal area which may occur through a change of land use or indirectly through changes to sedimentation.
Potential Impacts - other Plans and Programmes	**Waveney District Council Local Development Framework** Habitat disturbance (recreation, infrastructure development) Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks (in particular Blyth Estuary Strategy)
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Minsmere to Walberswick, SPA / Ramsar Construction (duration approx 5 years)	
Noise/ Light/ Visual Disturbance	
Potential Impacts: Pathway	The construction phase extends over 6-7 years with potential for significant increases in noise/ light and visual changes during the construction period
Potential effects on the SPA/Ramsar: Receptor	Overwintering and breeding birds including the qualifying assemblages are disturbed by sudden movements and noise which can displace them from their feeding grounds. Breeding Little Terns are highly sensitive to noise and visual disturbance which may cause them to abandon eggs or chicks. NE notes that there is currently a high vulnerability score through disturbance from egg collectors and vandal (off-road bikes).
Risk of Likely Significant Effect (LSE)?	Disturbance to birds is known to alter foraging, roosting and breeding patterns and is a known vulnerability for the qualifying features. There is therefore a risk of likely significant effect.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk, Waveney District Council) increases in human disturbance arising from housing/ economic development, infrastructure, increase in transport.
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Source: Operation (duration approx 60 years)

Minsmere to Walberswick, SPA / Ramsar Operation (duration approx 60 years)	
Water Resources/ Quality	
Potential Impacts: Pathway	Potential impacts on water quality and drainage from planned and accidental discharges (radioactive and non-radioactive), and from the abstraction and discharge of water for cooling (heated water up to 10^{o}c warmer than the receiving environment).
Potential effects on the SPA/Ramsar: Receptor	Waterfowl are subject to accumulation of toxins through the food chain, and vulnerable to changes in palatability and abundance of prey caused by toxic contamination. There may be some existing contamination through the introduction of radionuclides from the existing power station, although NE has given this a low vulnerability score (whilst noting that it will require further investigation). Changes to water nutrients / temperature can impact species composition/ encourage excessive algal growth – results in wider impacts on dependant bird species. Pollutants are mobile and may impact other watercourses/ cycles both up and downstream from the release point as a result of tidal movements.
Risk of Likely Significant Effect (LSE)?	Potential for operation effects of changes to water quality and temperature to result in adverse effects on water quality. Groundwater quantity and chemical quality around The nominated site currently are assessed by the EA as being 'poor'. Risk of likely significant effect.
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Waveney District Council Local Development Framework** housing/ employment allocations: Water quality (abstraction, pollution)

Minsmere to Walberswick, SPA / Ramsar Operation (duration approx 60 years)	
Water Resources/ Quality	
	Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies; • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Minsmere to Walberswick, SPA / Ramsar Operation (duration approx 60 years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth.
Potential effects on the SPA/Ramsar: Receptor	An increase in airborne pollutants can lead to nutrient loading and changes to habitat structure and species composition from aerial deposition. Air quality is a vulnerability for key supporting habitats for example, heathland which supports Nightjar and Woodlark.
Risk of Likely Significant Effect (LSE)?	Air quality is a vulnerability for supporting habitats for SPA features. Risk of likely significant effect
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk, Waveney District Council) increases in air borne pollutants arising from housing/ economic development, infrastructure, increase in transport.
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Minsmere to Walberswick, SPA / Ramsar Operation (duration approx 60 years)	
Habitat Loss and Fragmentation	
Potential Impacts: Pathway	Potential for fragmentation of habitat through loss of buffer habitats (land between designated areas) for proposed site. The construction and maintenance of permanent infrastructure such as roads, compound sites and waste storage facilities may result in fragmentation of habitats and reduce/alter available corridors for the movement of species across habitats and resources.
Potential effects on the SPA/Ramsar: Receptor	Particular issues include the loss of sightlines between feeding and roosting sites for bird species as noted in conservation objectives for all SPA interest features for example, Little Tern require 200m unrestricted views to detect predators. Other impacts could include loss of buffer habitats for the construction of access roads, storage facilities etc. which may occasionally be used for feeding and roosting by qualifying interest features such as marsh harriers, Nightjar and Woodlark.
Risk of Likely Significant Effect (LSE)?	Further information would be required to determine usage of potentially affected habitats by qualifying interest features.
Potential Impacts - other Plans and Programmes	**Waveney District Council Local Development Framework** Habitat disturbance (recreation, infrastructure development) Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks (in particular Blyth Estuary Strategy)
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Source: Decommissioning (duration approx 30 years)

Minsmere to Walberswick, SPA / Ramsar Decommissioning (duration approx 30 years)	
Water Resources/ Quality	
Potential Impacts: Pathway	Potential for effects on quality/ drainage from interim storage general and radioactive (accidental leakage/ pollution incidents). Potential impacts of toxins/ pollution noted above.
Potential effects on the SPA/Ramsar: Receptor	Waterfowl are subject to accumulation of toxins through the food chain, and vulnerable to changes in palatability and abundance of prey caused by toxic contamination. There may be some existing contamination through the introduction of radionuclides from the existing power station, although NE has given this a low vulnerability score (whilst noting that it will require further investigation).
Risk of Likely Significant Effect (LSE)?	There is the potential for significant effect, particularly at a local level as a result of changes to supporting habitats and prey availability / quality.
Potential Impacts - other Plans and Programmes	**Waveney District Council Local Development Framework** housing/ employment allocations: Water quality (abstraction, pollution) Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Minsmere to Walberswick, SPA / Ramsar Decommissioning (duration approx 30 years)	
Air Quality	
Potential Impacts: Pathway	Potential for local level effects in line with increased traffic/ transportation/ development.
Potential effects on the SPA/Ramsar: Receptor	Air quality is a vulnerability for key supporting habitats for example, heathland which supports Nightjar and Woodlark is vulnerable to nitrogen deposition; shingle which supports Little Terns is vulnerable to smothering by airborne particulates.
Risk of Likely Significant Effect (LSE)?	There is the potential for a significant effect due to resulting changes on supporting habitat structure and composition
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk, Waveney District Council) increases in air borne pollutants arising from housing/ economic development, infrastructure, increase in transport.
Risk from 'In Combination' Effects?	Unlikely
AA Required?	Yes

Minsmere to Walberswick, SPA / Ramsar Decommissioning (duration approx 30 years)	
Noise, light, visual Disturbance	
Potential Impacts: Pathway	Decommissioning activity and associated de-construction likely to result in significant local increases in noise events, light pollution and visual disturbance in and around the immediate vicinity of the site.
Potential effects on the SPA/Ramsar: Receptor	Overwintering and breeding birds including the qualifying assemblages are disturbed by sudden movements and noise which can displace them from their feeding grounds. Breeding Little Terns are highly sensitive to noise and visual disturbance which may cause them to abandon eggs or chicks. NE notes that there is currently a high vulnerability score through disturbance from egg collectors and vandal (off-road bikes). The influx of people into the area as a result of the increased workforce during decommissioning has the potential to exert additional recreation pressures on the SPA / Ramsar. This is currently an identified vulnerability for the designated sites.
Risk of Likely Significant Effect (LSE)?	Disturbance to birds is known to alter foraging, roosting and breeding patterns and is a known vulnerability for the qualifying features. There is therefore a risk of likely significant effect.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk, Waveney District Council): increases in human disturbance arising from housing/ economic development, infrastructure, increase in transport
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Minsmere to Walberswick, SPA / Ramsar Decommissioning (duration approx 30 years)	
Habitat Loss and Fragmentation	
Potential Impacts: Pathway	Changes to footprint of site through decommissioning activities, for example to accommodate waste storage, develop infrastructure.
Potential effects on the SPA/Ramsar: Receptor	Additional construction activities required during decomissioning can result in a direct loss of terrestrial, marine and sub-tidal habitats given the location of the proposed development site on the coast.
Risk of Likely Significant Effect (LSE)?	Further information would be required to determine usage of potentially affected habitats by qualifying interest features.
Potential Impacts - other Plans and Programmes	**Waveney District Council Local Development Framework** – housing / employment / infrastructure provisions could lead to habitat loss / fragmentation. Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies; • Coastal Habitat Management Plans Frameworks (in particular Blyth Estuary Strategy)
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Sandlings SPA
Source: Construction (duration approx 5 years)

Sandlings SPA Construction (duration approx 5 years)	
Water Quality	
Potential Impacts: Pathway	Potential effects on water quality and drainage from earthworks/ excavations, infrastructure provision (sedimentation, pollution incidents)
Potential effects on the SPA: Receptor	This SPA comprises 6 widely dispersed component units, of which the closest is Leiston-Aldeburgh. An area of remnant heathland known as The Walks is approximately 1.7km to the south west of the nominated site, within 500m of the Sizewell Railhead Halt (cited in the ES Scoping report as being a potential key transport link during construction) and is bordered by Lover's Lane to the north (a potential vehicle access route). Potential effects on water quality and drainage from earthworks/ excavations, infrastructure provision (sedimentation, pollution incidents) could impact upon key supporting habitats (heathland and coniferous woodland) for Nightjar and Woodlark.
Risk of Likely Significant Effect (LSE)?	Further information would be required to determine areas likely to be affected and their usage by qualifying interest features. However, there is the potential for a significant effect.
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk Coastal District Council) increases in air borne pollutants arising from housing/ economic development, infrastructure, increase in transport.
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Sandlings SPA Construction (duration approx 5 years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth.
Potential effects on the SPA: Receptor	Air quality is a vulnerability for key supporting habitats. For example, heathland which supports Nightjar and Woodlark is vulnerable to nitrogen deposition as it can lead to increased competition from plants with a high demand for nitrogen, such as coarse grasses. This results in a degradation of the quality of the habitat available for interest features.
Risk of Likely Significant Effect (LSE)?	Further information would be required to determine areas likely to be affected and their usage by qualifying interest features. However, given the identified vulnerabilities of supporting habitats to air quality there is the potential for a significant effect.
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk Coastal District Council) increases in air borne pollutants arising from housing/ economic development, infrastructure, increase in transport.
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Sandlings SPA Construction (duration approx 5 years)	
Habitats and Species (Loss and Fragmentation)	
Potential Impacts: Pathway	Construction of cooling water infrastructure, extension of site into 'buffer' habitats, possible development at the coastal fringes
Potential effects on the SPA: Receptor	Direct impacts on habitats within the Leiston-Aldeburgh SSSI component of the SPA could result from any infrastructure improvements along Lover's Lane (cited in the ES scoping report as a potential vehicle access route to The nominated site). In addition transmission lines from the existing power station currently dissect The Walks and it is possible that this corridor would also be used for new transmission lines. More generally, habitat used by interest features for foraging / roosting which falls outside of the SPA but within the footprint of the nominated site could be lost or become fragmented. Both Woodlark and Nightjar are vulnerable to even minor changes / loss of supporting habitats.
Risk of Likely Significant Effect (LSE)?	Further information would be required to determine areas likely to be affected and their usage by qualifying interest features. However, given the identified vulnerabilities of the interest features combined with the current unfavourable condition (recovering) for this SSSI component unit for the SPA there is the potential for a significant effect.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment / infrastructure provisions could lead to habitat loss / fragmentation..
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Sandlings SPA Construction (duration approx 5 years)	
Noise/ Light/ Visual Disturbance	
Potential Impacts: Pathway	The construction phase extends over 5 years with potential for significant increases in noise/ light and visual changes during the construction period.
Potential effects on the SPA: Receptor	Both Nightjar and Woodlark are highly sensitive to disturbance when nesting and could be impacted by construction works associated with any infrastructure works for example, along Lover's Lane.
Risk of Likely Significant Effect (LSE)?	Further information would be required to determine areas likely to be affected and their usage by qualifying interest features. However, given the identified vulnerabilities of the interest features there is the potential for a significant effect.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) increases in human disturbance arising from housing/ economic development, infrastructure, increase in transport.
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Source: Operation (duration approx 60 years)

Sandlings SPA Operation (duration approx 60 years)	
Water Quality	
Potential Impacts: Pathway	Potential impacts on water quality and drainage from planned and accidental discharges (radioactive and non-radioactive), and from the abstraction and discharge of water for cooling (heated water up to 10^{o}c warmer than the receiving environment).
Potential effects on the SPA: Receptor	Changes to supporting habitats for Woodlark and Nightjar as a result of abstraction or accidental pollution could result in areas of habitat (both within and outside the SPA) becoming unsuitable (for example, lack of bare areas for nesting, reduced invertebrate prey availability).
Risk of Likely Significant Effect (LSE)?	Further information would be required to determine areas likely to be affected and their usage by qualifying interest features. Risk of likely significant effect.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment allocations: Water quality (abstraction, pollution)
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Sandlings SPA Operation (duration approx 60 years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth.
Potential effects on the SPA: Receptor	Air quality is a vulnerability for key supporting habitats. For example, heathland is vulnerable to nitrogen deposition as it can lead to eutrophication effects resulting in a degradation of the quality of the habitat available for interest features, Woodlark and Nightjar.
Risk of Likely Significant Effect (LSE)?	Further information would be required to determine areas likely to be affected and their usage by qualifying interest features. Risk of likely significant effect.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) increases in air borne pollutants arising from housing/ economic development, infrastructure, increase in transport.
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Sandlings SPA Operation (duration approx 60 years)	
Habitats and Species (Loss and Fragmentation)	
Potential Impacts: Pathway	Potential for fragmentation of habitat through loss of buffer habitats (land between designated areas) for proposed site. The construction and maintenance of permanent infrastructure such as roads, compound sites and waste storage facilities may result in fragmentation of habitats and reduce/alter available corridors for the movement of species across habitats and resources
Potential effects on the SPA: Receptor	Potential for fragmentation of habitat through loss of buffer habitats (land between designated areas) for proposed site. For example, Nightjars forage some distance from their nesting sites but require continuous cover along the routes they use (for example, woodland / scrub). Fragmentation of these habitats to accommodate new infrastructure could impact upon Nightjars foraging in habitats to the north of the SPA.
Risk of Likely Significant Effect (LSE)?	Further information would be required to determine areas likely to be affected and their usage by qualifying interest features. However, there is the potential for a significant effect.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) increases in air borne pollutants arising from housing/ economic development, infrastructure, increase in transport.
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Source: Decommissioning (duration approx 30 years)

Sandlings SPA Decommissioning (duration approx 30 years)	
Water Quality	
Potential Impacts: Pathway	Potential effects on water quality and drainage from [de]construction activities, earthworks, infrastructure, waste storage.
Potential effects on the SPA: Receptor	Potential effects on supporting habitats with consequences for interest features noted above
Risk of Likely Significant Effect (LSE)?	There is the potential for significant effect, particularly at a local level.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment allocations: Water quality (abstraction, pollution)
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Sandlings SPA Decommissioning (duration approx 30 years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth associated with decommissioning and the emissions arising from [de]construction activity. Likely to be restricted to a local level for example, dust/ particulates.
Potential effects on the SPA: Receptor	Air quality impacts could result in indirect impacts on interest features as a result of the changes to supporting habitats noted above.
Risk of Likely Significant Effect (LSE)?	Further information would be required to determine areas likely to be affected and their usage by qualifying interest features. Risk of likely significant effect.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) increases in air borne pollutants arising from housing/ economic development, infrastructure, increase in transport.
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Sandlings SPA Decommissioning (duration approx 30 years)	
Noise/ Light/ Visual Disturbance	
Potential Impacts: Pathway	Decommissioning activity and associated de-construction likely to result in significant local increases in noise events, light pollution and visual disturbance in and around the immediate vicinity of the site.
Potential effects on the SPA: Receptor	There is the potential for increased human presence in the area due to the requirement for a large workforce. This could exert additional recreational pressures on the SPA. Both Nightjar and Woodlark are highly sensitive to disturbance when nesting, most notably from dogs.
Risk of Likely Significant Effect (LSE)?	Further information would be required to determine areas likely to be affected and their usage by qualifying interest features. However, given the identified vulnerabilities of the interest features there is the potential for a significant effect.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) increases in human disturbance arising from housing/ economic development, infrastructure, increase in transport.
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Alde – Ore and Butley Estuaries SAC
Source: Construction (duration approx 5 years)

Alde-Ore and Butley Estuaries SAC Construction (duration approx 5 years)	
Water Quality	
Potential Impacts: Pathway	Potential effects on water quality and drainage from earthworks/ excavations and infrastructure provision (sedimentation, pollution incidents through water courses and cycles).
Potential effects on the SAC: Receptor	Beyond Southwold, down to Thorpe Ness there is a weak southerly net drift of coastal sediments (although it is thought that little sediment moves south beyond Thorpe Ness). As such there is the potential for this weak net movement to provide a potential pathway through which radioactive and non-radioactive discharges (including spillages from pollution events) could impact upon the estuaries, mudflats and salt marsh habitats within the SAC.
Risk of Likely Significant Effect (LSE)?	Water quality has been identified as a vulnerability for this SAC. Whilst the net southerly drift of material along the coast could provide a potential mechanism for the transfer of contaminants, it is uncertain whether this would be significant given the distance of the SAC (8km) from the nominated site.
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment allocations: Water quality (abstraction, pollution). Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Alde-Ore and Butley Estuaries SAC Construction (duration approx 5 years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth, and the emissions arising from construction activity. Likely to be restricted to a local level for example, dust/ particulates.
Potential effects on the SAC: Receptor	Air quality is an identified potential vulnerability for Atlantic salt meadows, with regards nutrient loading in particular.
Risk of Likely Significant Effect (LSE)?	Although air quality is an identified potential vulnerability for a qualifying habitat, effects are considered unlikely to be significant given the distance of the European site from the nomination (over 5km away).
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment allocations: Water quality (abstraction, pollution).
Risk from 'In Combination' Effects?	No
AA Required?	No

Alde-Ore and Butley Estuaries SAC Construction (duration approx 5 years)	
Habitats and Species (Loss and Fragmentation)	
Potential Impacts: Pathway	Construction of cooling water infrastructure, extension of site into 'buffer' habitats, possible development at the coastal fringes
Potential effects on the SAC: Receptor	The qualifying features for this SAC are dependent on the protection conferred by Orfordness. Any breach of this shingle bank through means described below for Orfordness could lead to habitat loss / modification within the SAC.
Risk of Likely Significant Effect (LSE)?	Further understanding of the coastal sediment flows between the nominated site and Orfordness would be required to determine the likelihood and significance of this impact. Risk of significant likely effect.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment / infrastructure allocations could lead to habitat loss and fragmentation. Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Source: Operation (duration approx 60 years)

Alde-Ore and Butley Estuaries SAC Operation (duration approx 60 years)	
Water Quality	
Potential Impacts: Pathway	Potential impacts on water quality and drainage from planned and accidental discharges (radioactive and non-radioactive), and from the abstraction and discharge of water for cooling (heated water up to 10^{o}c warmer than the receiving environment).
Potential effects on the SAC: Receptor	The north-south long-shore drift movement (albeit weak between the nominated site and the SAC) has the potential to transfer radioactive and non-radioactive discharges / spillages which could potentially accumulate within the fine sediments found within the mouth of the estuary.
Risk of Likely Significant Effect (LSE)?	Water quality has been identified as a vulnerability for this SAC. Whilst the net southerly drift of material along the coast could provide a potential mechanism for the transfer of contaminants, it is uncertain whether this would be significant given the distance of the SAC (8km) from the nominated site.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) increases in air borne pollutants arising from housing/ economic development, infrastructure, increase in transport. Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Alde-Ore and Butley Estuaries SAC Operation (duration approx 60 years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth.
Potential effects on the SAC: Receptor	Air quality is an identified potential vulnerability for Atlantic salt meadows, with regards nutrient loading in particular.
Risk of Likely Significant Effect (LSE)?	Although air quality is an identified potential vulnerability for a qualifying habitat, effects are considered unlikely to be significant given the distance of the European site from the nomination (over 5km away).
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk Coastal District Council) – housing/ employment allocations: Water quality (abstraction, pollution).
Risk from 'In Combination' Effects?	No
AA Required?	No

Alde-Ore and Butley Estuaries SAC Operation (duration approx 60 years)	
Habitats and Species (Loss and Fragmentation)	
Potential Impacts: Pathway	Construction of cooling water infrastructure, extension of site into 'buffer' habitats, possible development at the coastal fringes
Potential effects on the SAC: Receptor	A reduction in the volume of sediment reaching Orfordness (see below for details) could lead to erosion of the shingle feature and subsequent loss / modification of qualifying habitats it protects within this SAC.
Risk of Likely Significant Effect (LSE)?	Further understanding of the coastal sediment flows between the nominated site and Orfordness would be required to determine the likelihood and significance of this impact. Risk of significant likely effect.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment / infrastructure allocations could lead to habitat loss and fragmentation.. Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Source: Decommissioning (duration approx 30 years)

Alde-Ore and Butley Estuaries SAC Decommissioning (duration approx 30 years)	
Water Quality	
Potential Impacts: Pathway	Potential effects on water quality and drainage from [de]construction activities, earthworks, infrastructure, waste storage.
Potential effects on the SAC: Receptor	Potential for effects on quality/ from interim storage, general and radioactive (accidental leakage/ pollution incidents). Potential impacts of toxins/ pollution noted above.
Risk of Likely Significant Effect (LSE)?	Water quality has been identified as a vulnerability for this SAC. Whilst the net southerly drift of material along the coast could provide a potential mechanism for the transfer of contaminants, it is uncertain whether this would be significant given the distance of the SAC (8km) from the nominated site.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) – housing/ employment allocations: Water quality (abstraction, pollution) Habitat disturbance (recreation, infrastructure development) Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Alde-Ore and Butley Estuaries SAC Decommissioning (duration approx 30 years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth associated with decommissioning and the emissions arising from [de]construction activity. Likely to be restricted to a local level for example, dust/ particulates.
Potential effects on the SAC: Receptor	Air quality is an identified potential vulnerability for Atlantic salt meadows, with regards nutrient loading in particular.
Risk of Likely Significant Effect (LSE)?	Although air quality is an identified potential vulnerability for a qualifying habitat, effects are considered unlikely to be significant given the distance of the European site from the nomination (over 5km away).
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk Coastal District Council) – housing/ employment allocations: Water quality (abstraction, pollution)
Risk from 'In Combination' Effects?	No
AA Required?	No

Alde-Ore and Butley Estuaries SAC Decommissioning (duration approx 30 years)	
Habitats and Species (Loss and Fragmentation)	
Potential Impacts: Pathway	Construction of temporary marine off-loading facility, and possible changes to site footprint with extension into coastal fringe.
Potential effects on the SAC: Receptor	Any development or activity that interferes with coastal processes (for example depletion of Orfordness shingle bank – see below) could potentially result in the loss / modification of qualifying interests within this SAC also.
Risk of Likely Significant Effect (LSE)?	Further understanding of the coastal sediment flows between the nominated site and Orfordness would be required to determine the likelihood and significance of this impact. Risk of significant likely effect.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment / infrastructure allocations could lead to habitat loss and fragmentation. Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Alde-Ore Estuary SPA/Ramsar

Source: Construction (duration approx 5 years)

Alde-Ore Estuary SPA / Ramsar Construction (approx 5 years)	
Water Quality	
Potential Impacts: Pathway	Potential effects on water quality and drainage from earthworks/ excavations and infrastructure provision (sedimentation, pollution incidents through water courses and cycles).
Potential effects on the SPA/Ramsar: Receptor	Beyond Southwold, down to Thorpe Ness there is a weak southerly net drift of coastal sediments (although little sediment moves south beyond Thorpe Ness). As such there is the potential for this movement to provide a pathway between the nominated site and supporting habitats within the SPA through which radioactive and non-radioactive discharges (including spillages from pollution events) could impact upon the important bird populations. Avocets, Little Terns, Sandwich Tern s, Redshank and Lesser Black-backed Gulls are vulnerable to bioaccumulation of toxins through the food chain. Vulnerability score for toxic contamination for this site is currently medium.
Risk of Likely Significant Effect (LSE)?	Water quality has been identified as a vulnerability for the supporting habitats used by the interest features. Whilst the net southerly drift of material along the coast could provide a potential mechanism for the transfer of contaminants, it is uncertain whether this would be significant given the distance of the SPA (8km) from the nominated site and further investigations would be required to ascertain this.
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment allocations: Water quality (abstraction, pollution) Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In	Uncertain

Alde-Ore Estuary SPA / Ramsar Construction (approx 5 years)	
Water Quality	
Combination' Effects?	
AA Required?	Yes

Alde-Ore Estuary SPA / Ramsar Construction (duration approx 5 years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth, and the emissions arising from construction activity. Likely to be restricted to a local level for example, dust/ particulates.
Potential effects on the SPA / Ramsar: Receptor	Air quality is an identified potential vulnerability for salt marsh with regards nutrient loading in particular.
Risk of Likely Significant Effect (LSE)?	Although air quality is an identified potential vulnerability for a key supporting habitat, effects are considered unlikely to be significant given the distance of the European site from the nomination (over 5km away).
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment allocations: Water quality (abstraction, pollution).
Risk from 'In Combination' Effects?	No
AA Required?	No

Alde-Ore Estuary SPA / Ramsar Construction (approx 5 years)	
Habitats and Species (Loss and Fragmentation)	
Potential Impacts: Pathway	Construction of cooling water infrastructure, extension of site into 'buffer' habitats, possible development at the coastal fringes
Potential effects on the SPA/Ramsar: Receptor	The supporting habitats for the qualifying interests for the SAC / Ramsar are dependent on the protection conferred by Orfordness. Any breach of this shingle bank through means described below for Orfordness could lead to habitat losses.
Risk of Likely Significant Effect (LSE)?	Further understanding of the coastal sediment flows between the nominated site and Orfordness would be required to determine the likelihood and significance of this impact. Risk of significant likely effect.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment / infrastructure allocations could lead to habitat loss and fragmentation. Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Alde-Ore Estuary SPA / Ramsar Construction (duration approx 5 years)	
Noise/ Light/ Visual Disturbance	
Potential Impacts: Pathway	The construction phase extends over 5 years with potential for significant increases in noise/ light and visual changes during the construction period. The construction force would result in an influx of people into the area with potential for increased visitor pressure.
Potential effects on the SPA/Ramsar: Receptor	Overwintering and breeding birds including the qualifying assemblages are disturbed by sudden movements and noise which can displace them from their feeding grounds.
Risk of Likely Significant Effect (LSE)?	Whilst disturbance to birds is a known vulnerability for the qualifying interests, given the distance of the European sites from the nomination (over 5km) the risk of significant effects is considered unlikely.
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment allocations: Water quality (abstraction, pollution).
Risk from 'In Combination' Effects?	No
AA Required?	No

Source: Operation (duration approx 60 years)

Alde-Ore Estuary SPA / Ramsar Operation (approx 60 years)	
Water Quality	
Potential Impacts: Pathway	Potential impacts on water quality and drainage from planned and accidental discharges (radioactive and non-radioactive), and from the abstraction and discharge of water for cooling (heated water up to 10^{o} c warmer than the receiving environment).
Potential effects on the SPA/Ramsar: Receptor	The north-south long-shore drift movement (albeit weak between the nominated site and the SPA) has the potential to transfer radioactive and non-radioactive discharges / spillages which could potentially accumulate within the fine sediments found within the mouth of the estuary. Toxic and non-toxic contamination is a vulnerability for this site / features.
Risk of Likely Significant Effect (LSE)?	Water quality has been identified as a vulnerability for supporting habitats for the interest features. Whilst the net southerly drift of material along the coast could provide a potential mechanism for the transfer of contaminants, it is uncertain whether this would be significant given the distance of the SPA (8km) from the nominated site.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment allocations: Water quality (abstraction, pollution). Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Alde-Ore Estuary SPA / Ramsar Operation (duration approx 60 years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth.
Potential effects on the SPA / Ramsar: Receptor	Air quality is an identified potential vulnerability for salt marsh, with regards nutrient loading in particular.
Risk of Likely Significant Effect (LSE)?	Although air quality is an identified potential vulnerability for a key supporting habitat, effects are considered unlikely to be significant given the distance of the European site from the nomination (over 5km away).
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment allocations: Water quality (abstraction, pollution).
Risk from 'In Combination' Effects?	No
AA Required?	No

Alde-Ore Estuary SPA / Ramsar Operation (approx 60 years)	
Habitats and Species (Loss and Fragmentation)	
Potential Impacts: Pathway	Construction of cooling water infrastructure, extension of site into 'buffer' habitats, possible development at the coastal fringes
Potential effects on the SPA/Ramsar: Receptor	A reduction in the volume of sediment reaching Orfordness (see Orfordness SAC section for details) could lead to erosion of the shingle feature and subsequent loss of supporting habitats which it protects within the SPA / Ramsar.
Risk of Likely Significant Effect (LSE)?	Further understanding of the coastal sediment flows between the nominated site and Orfordness would be required to determine the likelihood and significance of this impact. Risk of significant likely effect.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment / infrastructure allocations could lead to habitat loss and fragmentation. Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Source: Decommissioning (duration approx 30 years)

Alde-Ore Estuary SPA / Ramsar Decommissioning (approx 30 years)	
Water Quality	
Potential Impacts: Pathway	Potential effects on water quality and drainage from [de]construction activities, earthworks, infrastructure, waste storage.
Potential effects on the SAC: Receptor	Potential for effects on quality/ from interim storage, general and radioactive (accidental leakage/ pollution incidents). Potential impacts of toxins/ pollution noted above.
Risk of Likely Significant Effect (LSE)?	Water quality has been identified as a vulnerability for the supporting habitats used by the interest features. Whilst the net southerly drift of material along the coast could provide a potential mechanism for the transfer of contaminants, it is uncertain whether this would be significant given the distance of the SPA (8km) from the nominated site and further investigations would be required to ascertain this.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment allocations: Water quality (abstraction, pollution). Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Alde-Ore Estuary SPA / Ramsar Decommissioning (duration approx 30 years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth associated with decommissioning and the emissions arising from [de]construction activity. Likely to be restricted to a local level for example, dust/ particulates.
Potential effects on the SPA / Ramsar: Receptor	Air quality is an identified potential vulnerability for salt marsh, with regards nutrient loading in particular.
Risk of Likely Significant Effect (LSE)?	Although air quality is an identified potential vulnerability for a key supporting habitat, effects are considered unlikely to be significant given the distance of the European site from the nomination (over 5km away).
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment allocations: Water quality (abstraction, pollution).
Risk from 'In Combination' Effects?	No
AA Required?	No

Alde-Ore Estuary SPA / Ramsar Decommissioning (approx 30 years)	
Habitats and Species (Loss and Fragmentation)	
Potential Impacts: Pathway	Construction of temporary marine off-loading facility, and possible changes to site footprint with extension into coastal fringe.
Potential effects on the SAC: Receptor	Any development or activity that interferes with coastal processes (for example depletion of Orfordness shingle bank – see below) could potentially result in the loss / modification of supporting habitats within the SPA / Ramsar also
Risk of Likely Significant Effect (LSE)?	Further understanding of the coastal sediment flows between the nominated site and Orfordness would be required to determine the likelihood and significance of this impact. Risk of significant likely effect.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment / infrastructure allocations could lead to habitat loss and fragmentation. Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Alde-Ore Estuary SPA / Ramsar Construction (duration approx 5 years)	
Noise/ Light/ Visual Disturbance	
Potential Impacts: Pathway	Decommissioning activity and associated de-construction likely to result in significant local increases in noise events, light pollution and visual disturbance in and around the immediate vicinity of the site. Influx of people into the area to make up the workforce could exert additional visitor pressures.
Potential effects on the SPA/Ramsar: Receptor	Overwintering and breeding birds including the qualifying assemblages are disturbed by sudden movements and noise which can displace them from their feeding grounds.
Risk of Likely Significant Effect (LSE)?	Whilst disturbance to birds is a known vulnerability for the qualifying interests, given the distance of the European sites from the nomination (over 5km) the risk of significant effects is considered unlikely.
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment allocations: Water quality (abstraction, pollution).
Risk from 'In Combination' Effects?	No
AA Required?	No

Orfordness Shingle Street SAC

Authority: Suffolk

Source: Construction (duration approx 5 years)

Orfordness -Shingle Street SAC Construction (approx 5 years)	
Water Quality	
Potential Impacts: Pathway	Potential effects on water quality and drainage from earthworks/ excavations and infrastructure provision (sedimentation, pollution incidents through water courses and cycles).
Potential effects on the SAC: Receptor	Beyond Southwold, down to Thorpe Ness there is a weak southerly net drift of coastal sediments (although little sediment moves south beyond Thorpe Ness). As such there is the potential for this weak movement to provide a pathway between the nominated site and SAC through which radioactive and non-radioactive discharges (including spillages from pollution events) could impact upon the shingle plant communities. Overtopping during storm conditions and percolation could also provide a potential pathway for pollutants (for example, from pollution events) into the lagoons. Both habitats are also vulnerable to nutrient loading and some of the lagoons are already impoverished, possibly due to nutrient enrichment related to the presence of the very large breeding gull colonies.
Risk of Likely Significant Effect (LSE)?	Water quality has been identified as a vulnerability for this SAC. Whilst the net southerly drift of material along the coast could provide a potential mechanism for the transfer of contaminants, it is uncertain whether this would be significant given the distance of the SAC (over 8km) from the nominated site.
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment allocations: Water quality (abstraction, pollution). Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks

Orfordness -Shingle Street SAC Construction (approx 5 years)	
Water Quality	
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Orfordness – Shingle Street SAC Construction (duration approx 5 years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth, and the emissions arising from construction activity. Likely to be restricted to a local level for example, dust/ particulates.
Potential effects on the SAC: Receptor	Air quality is an identified potential vulnerability for shingle habitats, with regards nutrient loading in particular.
Risk of Likely Significant Effect (LSE)?	Although air quality is an identified potential vulnerability for a qualifying habitat, effects are considered unlikely to be significant given the distance of the European site from the nomination (over 8km away).
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment allocations: Water quality (abstraction, pollution).
Risk from 'In Combination' Effects?	No
AA Required?	No

Orfordness -Shingle Street SAC Construction (approx 5 years)	
Habitats and Species (Loss and Fragmentation)	
Potential Impacts: Pathway	Construction of cooling water infrastructure, extension of site into 'buffer' habitats, possible development at the coastal fringes
Potential effects on the SAC: Receptor	The qualifying features for this SAC are present because of the area being an 'active process site'. Any development or activity that restricts natural processes (for example, construction of a new marine landing facility and coastal defences) is likely to damage the interest features of the site.
Risk of Likely Significant Effect (LSE)?	Further understanding of the coastal sediment flows between the nominated site and Orfordness would be required to determine the likelihood and significance of this impact. Risk of significant likely effect.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment / infrastructure allocations could lead to habitat loss and fragmentation. Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Source: Operation (duration approx 60 years)

Orfordness -Shingle Street SAC Operation (approx 60 years)	
Water Quality	
Potential Impacts: Pathway	Potential impacts on water quality and drainage from planned and accidental discharges (radioactive and non-radioactive), and from the abstraction and discharge of water for cooling (heated water up to 10^{o}c warmer than the receiving environment).
Potential effects on the SAC: Receptor	The north-south long-shore drift movement (albeit weak between the nominated site and the SAC) has the potential to transfer radioactive and non-radioactive discharges / spillages which could potentially accumulate within the fine sediments found within the mouth of the estuary.
Risk of Likely Significant Effect (LSE)?	Water quality has been identified as a vulnerability for this SAC. Whilst the net southerly drift of material along the coast could provide a potential mechanism for the transfer of contaminants, it is uncertain whether this would be significant given the distance of the SAC (8km) from the nominated site.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment allocations: Water quality (abstraction, pollution). Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Orfordness – Shingle Street SAC Operation (duration approx 60 years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth.
Potential effects on the SAC: Receptor	Air quality is an identified potential vulnerability for shingle habitats, with regards nutrient loading in particular.
Risk of Likely Significant Effect (LSE)?	Although air quality is an identified potential vulnerability for a qualifying habitat, effects are considered unlikely to be significant given the distance of the European site from the nomination (over 8km away).
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment allocations: Water quality (abstraction, pollution).
Risk from 'In Combination' Effects?	No
AA Required?	No

Orfordness -Shingle Street SAC Operation (approx 60 years)	
Habitats and Species (Loss and Fragmentation)	
Potential Impacts: Pathway	Construction of cooling water infrastructure, extension of site into 'buffer' habitats, possible development at the coastal fringes
Potential effects on the SAC: Receptor	A reduction in the volume of sediment reaching Orfordness (for example, through interruption in flows as a result of permanent sea defences) could lead to erosion of the shingle feature and lagoons supported by it. Further understanding of the coastal sediment flows between the nominated site and Orfordness would be required to determine the likelihood and significance of this.
Risk of Likely Significant Effect (LSE)?	Further understanding of the coastal sediment flows between the nominated site and Orfordness would be required to determine the likelihood and significance of this impact. Risk of significant likely effect.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment / infrastructure allocations could lead to habitat loss and fragmentation. Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Source: Decommissioning (duration approx 30 years)

Orfordness -Shingle Street SAC Decommissioning (approx 30 years)	
Water Quality	
Potential Impacts: Pathway	Potential effects on water quality and drainage from [de]construction activities, earthworks, infrastructure, waste storage.
Potential effects on the SAC: Receptor	Potential for effects on quality/ drainage from interim storage general and radioactive (accidental leakage/ pollution incidents). Potential impacts of toxins/ pollution noted above.
Risk of Likely Significant Effect (LSE)?	Water quality has been identified as a vulnerability for this SAC. Whilst the net southerly drift of material along the coast could provide a potential mechanism for the transfer of contaminants, it is uncertain whether this would be significant given the distance of the SAC (over 8km) from the nominated site.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council) housing/ employment allocations: Water quality (abstraction, pollution). Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Orfordness – Shingle Street SAC Decommissioning (duration approx 30 years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth associated with decommissioning and the emissions arising from [de]construction activity. Likely to be restricted to a local level for example, dust/ particulates.
Potential effects on the SAC: Receptor	Air quality is an identified potential vulnerability for shingle habitats, with regards nutrient loading in particular.
Risk of Likely Significant Effect (LSE)?	Although air quality is an identified potential vulnerability for a qualifying habitat, effects are considered unlikely to be significant given the distance of the European site from the nomination (over 8km away).
Potential Impacts - other Plans and Programmes	**Decommissioning of Sizewell A –** Water quality, air quality, noise and disturbance **Local Development Frameworks** (Suffolk Coastal District Council) – housing/ employment allocations: Water quality (abstraction, pollution).
Risk from 'In Combination' Effects?	No
AA Required?	No

Orfordness -Shingle Street SAC Decommissioning (approx 30 years)	
Habitats and Species (Loss and Fragmentation)	
Potential Impacts: Pathway	Construction of temporary marine off-loading facility, and possible changes to site footprint with extension into coastal fringe.
Potential effects on the SAC: Receptor	Any development or activity that interferes with coastal processes that could lead to depletion of Orfordness shingle bank could potentially result in the loss / modification of qualifying habitats.
Risk of Likely Significant Effect (LSE)?	Further understanding of the coastal sediment flows between the nominated site and Orfordness would be required to determine the likelihood and significance of this impact. Risk of significant likely effect.
Potential Impacts - other Plans and Programmes	**Local Development Frameworks** (Suffolk Coastal District Council)– housing/ employment / infrastructure allocations could lead to habitat loss and fragmentation. Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks
Risk from 'In Combination' Effects?	Uncertain
AA Required?	Yes

Outer Thames Estuary SPA

The Joint Nature Conservation Committee (JNCC), Natural England and the Countryside Council for Wales (CCW) are undertaking a formal consultation on 10 possible Special Areas of Conservation and two potential Special Protection Areas in English, Welsh and offshore waters around the UK. The Outer Thames Estuary SPA is one of these sites and has not yet been formally designated.

Source: Construction (duration approx 5 years)

Outer Thames Estuary SPA: Construction (duration approx 5years)	
Water Resources/Quality	
Potential Impacts: Pathway	Potential effects on water quality and drainage from earthworks/ excavations and infrastructure provision (for example, increased run-off and sedimentation, pollution incidents through water courses and cycles). There may be a requirement for cooling water culverts and a marine landing facility extending into the coastal zone. Potential works associated with construction of these, for example, dredging, tunnelling or burying, could impact on water quality.
Potential effects on the SPA: Receptor	Red-throated Divers have a high sensitivity to toxic contamination through non-synthetic compounds (for example, heavy metals and hydrocarbons) and a moderate sensitivity to the introduction of synthetic compounds (for example, PCBs). Direct mortality of Red-throated Divers can occur as a result of heavy oils reducing the waterproofing of the birds' feathers, causing them to lose body heat, become exhausted and eventually drown (especially if a spill were to occur when the birds become flightless during their autumn moult in September and October). Indirect effects can also occur as a result of toxins / pollutants deteriorating populations of prey items, either through mortality, reduced palatability or through accumulation of toxins within the food chain.

Outer Thames Estuary SPA: Construction (duration approx 5years)	
Water Resources/Quality	
	Red-throated Divers also have a moderate sensitivity to non-toxic contamination as a result of changes in nutrient and organic loading, as well as changes in thermal regimes, changes in turbidity and changes in salinity. All such sources of non-toxic contamination can effect species composition and species richness within coastal waters, resulting in a reduction of prey items for divers and, in the case of increased turbidity, reduced visibility of prey items. The relative vulnerability of Red-throated Divers as a result of the introduction of radionuclides has not been assessed due to data deficiencies.
Risk of Likely Significant Effect (LSE)?	Any LSE would most likely be associated with release of pollutants/toxins, which could impact upon Red-throated Divers through impacts to prey items and accumulation in the food chain. Given the close proximity of the SPA to the nominated site, impacts associated with water quality as a result of construction activities cannot be ruled out at this stage.
Potential Impacts - other Plans and Programmes	Decommissioning of Sizewell A Waveney District Council Local Development Framework - water abstraction, increased effluent discharges as a result of housing / employment growth Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks The following is a list of current and proposed economic activities in the Outer Thames Estuary, which could result in impacts to SPA: • Aggregate extraction

Outer Thames Estuary SPA: Construction (duration approx 5years)	
Water Resources/Quality	
	• Oil and Gas • Shipping - including dredging of channels • Land-based sources of pollution
Risk from 'In Combination' Effects?	Considered likely but unknown at the current time, as no other plans or programmes are noted which address the SPA.
AA Required?	Yes

Outer Thames Estuary SPA: Construction (duration approx 5years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth, and the emissions arising from construction activity. Likely to be restricted to the local level, for example, dust/ particulates.
Potential effects on the SPA: Receptor	An increase in airborne pollutants can lead to nutrient loading, which could impact upon species composition and abundance of prey items of Red-throated Divers.
Risk of Likely Significant Effect (LSE)?	Air quality is not a specific identified vulnerability for the SPA, although given its proximity to the nominated site (immediately adjacent) further investigation into the impacts of nutrient loading from airborne pollution should be undertaken.

Outer Thames Estuary SPA: Construction (duration approx 5years)	
Air Quality	
Potential Impacts - other Plans and Programmes	Decommissioning of Sizewell A **Local Development Frameworks** (for example, Suffolk Coastal District Council) - increases in airborne pollutants arising from housing/ economic development, infrastructure, increase in transport. Of relevance to understanding environmental condition: • Coastal Habitat Management Plans Frameworks The following is a list of current and proposed economic activities in the Outer Thames Estuary which could result in impacts to SPA: • Aggregate extraction • Oil and Gas • Shipping - including dredging of channels • Land-based sources of pollution
Risk from 'In Combination' Effects?	Considered likely but unknown at the current time, as no other plans or programmes are noted which address the SPA.
AA Required?	Yes

Outer Thames Estuary SPA: Construction (duration approx 5years)

Habitat (and Species) Loss and Fragmentation	
Potential Impacts: Pathway	Potential impacts could arise during the construction of cooling water culverts, marine landing facility and infrastructure, upgraded coastal protection and any additional channel dredging operations that are required.
Potential effects on the SPA: Receptor	Physical loss of and damage to supporting habitat (shallow coastal waters and areas in the vicinity of sub-tidal sandbanks) is a key sensitivity of the SPA. This is due to the loss of foraging sites for Red-throated Divers and hence, is detrimental to the favourable condition of the SPA. The link between this species and benthic communities is not well understood, but it is thought that sandbanks may have a functional role (as nursery, spawning, feeding or in providing shelter) in supporting some of their prey species such as gadoids, sprat, herring and sand eel.
Risk of Likely Significant Effect (LSE)?	Direct loss of habitat within the SPA used by Red-throated Divers could result in significant effects. Other significant effects on supporting habitats could occur through indirect pathways, including changes to coastal sediment regimes as a result of coastal defences and construction of a marine landing facility.
Potential Impacts - other Plans and Programmes	Of relevance to understanding environmental condition: • Coastal Habitat Management Plans Frameworks The following is a list of current and proposed economic activities in the Outer Thames Estuary which could result in impacts to SPA: • Aggregate extraction • Oil and Gas • Renewables • Cables • Fisheries • Shipping - including dredging of channels • Recreation
Risk from 'In Combination' Effects?	Considered likely but unknown at the current time, as no other plans or programmes are noted which address the SPA.

Outer Thames Estuary SPA: Construction (duration approx 5years)	
Habitat (and Species) Loss and Fragmentation	
AA Required?	Yes

Outer Thames Estuary SPA: Construction (duration approx 5years)	
Noise/ Light/ Visual Disturbance	
Potential Impacts: Pathway	The construction phase is anticipated to last for approximately 5 years. There is the potential for a significant increase in noise, light and visual changes during the construction period, for example through machinery noise, increased vehicular movements and increased personnel present on site. Noise impacts are particularly relevant for any activities occurring within the intertidal zone, such as the construction of the marine landing facility, cooling culverts and coastal protection upgrades.
Potential effects on the SPA: Receptor	The main impacts of noise, light and visual disturbance on the SPA would most likely be disturbance of Red-throated Divers if they use habitats in close proximity to the nominated site. The species is known to be highly sensitive to noise disturbance during the winter, which can result in displacement from feeding grounds and can affect the birds' chances of survival.
Risk of Likely Significant Effect (LSE)?	The SPA is adjacent to the nominated site. One of the key requirements for Red-throated Divers is minimal disturbance. Any increased noise disturbance as a result of construction could therefore have a likely significant effect.
Potential Impacts -	Decommissioning of Sizewell A

Outer Thames Estuary SPA: Construction (duration approx 5years)	
Noise/ Light/ Visual Disturbance	
other Plans and Programmes	The following is a list of current and proposed economic activities in the Outer Thames Estuary which could result in impacts to SPA: • Aggregate extraction • Oil and Gas • Renewables • Cables • Fisheries • Shipping - including dredging of channels • Recreation
Risk from 'In Combination' Effects?	Considered likely but unknown at the current time, as no other plans or programmes are noted which address the SPA.
AA Required?	Yes

Source: Operation (duration approx 60 years)

Outer Thames Estuary SPA : Operation (duration approx 60 years)	
Water Resources/Quality	
Potential Impacts: Pathway	Potential impacts on water quality and drainage from planned and accidental discharges (radioactive and non-radioactive), and from the abstraction and discharge of water for cooling (heated water up to 10^{o} warmer than the receiving environment).
Potential effects on the SPA: Receptor	Non-toxic water contamination (for example, changes to temperature and nutrient loading) can impact upon species composition, for example, by encouraging excessive algal growth. This, in turn, can affect associated invertebrate/fish assemblages with resulting reductions to prey availability for Red-throated Divers' food. The sensitivity of the prey species of Red-throated Divers to non-toxic contamination is considered moderate. Accidental release of toxic pollutants may impact on the favourable condition of the SPA. For example, toxins may bio-accumulate within fish/invertebrates, which may have an impact on Red-throated Divers. Biocides used to clean cooling infrastructure may have similar impacts. There could also be an actual reduction in prey item abundance through displacement or direct mortality. Red-throated Divers are also directly sensitive to the accidental release of toxic pollutants. Oil on the feathers can lead to loss of insulation, reduced buoyancy and possible drowning. Dispersants used to disperse the oil may also be harmful to the species. The relative vulnerability of Red-throated Divers as a result of the introduction of radionuclides has not been assessed due to data deficiencies.
Risk of Likely Significant Effect (LSE)?	Given the close proximity of the SPA to the nominated site, significant impacts associated with water quality as a result of operational activities cannot be ruled out at this stage.
Potential Impacts -	Decommissioning of Sizewell A

Outer Thames Estuary SPA : Operation (duration approx 60 years)	
Water Resources/Quality	
other Plans and Programmes	Waveney District Council Local Development Framework (water abstraction, increased effluent discharges as a result of housing / employment growth) Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks The following is a list of current and proposed economic activities in the Outer Thames Estuary which could result in impacts to SPA: • Aggregate extraction • Oil and Gas • Shipping - including dredging of channels • Land-based sources of pollution
Risk from 'In Combination' Effects?	Considered likely but unknown at the current time, as no other plans or programmes are noted which address the SPA.
AA Required?	Yes

Outer Thames Estuary SPA Operation (duration approx 60 years)

Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth / shipping movements (nitrogen oxides, sulphur dioxide). Potential impacts from planned (argon-41, krypton-85 and tritium) and accidental radioactive emissions.
Potential effects on the SPA: Receptor	An increase in airborne pollutants can lead to nutrient loading and changes to water quality from aerial deposition. This could impact upon abundance and distribution of prey species (fish/invertebrate) of Red-throated Divers.
Risk of Likely Significant Effect (LSE)?	Air quality not a specific identified vulnerability for the SPA, although given its proximity to the nominated site, further investigation into the impacts of nutrient loading from airborne pollution should be undertaken.
Potential Impacts - other Plans and Programmes	Decommissioning of Sizewell A Local Development Frameworks (for example, Suffolk Coastal District Council) increases in airborne pollutants arising from housing/ economic development, infrastructure, increase in transport. Of relevance to understanding environmental condition: • Coastal Habitat Management Plans Frameworks The following is a list of current and proposed economic activities in the Outer Thames Estuary which could result in impacts to SPA: • Aggregate extraction • Oil and Gas • Shipping - including dredging of channels • Land-based sources of pollution

Outer Thames Estuary SPA Operation (duration approx 60 years)	
Air Quality	
Risk from 'In Combination' Effects?	Considered likely but unknown at the current time, as no other plans or programmes are noted which address the SPA.
AA Required?	Yes

Outer Thames Estuary SPA: Operation (duration approx 60 years)	
Habitats and Species (Loss and Fragmentation)	
Potential Impacts: Pathway	Changes to footprint of site through operation, for example, to accommodate waste storage, develop infrastructure (in particular any development which extends into the coastal fringe). Cooling water discharge into the North Sea could also lead to loss / damage to benthic habitats as a result of scour at the outfall.
Potential effects on the SPA: Receptor	Physical loss of and damage to supporting habitat (shallow coastal waters and areas in the vicinity of sub-tidal sanbanks) is a key sensitivity of the SPA given the resulting impact to abundance and quality of prey items of Red-throated Divers.
Risk of Likely Significant Effect (LSE)?	Direct and in-direct loss of supporting habitat used by Red-throated Divers could result in significant effects on the SPA.
Potential Impacts - other Plans and Programmes	Of relevance to understanding environmental condition: • Coastal Habitat Management Plans Frameworks The following is a list of current and proposed economic activities in the Outer Thames Estuary which could result in

Outer Thames Estuary SPA: Operation (duration approx 60 years)	
Habitats and Species (Loss and Fragmentation)	
	impacts to SPA: • Aggregate extraction (water quality, air quality, habitat loss / damage, disturbance) • Oil and Gas (water quality, air quality, habitat loss / damage, disturbance) • Renewables (habitat loss / damage, disturbance) • Cables (habitat loss / damage, disturbance) • Fisheries (habitat / species loss, disturbance) • Shipping - including dredging of channels (habitat loss / damage, disturbance, water quality, air quality) • Recreation (disturbance, habitat damage)
Risk from 'In Combination' Effects?	Considered likely but unknown at the current time, as no other plans or programmes are noted which address the SPA.
AA Required?	Yes

Outer Thames Estuary SPA: Operation (duration approx 60 years)	
Noise/ Light/ Visual Disturbance	
Potential Impacts: Pathway	Increased workforce on site could lead to increased human pressure and disturbance (for example through increased recreational activity), as well as any routine maintenance required on coastal defences / infrastructure. There may also be additional shipping movements within the SPA and any lighting used on the power station buildings could result in some light spill onto adjacent coastal waters.

Outer Thames Estuary SPA: Operation (duration approx 60 years)	
Noise/ Light/ Visual Disturbance	
Potential effects on the SPA: Receptor	The main impacts of noise, visual and light disturbance on the SPA would most likely be disturbance of Red-throated Divers if they use habitats in close proximity to the nominated site. The species is known to have a high sensitivity to non-physical disturbance during the winter, which can result in displacement from feeding grounds and interrupt flight lines, both of which can affect the birds' chances of survival.
Risk of Likely Significant Effect (LSE)?	The SPA is adjacent to the nominated site. One of the key requirements for Red-throated Divers is minimal disturbance. Any increased non-physical disturbance could therefore have a likely significant effect.
Potential Impacts - other Plans and Programmes	Decommissioning of Sizewell A The following is a list of current and proposed economic activities in the Outer Thames Estuary which could result in impacts to SPA: • Aggregate extraction • Oil and Gas • Renewables • Cables • Fisheries • Shipping - including dredging of channels • Recreation
Risk from 'In Combination' Effects?	Considered likely but unknown at the current time, as no other plans or programmes are noted which address the SPA.
AA Required?	Yes

Source: Decommissioning (duration approx 30 years)

Outer Thames Estuary SPA: Decommissioning (duration approx 30 years)	
Water Resources/Quality	
Potential Impacts: Pathway	Potential effects on water quality and drainage from earthworks/ excavations and infrastructure provision (for example, increased run-off and sedimentation, pollution incidents).
Potential effects on the SPA: Receptor	Any release of toxins/pollutants could impact on Red-throated Divers (the interest feature of the SPA) either directly (for example, through mortality as a result of oiled feathers) or indirectly though effects on habitats and prey species. Food sources (including small fish populations) could deteriorate and birds feeding along the coastline where contaminants may be released may suffer through accumulation of toxins within the food chain. Increased nutrient input may also affect species composition and abundance within the SPA causing a reduction in prey availability.
Risk of Likely Significant Effect (LSE)?	Any LSE would most likely be associated with release of pollutants/toxins, which could impact upon Red-throated Divers through accumulation in the food chain. Given the close proximity of the SPA to the nominated site, impacts associated with water quality as a result of decommissioning activities cannot be ruled out at this stage.
Potential Impacts - other Plans and Programmes	Decommissioning of Sizewell A Waveney District Council Local Development Framework - water abstraction, increased effluent discharges as a result of housing / employment growth Of relevance to understanding environmental condition: • Catchment Abstraction Management Strategies • Coastal Habitat Management Plans Frameworks

Outer Thames Estuary SPA: Decommissioning (duration approx 30 years)	
Water Resources/Quality	
	The following is a list of current and proposed economic activities in the Outer Thames Estuary which could result in impacts to SPA: • Aggregate extraction • Oil and Gas • Shipping - including dredging of channels • Land-based sources of pollution
Risk from 'In Combination' Effects?	Considered likely but unknown at the current time, as no other plans or programmes are noted which address the SPA.
AA Required?	Yes

Outer Thames Estuary SPA: Decommissioning (duration approx 30 years)	
Air Quality	
Potential Impacts: Pathway	Potential local impacts from increased development/ traffic growth and emissions arising from de-construction activity (including increased shipping). Likely to be restricted to a local level, for example dust/ particulates.
Potential effects on the SPA: Receptor	An increase in airborne pollutants can lead to nutrient loading, which could impact upon on species composition and abundance of prey items of Red-throated Divers.
Risk of Likely	Air quality is not a specific identified vulnerability for the SPA, although, given its proximity to the nominated site

Outer Thames Estuary SPA: Decommissioning (duration approx 30 years)	
Air Quality	
Significant Effect (LSE)?	(immediately adjacent), further investigation into the impacts of nutrient loading from airborne pollution should be undertaken.
Potential Impacts - other Plans and Programmes	Decommissioning of Sizewell A Local Development Frameworks (for example, Suffolk Coastal District Council) - increases in airborne pollutants arising from housing/ economic development, infrastructure, increase in transport. Of relevance to understanding environmental condition: • Coastal Habitat Management Plans Frameworks The following is a list of current and proposed economic activities in the Outer Thames Estuary which could result in impacts to SPA: • Aggregate extraction • Oil and Gas • Shipping - including dredging of channels • Land-based sources of pollution
Risk from 'In Combination' Effects?	Considered likely but unknown at the current time, as no other plans or programmes are noted which address the SPA.
AA Required?	Yes

Outer Thames Estuary SPA: Decommissioning (duration approx 30 years)	
Habitat (and Species) Loss and Fragmentation	
Potential Impacts: Pathway	Changes to footprint of site through decommissioning activities, for example to accommodate waste storage, develop infrastructure (in particular any development which extends into the coastal fringe).
Potential effects on the SPA: Receptor	Loss or fragmentation of any habitat (particularly sandbanks) within the SPA could reduce the availability of feeding habitat for Red-throated Divers and thus could be detrimental to the favourable condition of the SPA.
Risk of Likely Significant Effect (LSE)?	Direct loss of supporting habitat within the SPA used by Red-throated Divers could result in significant effects.
Potential Impacts - other Plans and Programmes	Of relevance to understanding environmental condition: • Coastal Habitat Management Plans Frameworks The following is a list of current and proposed economic activities in the Outer Thames Estuary which could result in impacts to SPA: • Aggregate extraction • Oil and Gas • Renewables • Cables • Fisheries • Shipping - including dredging of channels • Recreation
Risk from 'In Combination' Effects?	Considered likely but unknown at the current time, as no other plans or programmes are noted which address the SPA.
AA Required?	Yes

Outer Thames Estuary SPA: Decommissioning (duration approx 30 years)	
Noise/ Light/ Visual Disturbance	
Potential Impacts: Pathway	Decommissioning activity and associated deconstruction are likely to result in significant local increases in noise events, light pollution and visual disturbance in and around the nominated site. Increased workforce on site could lead to increased human pressure and disturbance (for example through increased recreational activity). There may also be additional shipping movements within the SPA to transport materials off-site.
Potential effects on the SPA: Receptor	The main impacts of noise, light and visual disturbance on the SPA would most likely be disturbance of Red-throated Divers if they use habitats in close proximity to the nominated site. Red-throated Divers are sensitive to disturbance, which can displace them from their feeding and roosting grounds and interrupt flight paths.
Risk of Likely Significant Effect (LSE)?	The SPA is adjacent to the nominated site. One of the key requirements for Red-throated Divers is minimal disturbance. Any increased noise disturbance as a result of decommissioning could therefore have a likely significant effect.
Potential Impacts - other Plans and Programmes	Decommissioning of Sizewell A The following is a list of current and proposed economic activities in the Outer Thames Estuary which could result in impacts to SPA: • Aggregate extraction • Oil and Gas • Renewables • Cables • Fisheries

Outer Thames Estuary SPA: Decommissioning (duration approx 30 years)	
Noise/ Light/ Visual Disturbance	
	• Shipping - including dredging of channels • Recreation
Risk from 'In Combination' Effects?	Considered likely but unknown at the current time, as no other plans or programmes are noted which address the SPA.
AA Required?	Yes

Appendix 4: HRA/ Appropriate Assessment Proforma

Minsmere to Walberswick Heaths and Marshes SAC

- **Location: 521522 N/013702 E**
- **Size (ha): 1265.52**
- **Designation: SAC**

	Minsmere to Walberswick Heaths and Marshes SAC
Qualifying Features	***Annex I habitats that are a primary reason for selection of this site:*** **1210 Annual vegetation of drift lines** **4030 European dry heaths** ***Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:*** **1220 Perennial vegetation of stony banks**
Conservation Objectives	Subject to natural change, to maintain, in favourable condition: • Annual vegetation of drift lines • Perennial vegetation of stony banks. To maintain in favourable condition: • Dry heaths
Key Environmental	• **Coastal processes** - The conservation of the site features is dependent on the maintenance of erosional

	Minsmere to Walberswick Heaths and Marshes SAC
Conditions (factors that maintain site integrity)	forces along the coastline. Many features, such as the shingle banks are rarely stable in the long term, exhibiting continuous longshore drift with shingle being transported and sorted by wave action. The dynamic nature is an important aspect of the qualifying interest features and colonising species are able to tolerate periodic disturbance, which may involve the total removal of the surface and subsequent recolonisation with vegetation. Species are also tolerant of saltwater inundation, as the beaches are often over-topped by the tide or subject to spray from waves breaking over the beach. • **Manage public access and activities**- A key management requirement is to avoid or minimise surface disturbance, especially in the more open communities. Many of the vegetation types and species associated with shingle are fragile and vulnerable to damage from trampling. This breaks up the fine humus that develops in the upper layers of the shingle that is vital for the plants to survive. Where recreational pressures are significant enough to result in the loss of vegetation cover, or prevent its recovery, it may be necessary to take steps to manage access. • **Scrub management –** The dry heaths within the site are dependent on active management. The site management plan includes actions to ensure that open heathland is maintained and areas of scrub and bracken are cleared from former heath (this is also important to maintain the populations of the rare silver-studded blue butterfly present on site).
Vulnerabilities (includes existing pressures and trends) ***Details at Appendix 1***	• Physical damage / disturbance through trampling / recreational activities • Contamination by synthetic and/or non-synthetic toxic compounds • Damage by abrasion or selective extraction • Changes in nutrient and/or organic loading • Inappropriate management (including grazing) / neglect of heathland • Summer fires • Atmospheric deposition of nitrogen

	Minsmere to Walberswick Heaths and Marshes SAC
Predicted Impacts ***What are the issues arising from the plan and how might the site be affected?***	**Water Resources and Quality** • Increased/ altered drainage from earthworks and excavation • Potential for toxic contamination from accidental leakage • Radioactive discharges (accidental and routine) • Alteration of flow from abstraction • Changes to water temperature from controlled discharge **Habitat Loss and Fragmentation** • Loss of buffer habitats through construction of sea defences / marine landing facility and cooling systems • Loss of seed bank through removal of coastal habitats could prevent recolonisation of adjacent areas within the SAC. **Air Quality** • Local level impacts (reduced air quality, NOx gases from road/ transport/ generation sources) arising from construction, operation, decommissioning activities
Potential In-combination effects (screening) ***What other plans and programmes could lead to in-combinations effects?***	The following plans have the potential to contribute 'in-combination' impacts in relation to the key issues identified. In-combination impacts may be positive where the plans' function is to actively management those identified issues (for example Catchment Abstraction Management Strategies). **Water Resources and Quality** • Decommissioning of Sizewell A (and possibly B) • Shoreline Management Plan • Blyth Estuary Draft Strategy • Minsmere Flood Risk Management Project **Habitat Loss and Fragmentation** • Decommissioning of Sizewell A (and possibly B) • Shoreline Management Plan

	Minsmere to Walberswick Heaths and Marshes SAC
	• Blyth Estuary Draft Strategy • Minsmere Flood Risk Management Project **Air Quality** • Local Development Frameworks (Suffolk County Council, Waveney District Council) • Decommissioning of Sizewell A (and possibly B)
Appropriate Assessment **Likelihood of adverse effect on integrity:**	**Water Resources and Quality** • Current Environment Agency data[6] indicates that where assessed; the ecological and chemical status of the coastal and estuarine environments near to Sizewell is assessed as 'moderate' and 'good' respectively. By 2015 the EA predicts that the ecological status will increase to 'good' and that chemical status will remain 'good'. This includes measurements taken from the mouth of the River Blyth to the north of the SAC where dissolved inorganic nitrogen is currently achieving less than 'good' ecological status. • Current assessments for the coastal water quality, further south from Sizewell along the Essex coastline indicate that the ecological and chemical status of the environments here are the same as those surrounding Sizewell but the prediction here is that the ecological status will remain 'moderate' or worse until 2015. • The ecological status of the rivers around Sizewell range from being assessed as 'poor' to 'moderate' – the chemical condition of these rivers has yet to be assessed. Groundwater chemical quality around Sizewell is assessed by the EA as being 'poor'. • Radioactive discharges are subject to targets monitored by the EA and of the non-radioactive discharges, nitrate contributions are considered to be the most significant (research cited by the EA in the nuclear sector report). In particular it is noted that there can be measurable localised impacts on sea nutrient levels in the

[6] Environment Agency River Basin Management Plans: Draft Anglian River Basin District, 2008. The data used in this assessment is taken from the Draft River Basin Management Plan, which was the most up to date plan available at the time. Draft plans were presented to the Government for approval in September 2009, with final plans published in December 2009
UKTG – Water Framework Directive Website: http://www.wfduk.org/
Environmental Agency – http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopicsandlang=_e

	Minsmere to Walberswick Heaths and Marshes SAC
	vicinity of discharges. • Current water quality indicators show that generally ecological and chemical levels around the coastal areas surrounding Sizewell to be 'moderate' or higher, there are some areas for concern with regards nearby rivers as well as groundwater with 'poor' ecological status. It is therefore not possible (without further information on discharge levels and quality) to conclude that discharges both radioactive and non-radioactive will not have an adverse effect on the SAC. • Sizewell and part of the SAC falls within the River Yox catchment area (WRMU4). No water is available for further licensing within this unit at low flows although water may be available at higher flows with appropriate restrictions (i.e. new licences may be considered for non-consumptive uses).It may therefore be a requirement for any new developments at Sizewell to provide water supply strategies. This catchment drains to the Sizewell Belts and thence to the north via an artificial channel (the Leiston Brook) eventually to join the Minsmere River approximately 2km to the north of the nominated site. The Minsmere River discharges to the North Sea through a sluice gate. To the south of the nominated site surface water runoff is directed to the Hundred River, approximately 2.2km distant; this is a separate catchment area from that within which the Sizewell is located. • Given that water abstraction requirements and locations for Sizewell are currently unknown, it is not possible to conclude that water supply to the development will avoid levels of abstraction that lead to adverse effects on the SAC. **Habitat Loss and Fragmentation** • The Suffolk Coast and Estuaries Habitat Management Plan (CHaMP)[7] describes the main issues facing the Habitat Behaviour Units (HBU) along this stretch of coastline. HBU B incorporates the shingle bank (part of the SAC) which stretches between the harbour structures of the Blyth and Dunwich village which has developed as a result of long term erosion of the Blyth / Dunwich delta, moving back to form the present coastline. Continued coastal defence management work on the immediate coastline potentially damages SAC (annual vegetation) and SPA/Ramsar interests. Significant loss of ecological interest could occur over the

[7] The Suffolk Coast and Estuaries Habitat Management Plan (CHaMP): Coastal Habitat Management Plan Final Report (October 2002)

	Minsmere to Walberswick Heaths and Marshes SAC
	long term due to failure of the fronting shingle ridge and tidal inundation of freshwater and brackish wetland habitats to landward. • Realignment (as proposed under the Blyth Estuary Flood Risk Management Strategy[8] and Minsmere Flood Risk Management Project[9]) or uncontrolled failure of defences within the Blyth estuary would result in significant change to qualifying interests (most significant would be conversion of the freshwater Westwood Marshes into saltmarsh and intertidal mudflat) The annual vegetation of drift line SAC interest would probably be maintained and could even improve through lack of human intervention along the frontage. • HBU C includes the coastline from Dunwich village to Thorpeness and includes the remainder of the SAC as well as Sizewell. The main issue facing this HBU is the fact that the cliffs at Dunwich will continue to erode (current rate of retreat is in the order of 1 to 2m each year) with loss of cliff top heathland vegetation (qualifying interest feature). The only means of protecting *in situ* the designated feature would be the full protection of the cliffs. However this is not considered appropriate as it would likely have a detrimental impact on the development of the shore (key source of sediment). Retreat is the current policy for this stretch of coastline and as such habitat creation to offset the loss of heathland vegetation is being considered. Any failure of the natural shoreline defence and secondary embankment to landward at Minsmere would also cause saline inundation and potentially result in significant change to existing designated habitats and features depending on the scale and duration of inundation. • The Shoreline Management Plan (SMP) for this area (subcell 3c Lowestoft to Harwich)[10] reports the result of analysis of the beach profiles in front of Sizewell. This suggests that since measurements resumed (gap between 1988 and 1993 due to construction of temporary and permanent works at Sizewell B) beach accretion has been recorded. Immediately in front of the cooling water pump house, however, erosion has been measured, possibly due to littoral drift being blocked by the temporary beach landing facility which was removed in 1994. Further south (opposite Sizewell A, stability and accretion is experienced. These findings provide further support to the argument that accretion along the shoreline to the north of Sizewell could result from the construction of a temporary marine landing facility with resulting impacts on the shingle habitats

[8] Blyth Estuary Flood Risk Management Strategy (Environment Agency, 2007)
[9] Minsmere Flood Risk Management Project, Preferred Option Information Document, November 2008
[10] Shoreline Management Plan Subcell 3c: Lowestoft to Harwich (Environment Agency, 1997)

	Minsmere to Walberswick Heaths and Marshes SAC
	found here • The extent of loss / modification to marine and terrestrial habitats from the construction of cooling water culverts, sea defences and a marine landing facility is currently unknown, and its significance in the context of wider habitat changes cannot be assessed. It is possible that these changes may act cumulatively or accelerate changes identified by the CHaMP in relation the primary designation features. At this strategic stage where detailed development plans are unknown, it is not possible to conclude that that there will not be adverse effects through habitat loss on the SAC. **Air Quality** • Information provided by the UK Air Pollution Information System[11] indicates that air quality within the area (centred on the SAC and including Site, up to a resolution of 5km) is generally good with pollution levels for all key pollutants (sulphur dioxide, particulates, nitrogen dioxide etc.) typically low. However, sensitivities and critical loads have been identified for the interest features within the SAC and have revealed that for some pollutants, current deposition levels are close to or within exceedance level ranges. For both heathland and perennial vegetation of stony banks, current deposition levels for Nitrogen when compared to critical loads for these habitats is in exceedance by a range of 4.4 to -5.6kg/N/yr. The effects of this eutrophication for heathland can be a transition of heather to grass and a decline in lichens whilst for perennial vegetation of stony banks there can be an increase in overall biomass resulting in increased competition. Heathland is also sensitive to increased acidification, with leaching causing a decrease in soil base saturation, increasing the availability of Al3+ ions, the mobilization of which may cause toxicity to plants and mycorrhiza. Deposition is currently at exceedance levels of 0.89 kg eq/ha/yr. • The Environment Agency assesses that, non-radioactive aerial emissions (sulphur dioxide, nitrogen oxides and volatile organic compounds) from nuclear power stations are extremely low compared with other

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	Minsmere to Walberswick Heaths and Marshes SAC
	regulated industries and the Agency does not consider them to be an environmental priority. • The Agency's most recent available assessment of radioactive aerial emissions indicates that all fall within authorised limits.[12] • Air quality issues around Sizewell are considered to potentially be most significant during construction and decommissioning phases (transport etc). The potential for cumulative effects from other plans and programmes is minimised by sustainable transport measures set out in the Local Transport Plan, and the main focus of new housing development being located away from Sizewell, more than 30km away to the south west near Ipswich. However, cumulative effects from the decommissioning of Sizewell A could be significant. Therefore, in the context of: known air quality conditions and the European site characterisation data which indicates that the qualifying features are considered vulnerable or at risk for issues of air quality; it is not possible to conclude that that there will not be adverse effects through habitat loss on the SAC.
Possible Avoidance and Mitigation Measures – *includes recommendations for policy/proposals*	**Water Resource and Quality** • Avoiding adverse effects on surface, ground and estuarine waters is primarily the responsibility of the Water Companies (resource planning) and the Environment Agency (abstraction licensing and discharge regulation). However, the Nuclear NPS can direct requirements for efficiency of water use and require that issues relating to supply and discharge (including potential effects on European sites) are in place prior to the implementation of the nominated site proposals. **Habitat Loss and Fragmentation** • Where proposals for design and build remain under development, the Nuclear NPS should seek to prioritise the avoidance of indirect habitat impacts and develop mitigation measures that protect the integrity of the designated site for example. through amended designs for the sea defences (soft engineering) and marine landing facility (permeable to sediment movements) and amended boundaries that create a buffer zone between Sizewell and the SAC. **Air Quality**

[12] Measuring Environmental Performance: Sector Report for the Nuclear Industry (Environment Agency, Nov 2005).

	Minsmere to Walberswick Heaths and Marshes SAC
	• The Nuclear NPS should take account of potential air quality impacts through requirements, particularly at a local level for sustainable transport plans including for example: the use of non-road transport where possible, phasing of development and robust monitoring at sites to track changes. In particular, the monitoring should account for the potential for cumulative impacts where the phasing between existing power stations and the new build overlaps.
Conclude no adverse effect on integrity?	• It is not possible at this stage of the development of the Nuclear NPS to say that proposals at Sizewell will not have significant adverse effects on Minsmere to Walberswick Heaths and Marshes SAC as a result of impacts to water, indirect effects associated with habitat loss/ fragmentation, and air quality.

Minsmere to Walberswick SPA

- **Location: 521855 N / 013802 E**
- **Size (ha): 2018.92**
- **Designation: SPA**

	Minsmere to Walberswick SPA
Qualifying Features	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*, 91 pairs representing at least 15.4% of the breeding population in Great Britain • Bittern *Botaurus stellaris*, 7 individuals representing at least 35.0% of the breeding population in Great Britain • Little Tern *Sterna albifrons*, 28 pairs representing at least 1.2% of the breeding population in Great Britain • Marsh Harrier *Circus aeruginosus*, 16 pairs representing at least 10.0% of the breeding population in Great Britain • Nightjar *Caprimulgus europaeus*, 24 pairs representing at least 0.7% of the breeding population in Great Britain • Woodlark *Lullula arborea*, 20 pairs representing at least 1.3% of the breeding population in Great Britain Over winter; • Avocet *Recurvirostra avosetta*, 278 individuals representing at least 21.9% of the wintering population in Great Britain • Bittern *Botaurus stellaris*, 14 individuals representing at least 14.0% of the wintering population in Great Britain • Hen Harrier *Circus cyaneus*, 15 individuals representing at least 2.0% of the wintering population in Great Britain

	Minsmere to Walberswick SPA
Conservation Objectives	The conservation objectives for this site are that, subject to natural change, the habitats listed below should be maintained in favourable condition: • Shingle • Shallow coastal waters • Swamp • Marginal and inundation • Standing water • Grassland • Coastal lagoons • Marsh • Heathland
Key Environmental Conditions (factors that maintain site integrity)	• Shingle areas - Little Tern require bare and sparsely vegetated shingle to nest • Shallow coastal water –artificial lagoons forming part of the RSPB reserve at Minsmere support a significant number of breeding Avocet as well as Shoveler, Gadwall, Teal and Shelduck. • Intertidal mudflat –provide an important feeding and roosting area for Avocet • Saltmarsh communities – provide important roosting areas for Avocet. • Swamp –Westwood Marshes is of major importance for breeding and wintering Bittern, Marsh and Hen HarrierS. • Heathland (Dunwich-Westleton) supports important breeding populations of Nightjar, Woodlark as well as Dartford Warbler. Both Nightjar and Woodlark require open areas of heathland, devoid of invading scrub and trees and also require an absence of disturbance from humans and dogs etc. • Standing water - Marsh Harriers and Bittern depend on areas of open water and their associated marginal habitats - reedbeds. As the availability of open water is a key factor, so it is important that the dykes and pools receive appropriate management to ensure their continued use. • Wet grassland – waterlogged, grazed fields provide an important habitat for breeding waders (for example Avocet) and wintering wildfowl.

	Minsmere to Walberswick SPA
Vulnerabilities (includes existing pressures and trends)	• Physical damage / disturbance through trampling / recreational activities • Contamination by synthetic and/or non-synthetic toxic compounds • Changes in salinity as a result of flooding of freshwater habitats • Damage by abrasion or selective extraction • Changes in nutrient and/or organic loading • Inappropriate management (including grazing) / neglect of heathland • Summer fires • Atmospheric deposition of nitrogen
Predicted Impacts ***What are the issues arising from the plan and how might the site be affected?***	**Water Resources and Quality** • Increased/ altered drainage from earthworks and excavation • Potential for toxic contamination from accidental leakage • Radioactive discharges (accidental and routine) • Alteration of flow from abstraction • Changes to water temperature from controlled discharge **Habitat Loss and Fragmentation** • Loss of buffer habitats through construction of sea wall / marine landing facility and cooling systems • Loss of seed bank through removal of coastal habitats could prevent recolonisation of adjacent areas within the SAC. **Air Quality** • Local level impacts (reduced air quality, NOx gases from road/ transport/ generation sources) arising from construction, operation, decommissioning activities **Disturbance (noise, light and visual)** • Local level impacts relating primarily to construction and decommissioning activities, also relevant offsite.

	Minsmere to Walberswick SPA
Potential In-combination effects (screening) ***What other plans and programmes could lead to in-combinations effects?***	The following plans have the potential to contribute 'in-combination' impacts in relation to the key issues identified. In-combination impacts may be positive where the plans' function is to actively management those identified issues (for example Catchment Abstraction Management Strategies). **Water Resources and Quality** • Decommissioning of Sizewell A (and possibly B) • Shoreline Management Plan • Blyth Estuary Draft Strategy • Minsmere Flood Risk Management Project **Habitat Loss and Fragmentation** • Decommissioning of Sizewell A (and possibly B) • Shoreline Management Plan • Blyth Estuary Draft Strategy • Minsmere Flood Risk Management Project **Air Quality** • Local Development Frameworks (Suffolk County Council, Waveney District Council) • Decommissioning of Sizewell A (and possibly B) **Disturbance** • Local Development Frameworks (Suffolk County Council, Waveney District Council) • Decommissioning of Sizewell A (and possibly B)
Appropriate Assessment	**Water Resources and Quality**

	Minsmere to Walberswick SPA
Likelihood of adverse effect on integrity:	• Current Environment Agency data[13] indicates that where assessed; the ecological and chemical status of the coastal and estuarine environments near to Sizewell is assessed as 'moderate' and 'good' respectively. By 2015 the EA predicts that the ecological status will increase to 'good' and that chemical status will remain 'good'. This includes measurements taken from the mouth of the River Blyth (part of the SPA is adjacent to the river at Tinker's Marsh) where dissolved inorganic nitrogen is currently achieving less than 'good' ecological status. • Current assessments for the coastal water quality, further south from Sizewell along the Essex coastline indicate that the ecological and chemical status of the environments here are the same as those surrounding Sizewell but the prediction here is that the ecological status will remain 'moderate' or worse until 2015. • The ecological status of the rivers around Sizewell range from being assessed as 'poor' to 'moderate' – the chemical condition of these rivers has yet to be assessed. Groundwater chemical quality around Sizewell is assessed by the EA as being 'poor'. • Radioactive discharges are subject to targets monitored by the EA and of the non-radioactive discharges, nitrate contributions are considered to be the most significant (research cited by the EA in the nuclear sector report). In particular it is noted that there can be measurable localised impacts on sea nutrient levels in the vicinity of discharges. • Sizewell and part of the SPA fall within the River Yox catchment area (WRMU4). No water is available for further licensing within this unit at low flows although water may be available at higher flows with appropriate restrictions (i.e. new licences may be considered for non-consumptive uses).It may therefore be a requirement for any new developments at Sizewell to provide water supply strategies. This catchment drains to the Sizewell Belts and thence to the north via an artificial channel (the Leiston Brook) eventually to join the Minsmere River approximately 2km to the north of the nominated site. The Minsmere River discharges to the North Sea through a sluice gate. To the south of the nominated site surface water runoff is directed to the Hundred River, approximately 2.2km distant; this is a separate catchment area.

[13] Environment Agency River Basin Management Plans: Draft Anglian River Basin District, 2008. The data used in this assessment is taken from the Draft River Basin Management Plan, which was the most up to date plan available at the time. Draft plans were presented to the Government for approval in September 2009, with final plans published in December 2009
UKTG – Water Framework Directive Website: http://www.wfduk.org/

	Minsmere to Walberswick SPA
	• Current water quality indicators show that generally ecological and chemical levels around the coastal areas surrounding Sizewell to be 'moderate' or higher. However, there are some areas for concern with regards nearby rivers as well as groundwater with 'poor' ecological status. It is therefore not possible (without further information on discharge levels and quality) to conclude that discharges both radioactive and non-radioactive will not have an adverse effect on the SPA. **Habitat Loss and Fragmentation** • The Suffolk Coast and Estuaries Habitat Management Plan (CHaMP)[14] describes the main issues facing the Habitat Behaviour Units (HBU) along this stretch of coastline. HBU B incorporates the shingle bank (part of the SPA) which stretches between the harbour structures of the Blyth and Dunwich village which has developed as a result of long term erosion of the Blyth / Dunwich delta, moving back to form the present coastline. Continued coastal defence management work on the immediate coastline potentially damages SPA interests as a result of disturbance / modification of shingle habitat used by nesting Little Terns and is considered unsustainable as a form of flood defence in the long term. There is a continual threat of significant loss of ecological interest due to failure of the fronting shingle ridge and tidal inundation of freshwater and brackish wetland habitats to landward. This would include the extensive reedbed at Westwood Marshes which supports breeding and wintering Marsh Harrier and Bittern and the man made scrapes support breeding Avocet and a wide range of wintering waterfowl. In addition grazing marsh in the Minsmere river valley which supports breeding waterfowl during the winter months would be lost. • Realignment (as proposed under the Blyth Estuary Flood Risk Management Strategy[15] and Minsmere Flood Risk Management Project[16]) or uncontrolled failure of defences within the Blyth estuary would result in significant change to supporting habitats for some of the designated SPA interests. Whilst extensive areas of saltmarsh and intertidal habitat would be created through any such controlled or uncontrolled failure of the existing defences and consequently provide additional habitats for Avocet and other wintering / breeding waterfowl, mitigation for the loss of freshwater habitats including reedbeds and grazing marsh would be a

[14] The Suffolk Coast and Estuaries Habitat Management Plan (CHaMP): Coastal Habitat Management Plan Final Report (October 2002)
[15] Blyth Estuary Flood Risk Management Strategy (Environment Agency, 2007)
[16] Minsmere Flood Risk Management Project, Preferred Option Information Document, November 2008

	Minsmere to Walberswick SPA
	requirement in order to avoid an impact on the integrity of the SPA. Shingle habitat used by Little Tern would be maintained in the longer term with a realignment of the coastline and could even be enhanced through lack of human intervention, • HBU C includes the coastline from Dunwich village to Thorpeness and includes an area of clifftop heathland. SPA interest features such as Nightjar breed in the area, although their use of the clifftop as a breeding site is likely to be extremely limited. The main issue facing this HBU is the fact that the cliffs at Dunwich will continue to erode (current rate of retreat is in the order of 1 to 2m each year) with loss of cliff top heathland vegetation. The only means of protecting *in situ* the designated feature would be the full protection of the cliffs. However this is not considered appropriate as it would likely have a detrimental impact on the development of the shore (key source of sediment). Retreat is the current policy for this stretch of coastline and as such habitat creation to offset the loss of heathland vegetation is being considered. Any failure of the natural shoreline defence and secondary embankment to landward at Minsmere would also cause saline inundation and potentially result in significant change to existing designated habitats and features depending on the scale and duration of inundation. • The Shoreline Management Plan (SMP) for this area (subcell 3c Lowestoft to Harwich)[17] reports the result of analysis of the beach profiles in front of Sizewell. This suggests that since measurements resumed (gap between 1988 and 1993 due to construction of temporary and permanent works at Sizewell B) beach accretion has been recorded. Immediately in front of the cooling water pump house, however, erosion has been measured, possibly due to littoral drift being blocked by the temporary beach landing facility which was removed in 1994. Further south (opposite Sizewell A, stability and accretion is experienced. These findings provide further support to the argument that accretion along the shoreline to the north of Sizewell could result from the construction of a temporary marine landing facility with resulting impacts on the shingle habitats found here • The extent of loss / modification to marine and terrestrial habitats from the construction of cooling water culverts, sea defences and a marine landing facility is currently unknown, and its significance in the context of wider habitat changes as described in the Blyth Estuary Strategy and Minsmere Flood Risk Management Project[18] cannot be assessed. It is possible that these changes may act cumulatively or even accelerate changes identified by the CHaMP in relation to the supporting habitats for the primary designation features. It is also

[17] Shoreline Management Plan Subcell 3c: Lowestoft to Harwich (Environment Agency, 1997)
[18] Minsmere Flood Risk Management Project, Preferred Option Information Document, November 2008

	Minsmere to Walberswick SPA
	possible that the footprint of the nominated site could affect habitats outside of the SPA which are used occasionally by the qualifying interest features and further information would need to be gathered to confirm this. At this strategic stage where detailed development plans are unknown, it is not possible to conclude that that there will not be adverse effects on the SPA qualifying features as a result of habitat loss. **Disturbance (noise, light and visual)** • No published studies on disturbance of birds within the SPA were found. However published studies on disturbance impacts more generally highlight vulnerabilities for qualifying interests of the SPA, namely Woodlark and Nightjar[19] and Little Tern[20] although most studies relate to recreational disturbance and highlight the significance of disturbance from dog walkers and close proximity to humans. • Site information for the SSSI units underpinning the SPA indicates that currently just under 50% of the habitats supporting the interest feature species are in favourable condition. Given that this creates the potential for current elevated stress levels on the bird populations and the fact that Sizewell lies directly adjacent to the SPA designation, without knowing the full extent and nature of the development proposals, it is not possible to determine how the nature or timing of the development may affect interest feature birds or to conclude that there will be no significant effect. **Air Quality** • Information provided by the UK Air Pollution Information System[21] indicates that air quality within the area (centred on the SPA and including Site, up to a resolution of 5km) is generally good with pollution levels for all key pollutants (sulphur dioxide, particulates, nitrogen dioxide etc.) typically low. However, sensitivities and critical loads have been identified for some of the habitats within the SAC and have revealed that for some pollutants, current deposition levels are close to or within exceedance level ranges. For both heathland and perennial vegetation of stony banks, current deposition levels for Nitrogen when compared to critical loads for these habitats is in exceedance by a range of 4.4 to -5.6kg/N/yr. The effects of this eutrophication for heathland

[19] A summary of the evidence base for : Disturbance effects to Annex 1 bird species of the Thames Basin Heaths, Footprint Ecology 2005
[20] Little Terns at Great Yarmouth: Disturbance to birds and implications for strategic planning, Footprint Ecology,
[21] http://www.apis.ac.uk/

	Minsmere to Walberswick SPA
	can be a transition of heather to grass and a decline in lichens whilst for perennial vegetation of stony banks there can be an increase in overall biomass resulting in increased competition. Heathland is also sensitive to increased acidification, with leaching causing a decrease in soil base saturation, increasing the availability of Al3+ ions, the mobilization of which may cause toxicity to plants and mycorrhiza. Deposition is currently at exceedance levels of 0.89 kg eq/ha/yr. • The Environment Agency assesses that, non-radioactive aerial emissions (sulphur dioxide, nitrogen oxides and volatile organic compounds) from nuclear power stations are extremely low compared with other regulated industries and the Agency does not consider them to be an environmental priority. • The Agency's most recent available assessment of radioactive aerial emissions indicates that all fall within authorised limits.[22] • Air quality issues around Sizewell are considered to potentially be most significant during construction and decommissioning phases (transport etc). The potential for cumulative effects from other plans and programmes is minimised by sustainable transport measures set out in the Local Transport Plan, and the main focus of new housing development being located away from Sizewell, more than 30km away to the south west near Ipswich. However, cumulative effects from the decommissioning of Sizewell A could be significant. Therefore, in the context of: known air quality conditions and the European site characterisation data which indicates that the qualifying features are considered vulnerable or at risk for issues of air quality; it is not possible to conclude that that there will not be adverse effects through habitat loss on the SPA.
Possible Avoidance and Mitigation Measures – *includes recommendations for policy/proposals*	**Water Resource and Quality** • Avoiding adverse effects on surface, ground and estuarine waters is primarily the responsibility of the Water Companies (resource planning) and the Environment Agency (abstraction licensing and discharge regulation). However, the Nuclear NPS can direct requirements for efficiency of water use and require that issues relating to supply and discharge (including potential effects on European sites) are in place prior to the implementation of the nominated site proposals.

[22] Measuring Environmental Performance: Sector Report for the Nuclear Industry (Environment Agency, Nov 2005).

	Minsmere to Walberswick SPA
	Habitat Loss and Fragmentation • Where proposals for design and build remain under development, the Nuclear NPS should seek to prioritise the avoidance of direct habitat impacts, for example through amended boundaries for the sea wall or design alterations for the marine landing facility, that protect the integrity of the designated site. **Disturbance (noise, light, visual)** • Disturbance events in relation to bird species are most significant when they are irregular/ sudden and unpredictable. Noise, light and visual impacts can be managed at a site level through phasing and timing that takes account of breeding and feeding cycles and should be supported by information on flight lines/ migration routes/ feeding and roosting areas should also be obtained. Precise detail and the nature of the measures required would need to be agreed with the Statutory Body prior to the commencement of development. These measures would form part of the wider site management plan that developers could be required to agree and implement prior to commencement. **Air Quality** • Air quality impacts have been assessed as being significant at this European site and it is appropriate that Nuclear NPS takes account of potential air quality impacts through requirements, particularly at a local level for sustainable transport plans including for example: the use of non-road transport where possible, phasing of development and robust monitoring at sites to track changes. In particular, the monitoring should account for the potential for cumulative impacts where the phasing between the existing power station and the new build overlaps.
Conclude no adverse effect on integrity?	• It is not possible at this stage of the development of the Nuclear NPS to say that proposals at Sizewell will not have significant adverse effects on Minsmere to Walberswick SPA as a result of changes to water quality, indirect effects associated with habitat loss/ fragmentation, disturbance and air quality.

Minsmere to Walberswick Ramsar

- **Location: 521855 N / 013802E**
- **Size (ha): 2018.92**
- **Designation: Ramsar**

	Minsmere to Walberswick Ramsar
Qualifying Features	Ramsar criterion 1 The site contains a mosaic of marine, freshwater, marshland and associated habitats complete with transition areas in between. Contains the largest continuous stand of reedbeds in England and Wales and rare transition in grazing marsh ditch plants from brackish to fresh water. Ramsar criterion 2 This site supports nine nationally scarce plants and at least 26 red data book invertebrates. Supports a population of the mollusc narrow-mouthed whorl snail *Vertigo angustior* (Habitats Directive Annex II; British Red Data Book Endangered), recently discovered on the Blyth estuary river walls. An important assemblage of rare breeding birds associated with marshland and reedbeds including: Bittern *Botaurus stellaris,* Gadwall *Anas strepera,* Teal *Anas crecca,* Shoveler *Anas clypeata,* Marsh Harrier *Circus aeruginosus,* Avocet *Recurvirostra avosetta* and Bearded Tit *Panurus biarmicus*
Conservation Objectives	• No conservation objectives currently available for this site.
Key Environmental Conditions (factors that maintain site integrity)	• Shingle areas - Little Tern require bare and sparsely vegetated shingle to nest • Shallow coastal water –artificial lagoons forming part of the RSPB reserve at Minsmere support a significant number of breeding Avocet as well as Shoveler, Gadwall, Teal and Shelduck. • Intertidal mudflat –provide an important feeding and roosting area for Avocet • Saltmarsh communities – provide important roosting areas for Avocet. • Swamp –Westwood Marshes is of major importance for breeding and wintering Bittern, Marsh and Hen Harrier.

	Minsmere to Walberswick Ramsar
	• Heathland within the SPA (Dunwich-Westleton) supports important breeding populations of Nightjar, Woodlark as well as Dartford Warbler. Both Nightjar and Woodlark require open areas of heathland, devoid of invading scrub and trees and also require an absence of disturbance from humans and dogs etc. • Standing water - Marsh Harriers and Bittern depend on areas of open water and their associated marginal habitats - reedbeds. As the availability of open water is a key factor, so it is important that the dykes and pools receive appropriate management to ensure their continued use. • Wet grassland – waterlogged, grazed fields provide an important habitat for breeding waders (for example Avocet) and wintering wildfowl.
Vulnerabilities (includes existing pressures and trends)	• Physical damage / disturbance through trampling / recreational activities • Contamination by synthetic and/or non-synthetic toxic compounds • Changes in salinity as a result of flooding of freshwater habitats • Damage by abrasion or selective extraction • Changes in nutrient and/or organic loading • Inappropriate management (including grazing) / neglect of heathland • Summer fires • Atmospheric deposition of nitrogen
Predicted Impacts ***What are the issues arising from the plan and how might the site be affected?***	**Water Resources and Quality** • Increased/ altered drainage from earthworks and excavation • Potential for toxic contamination from accidental leakage • Radioactive discharges (accidental and routine) • Alteration of flow from abstraction • Changes to water temperature from controlled discharge **Habitat Loss and Fragmentation** • Loss of buffer habitats through construction of sea wall / marine landing facility and cooling systems • Loss of seed bank through removal of coastal habitats could prevent recolonisation of adjacent areas within the SAC.

	Minsmere to Walberswick Ramsar
	Air Quality • Local level impacts (reduced air quality, NOx gases from road/ transport/ generation sources) arising from construction, operation, decommissioning activities **Disturbance (noise, light and visual)** • Local level impacts relating primarily to construction and decommissioning activities, also relevant offsite.
Potential In-combination effects (screening) ***What other plans and programmes could lead to in-combinations effects?***	The following plans have the potential to contribute 'in-combination' impacts in relation to the key issues identified. In-combination impacts may be positive where the plans' function is to actively management those identified issues (for example Catchment Abstraction Management Strategies). **Water Resources and Quality** • Decommissioning of Sizewell A (and possibly B) • Shoreline Management Plan • Blyth Estuary Draft Strategy • Minsmere Flood Risk Management Project **Habitat Loss and Fragmentation** • Decommissioning of Sizewell A (and possibly B) • Shoreline Management Plan • Blyth Estuary Draft Strategy • Minsmere Flood Risk Management Project **Air Quality** • Local Development Frameworks (Suffolk County Council, Waveney District Council) • Decommissioning of Sizewell A (and possibly B)

	Minsmere to Walberswick Ramsar
	Disturbance • Local Development Frameworks (Suffolk County Council, Waveney District Council) • Decommissioning of Sizewell A (and possibly B)
Appropriate Assessment **Likelihood of adverse effect on integrity:**	**Water Resources and Quality** • Current Environment Agency data[23] indicates that where assessed; the ecological and chemical status of the coastal and estuarine environments near to Sizewell is assessed as 'moderate' and 'good' respectively. By 2015 the EA predicts that the ecological status will increase to 'good' and that chemical status will remain 'good'. This includes measurements taken from the mouth of the River Blyth (part of the Ramsar is adjacent to the river at Tinker's Marsh) where dissolved inorganic nitrogen is currently achieving less than 'good' ecological status. • Current assessments for the coastal water quality, further south from Sizewell along the Essex coastline indicate that the ecological and chemical status of the environments here are the same as those surrounding Sizewell but the prediction here is that the ecological status will remain 'moderate' or worse until 2015. • The ecological status of the rivers around Sizewell range from being assessed as 'poor' to 'moderate' – the chemical condition of these rivers has yet to be assessed. Groundwater chemical quality around Sizewell is assessed by the EA as being 'poor'. • Radioactive discharges are subject to targets monitored by the EA and of the non-radioactive discharges, nitrate contributions are considered to be the most significant (research cited by the EA in the nuclear sector report). In particular it is noted that there can be measurable localised impacts on sea nutrient levels in the vicinity of discharges. • Sizewell and part of the Ramsar fall within the River Yox catchment area (WRMU4). No water is available for further licensing within this unit at low flows although water may be available at higher flows with appropriate restrictions (i.e. new licences may be considered for non-consumptive uses).It may therefore be a requirement

[23] Environment Agency River Basin Management Plans: Draft Anglian River Basin District, 2008. The data used in this assessment is taken from the Draft River Basin Management Plan, which was the most up to date plan available at the time. Draft plans were presented to the Government for approval in September 2009, with final plans published in December 2009
UKTG – Water Framework Directive Website: http://www.wfduk.org/

	Minsmere to Walberswick Ramsar
	for any new developments at Sizewell to provide water supply strategies. This catchment drains to the Sizewell Belts and thence to the north via an artificial channel (the Leiston Brook) eventually to join the Minsmere River approximately 2km to the north of the nominated site. The Minsmere River discharges to the North Sea through a sluice gate. To the south of the nominated site surface water runoff is directed to the Hundred River, approximately 2.2km distant; this is a separate catchment area. • Current water quality indicators show that generally ecological and chemical levels around the coastal areas surrounding Sizewell to be 'moderate' or higher, there are some areas for concern with regards nearby rivers as well as groundwater with 'poor' ecological status. It is therefore not possible (without further information on discharge levels and quality) to conclude that discharges both radioactive and non-radioactive will not have an adverse effect on the Ramsar designation. **Habitat Loss and Fragmentation** • The Suffolk Coast and Estuaries Habitat Management Plan (CHaMP)[24] describes the main issues facing the Habitat Behaviour Units (HBU) along this stretch of coastline. HBU B incorporates the shingle bank (part of the Ramsar) which stretches between the harbour structures of the Blyth and Dunwich village which has developed as a result of long term erosion of the Blyth / Dunwich delta, moving back to form the present coastline. Continued coastal defence management work on the immediate coastline potentially damages Ramsar criterion species and habitats as a result of disturbance / modification of shingle habitat used by nesting Little Terns and is considered unsustainable as a form of flood defence in the long term. There is a continual threat of significant loss of ecological interest due to failure of the fronting shingle ridge and tidal inundation of freshwater and brackish wetland habitats to landward. This would include the extensive reedbed at Westwood Marshes which is a criterion interest for the Ramsar, together with the populations of breeding and wintering Marsh Harrier, Bittern and Bearded Tit that it supports. The man made scrapes which support breeding Avocet and a wide range of wintering waterfowl would also be inundated, as would grazing marsh in the Minsmere river valley which supports breeding waterfowl during the winter months.

[24] The Suffolk Coast and Estuaries Habitat Management Plan (CHaMP): Coastal Habitat Management Plan Final Report (October 2002)

	Minsmere to Walberswick Ramsar
	• Realignment (as proposed under the Blyth Estuary Flood Risk Management Strategy[25] and Minsmere Flood Risk Management Project[26]) or uncontrolled failure of defences within the Blyth estuary would result in significant change to supporting habitats for some of the designated SPA interests. Whilst extensive areas of saltmarsh and intertidal habitat would be created through any such controlled or uncontrolled failure of the existing defences and consequently provide additional habitats for Avocet and other wintering / breeding waterfowl, mitigation for the loss of freshwater habitats including reedbeds and grazing marsh would be a requirement in order to avoid an impact on the integrity of the freshwater habitats and associated species within the Ramsar. Shingle habitat used by Little Tern would be maintained in the longer term with a realignment of the coastline and could even be enhanced through lack of human intervention, • HBU C includes the coastline from Dunwich village to Thorpeness and includes an area of clifftop heathland. Ramsar criterion species such as Nightjar breed in the area, although their use of the clifftop as a breeding site is likely to be extremely limited. The main issue facing this HBU is the fact that the cliffs at Dunwich will continue to erode (current rate of retreat is in the order of 1 to 2m each year) with loss of cliff top heathland vegetation. The only means of protecting *in situ* the designated feature would be the full protection of the cliffs. However this is not considered appropriate as it would likely have a detrimental impact on the development of the shore (key source of sediment). Retreat is the current policy for this stretch of coastline and as such habitat creation to offset the loss of heathland vegetation is being considered. Any failure of the natural shoreline defence and secondary embankment to landward at Minsmere would also cause saline inundation and potentially result in significant change to existing designated habitats and features depending on the scale and duration of inundation. • The Shoreline Management Plan (SMP) for this area (subcell 3c Lowestoft to Harwich)[27] reports the result of analysis of the beach profiles in front of Sizewell. This suggests that since measurements resumed (gap between 1988 and 1993 due to construction of temporary and permanent works at Sizewell B) beach accretion

[25] Blyth Estuary Flood Risk Management Strategy (Environment Agency, 2007)
[26] Minsmere Flood Risk Management Project, Preferred Option Information Document, November 2008
[27] Shoreline Management Plan Subcell 3c: Lowestoft to Harwich (Environment Agency, 1997)

	Minsmere to Walberswick Ramsar
	has been recorded. Immediately in front of the cooling water pump house, however, erosion has been measured, possibly due to littoral drift being blocked by the temporary beach landing facility which was removed in 1994. Further south (opposite Sizewell A, stability and accretion is experienced. These findings provide further support to the argument that accretion along the shoreline to the north of Sizewell could result from the construction of a temporary marine landing facility with resulting impacts on the shingle habitats found here • The extent of loss / modification to marine and terrestrial habitats from the construction of cooling water culverts, sea defences and a marine landing facility is currently unknown, and its significance in the context of wider habitat changes as described in the Blyth Estuary Strategy and Minsmere Flood Risk Management Project[28] cannot be assessed. It is possible that these changes may act cumulatively or even accelerate changes identified by the CHaMP in relation to the supporting habitats for the primary designation features. It is also possible that the footprint of the nominated site could affect habitats outside of the Ramsar which are used occasionally by the Ramsar criterion species and further information would need to be gathered to confirm this. At this strategic stage where detailed development plans are unknown, it is not possible to conclude that that there will not be adverse effects on the Ramsar as a result of habitat loss. **Disturbance (noise, light and visual)** • No published studies on disturbance of birds within the Ramsar were found. However published studies on disturbance impacts more generally highlight vulnerabilities for qualifying interests of the Ramsar, namely Woodlark and Nightjar[29] and Little Tern[30] although most studies relate to recreational disturbance and highlight the significance of disturbance from dog walkers and close proximity to humans. • Site information for the SSSI units underpinning the Ramsar indicates that currently just under 50% of the habitats are in favourable condition. Given that this creates the potential for current elevated stress levels on the bird populations and the fact that Sizewell lies directly adjacent to the Ramsar designation, without knowing the full extent and nature of the development proposals, it is not possible to determine how the nature or timing of

[28] Minsmere Flood Risk Management Project, Preferred Option Information Document, November 2008
[29] A summary of the evidence base for : Disturbance effects to Annex 1 bird species of the Thames Basin Heaths, Footprint Ecology 2005
[30] Little Terns at Great Yarmouth: Disturbance to birds and implications for strategic planning, Footprint Ecology,

	Minsmere to Walberswick Ramsar
	the development may affect interest feature birds or to conclude that there will be no significant effect. **Air Quality** • Information provided by the UK Air Pollution Information System[31] indicates that air quality within the area (centred on the SPA and including Site, up to a resolution of 5km) is generally good with pollution levels for all key pollutants (sulphur dioxide, particulates, nitrogen dioxide etc.) typically low. However, sensitivities and critical loads have been identified for some of the habitats within the SAC and have revealed that for some pollutants, current deposition levels are close to or within exceedance level ranges. For both heathland and perennial vegetation of stony banks, current deposition levels for Nitrogen when compared to critical loads for these habitats is in exceedance by a range of 4.4 to -5.6kg/N/yr. The effects of this eutrophication for heathland can be a transition of heather to grass and a decline in lichens whilst for perennial vegetation of stony banks there can be an increase in overall biomass resulting in increased competition. Heathland is also sensitive to increased acidification, with leaching causing a decrease in soil base saturation, increasing the availability of Al3+ ions, the mobilization of which may cause toxicity to plants and mycorrhiza. Deposition is currently at exceedance levels of 0.89 kg eq/ha/yr. • The Environment Agency assesses that, non-radioactive aerial emissions (sulphur dioxide, nitrogen oxides and volatile organic compounds) from nuclear power stations are extremely low compared with other regulated industries and the Agency does not consider them to be an environmental priority. The Agency's most recent available assessment of radioactive aerial emissions indicates that all fall within authorised limits.[32] • Air quality issues around Sizewell are considered to potentially be most significant during construction and decommissioning phases (transport etc). The potential for cumulative effects from other plans and programmes is minimised by sustainable transport measures set out in the Local Transport Plan, and the main focus of new housing development being located away from Sizewell, more than 30km away to the south west near Ipswich. However, cumulative effects from the decommissioning of Sizewell A could be significant. Therefore, in the

[31] [31] http://www.apis.ac.uk/
[32] Measuring Environmental Performance: Sector Report for the Nuclear Industry (Environment Agency, Nov 2005).

	Minsmere to Walberswick Ramsar
	context of: known air quality conditions and the European site characterisation data which indicates that the qualifying features are considered vulnerable or at risk for issues of air quality; it is not possible to conclude that that there will not be adverse on habitats within the Ramsar.
Possible Avoidance and Mitigation Measures – *includes recommendations for policy/proposals*	**Water Resource and Quality** • Avoiding adverse effects on surface, ground and estuarine waters is primarily the responsibility of the Water Companies (resource planning) and the Environment Agency (abstraction licensing and discharge regulation). However, the Nuclear NPS can direct requirements for efficiency of water use and require that issues relating to supply and discharge (including potential effects on European sites) are in place prior to the implementation of the nominated site proposals. **Habitat Loss and Fragmentation** • Where proposals for design and build remain under development, the Nuclear NPS should seek to prioritise the avoidance of direct habitat impacts, for example through amended boundaries for the sea wall or design alterations for the marine landing facility, that protect the integrity of the designated site. **Disturbance (noise, light, visual)** • Disturbance events in relation to bird species are most significant when they are irregular/ sudden and unpredictable. Noise, light and visual impacts can be managed at a site level through phasing and timing that takes account of breeding and feeding cycles and should be supported by information on flight lines/ migration routes/ feeding and roosting areas should also be obtained. Precise detail and the nature of the measures required would need to be agreed with the Statutory Body prior to the commencement of development. These measures would form part of the wider site management plan that developers could be required to agree and implement prior to commencement. **Air Quality** • Air quality impacts have been assessed as being significant for the European Sites around Sizewell, it is appropriate that the Nuclear NPS takes account of potential air quality impacts through its direction to the IPC. Requirements should include sustainable transport plans including, for example: the use of non-road transport

	Minsmere to Walberswick Ramsar
	where possible; the phasing of development; and robust monitoring at sites by operators (and the EA as appropriate) to track changes throughout the lifecycle of proposed operations. In particular, the monitoring should account for the potential for cumulative impacts where the phasing between existing power stations and the new build overlaps.
Conclude no adverse effect on integrity?	● It is not possible at this stage of the development of the Nuclear NPS to say that proposals at Sizewell will not have significant adverse effects on Minsmere to Walberswick Ramsar as a result of changes to water quality, indirect effects associated with habitat loss/ fragmentation, disturbance and air quality.

Sandlings SPA

- **Location: 521114 N / 013057 E**

Size (ha): 3391.8

- **Designation: SPA**

	Sandlings SPA
Qualifying Features	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; **Nightjar** *Caprimulgus europaeus*, 109 pairs representing at least 3.2% of the breeding population in Great Britain **Woodlark** *Lullula arborea*, 154 pairs representing at least 10.3% of the breeding population in Great Britain
Conservation Objectives	To maintain, in favourable condition, the habitats for the populations of *Annex 1* bird species (Woodlark and Nightjar) of European importance, with particular reference to: • lowland heathland; and • coniferous woodland.
Key Environmental Conditions (factors that maintain site integrity)	• Management of the heathland and confer plantations to maintain diverse vegetation structure and composition. For heathland this would involve low intensity grazing to prevent scrub encroachment. • Disturbance should be kept to a minimum; especially in clear felled areas which may support ground nesting birds. Management should ensure that necessary measures are undertaken to control recreational and other activities such as fire setting and vehicle scrambling. Suitable measures may include a system to allow for the effective control of fires, such as fire breaks, access for fire-fighting vehicles and emergency water, as well as the careful management of public access.
Vulnerabilities (includes existing pressures and	• Maintenance of open areas in the future relies on clear felling as the main silvicultural practice and the maintenance of some areas earmarked for Woodlark and Nightjar habitat. These objectives are included in the

	Sandlings SPA
trends) ***Details at Appendix 1***	East Anglia Forest District Strategic Plan. • Lack of traditional management has resulted in the heathland being subjected to sucessional changes with the consequent spread of bracken, shrubs and trees. This is being addressed through habitat management work under the Countryside Stewardship Scheme and Tomorrows Heathland Heritage, and is resulting in the restoration of more typical heathland habitat favourable to both Nightjar and Woodlark. • Human influences on the site include the frequent presence of travellers' caravans. This is a longstanding problem, and a variety of mechanisms are utilised to keep them from the heathland; the digging of trenches and construction of earth barriers around the borders of sites is proving effective.
Predicted Impacts ***What are the issues arising from the plan and how might the site be affected?***	**Water Resources and Quality** • Increased/ altered drainage from earthworks and excavation • Potential for toxic contamination from accidental leakage • Radioactive discharges (accidental and routine) • Alteration of flow from abstraction • Changes to water temperature from controlled discharge **Habitat Loss and Fragmentation** • Loss of buffer habitats through construction of sea wall / marine landing facility and cooling systems • Loss of seed bank through removal of coastal habitats could prevent recolonisation of adjacent areas within the SAC. **Air Quality** • Local level impacts (reduced air quality, NOx gases from road/ transport/ generation sources) arising from construction, operation, decommissioning activities **Disturbance (noise, light and visual)** • Local level impacts relating primarily to construction and decommissioning activities, also relevant offsite.

	Sandlings SPA
Potential In-combination effects (screening) ***What other plans and programmes could lead to in-combinations effects?***	The following plans have the potential to contribute 'in-combination' impacts in relation to the key issues identified. In-combination impacts may be positive where the plans' function is to actively management those identified issues (for example Catchment Abstraction Management Strategies). **Water Resources and Quality** • Decommissioning of Sizewell A (and possibly B) • Local Development Frameworks (Suffolk County Council, Suffolk Coastal District Council) **Habitat Loss and Fragmentation** • Local Development Frameworks (Suffolk County Council, Suffolk Coastal District Council) • Sandlings Forest Recreation Strategy **Air Quality** • Local Development Frameworks (Suffolk County Council, Suffolk Coastal District Council) • Decommissioning of Sizewell A (and possibly B) **Disturbance** • Decommissioning of Sizewell A (and possibly B) • Local Development Frameworks (Suffolk County Council, Suffolk coastal Local Development Framework) • Sandlings Forest Recreation Strategy
Appropriate Assessment **Likelihood of adverse effect on integrity:**	**Water Resources and Quality** • The six component sites which comprise Sandlings SPA are dispersed over several Water Resource Management Units (WRMUs).The closest part of the SPA to the nominated site (The Walks) lies within the same catchment as the nominated site (River Yox WRMU). No water is available for further licensing within this unit at low flows although water may be available at higher flows with appropriate restrictions (i.e. new licences may be considered for non-consumptive uses).It may therefore be a requirement for any new developments at Sizewell to provide water supply strategies. Current water quality within Leiston Beck which this catchment

	Sandlings SPA
	drains into is currently assessed as having 'moderate' ecological status with dissolved oxygen levels currently achieving 'less than good' status. • Much of the remainder of the SPA falls within the Hundred River WRMU, into which any surface run off from Sizewell A currently discharges. It is not understood at this stage how drainage will operate within the nominated site and whether or not the proposed development will also discharge into this catchment. The current ecological status of water quality within the Hundred River is 'moderate', although two elements are noted to be achieving 'less than good' status these are: dissolved oxygen and phosphate. • Whilst water quality is not an identified vulnerability for the site, pathways exist which could result in a localised degradation in water quality as a result of both abstraction in an area that is currently already at or nearing capacity in terms of consumptive abstraction licences as well a reduction in the ecological status of watercourses which discharge into the same catchment as the SPA through sedimentation, pollution incidents etc. Consequently, without further information regarding abstraction and routine discharge strategies, it is not possible to conclude that water quality impacts that arise as a result of the proposed development will not have an adverse effect on the key supporting habitats (heathland, acid grassland and conifer plantations) for the interest features of the SPA. **Habitat Loss and Fragmentation** • Of the six component SSSI units, four are in favourable condition. The closest SSSI unit to the nominated site is Leiston-Aldeburgh SSSI and this unit is currently assessed as being less than 50% favourable, the remainder classed as unfavourable recovering. This would suggest that the key supporting habitats for Nightjar and Woodlark within this unit at least are currently under stress which may increase their vulnerability to any habitat loss or fragmentation impacts should they arise through infrastructure works, notably along the route of Lover's Lane. • Without further information regarding details on infrastructure proposals as well as usage of the affected habitats by Woodlark and Nightjar, it is not possible to conclude that habitat loss / fragmentation impacts will not result in a significant adverse effect on the integrity of the SPA. **Air Quality**

	Sandlings SPA
	• Information provided by the UK Air Pollution Information System[33] indicates that air quality within the area (centred on the SPA) is generally good with pollution levels for all key pollutants (sulphur dioxide, particulates, nitrogen dioxide etc.) typically low. • Sensitivities and critical loads have been identified for key supporting habitats for the qualifying interests. All pollutants which have the potential to affect lowland heathland are currently below critical loads for this habitat type within the area. For planted coniferous woodland, current Nitrogen deposition levels of 13.7kg N/ha/year when compared to published critical loads for this habitat are in exceedence by up to 3.7kg N/ha/year. In forest ecosystems, subject to increased N deposition, effects on the tree components are uncommon and vary with species type and geographical location. However changes to woodland ground flora have been recorded and species such as *Deschampsia flexuosa*, *Holcus lanatus*, *Rubus idaeus* and *Urtica dioica* can become more abundant. Notwithstanding more immediate effects of management practices and other local factors, this effect could potentially impact upon the qualifying interest features of the SPA through a reduction in the availability of bare ground and areas of low-growing vegetation suitable for nesting Woodlark and Nightjar. • The Environment Agency assesses that, non-radioactive aerial emissions (sulphur dioxide, nitrogen oxides and volatile organic compounds) from nuclear power stations are extremely low compared with other regulated industries and the Agency does not consider them to be an environmental priority. • The Agency's most recent available assessment of radioactive aerial emissions indicates that all fall within authorised limits.[34] • Air quality issues around Sizewell are considered to potentially be most significant during construction and decommissioning phases (transport etc). The potential for cumulative effects from other plans and programmes is minimised by sustainable transport measures set out in the Local Transport Plan, and the main focus of new housing development being located away from Sizewell, to the south west near Ipswich. However, cumulative effects from the decommissioning of Sizewell A could be significant. Therefore, in the context of: known air quality conditions and the European site characterisation data which indicates that the qualifying features are

[33] http://www.apis.ac.uk/

[34] Measuring Environmental Performance: Sector Report for the Nuclear Industry (Environment Agency, Nov 2005).

	Sandlings SPA
	considered vulnerable or at risk for issues of air quality; it is not possible to conclude that that there will not be adverse on the SPA. **Disturbance (noise, light, visual)** • No published studies relating to disturbance of birds within Sandlings SPA were found. However published studies on disturbance impacts more generally highlight vulnerabilities with regards recreational pressures for the qualifying interest species, Woodlark and Nightjar[35]. Recreational disturbance and particularly disturbance from dog walkers can result in reduced densities of breeding pairs of both species within an area. Nests which failed were significantly closer to paths, tended to be closer to the main points of access to heaths, in areas with higher footpath density, notably of high levels of use, and in more sparsely vegetated locations. The flushing rate of Nightjars from the nest was associated with the height of vegetation around the nest and the extent of nest cover. • Site information for the SSSI units underpinning the SPA indicates that currently approximately 65% of the habitats are in favourable condition, and this suggests that be insufficient suitable alternative habitats within the SPA away from areas that could potentially be subjected by disturbance impacts as a result of the proposed development. • Given that disturbance impacts as a result of construction activities are currently unquantified, the combined effect of the noise / light / visual disturbance impacts with disturbance resulting from the predicted additional recreational pressures, it is not possible to conclude at this strategic stage that there will be no significant effect on the bird populations within the SPA.
Possible Avoidance and Mitigation Measures – *includes recommendations for policy/proposals*	**Water Resource and Quality** • Avoiding adverse effects on surface, ground and estuarine waters is primarily the responsibility of the Water Companies (resource planning) and the Environment Agency (abstraction licensing and discharge regulation). However, the Nuclear NPS can direct requirements for efficiency of water use and require that issues relating to supply and discharge (including potential effects on European sites) are in place prior to the implementation of

[35] A summary of the evidence base for : Disturbance effects to Annex 1 bird species of the Thames Basin Heaths, Footprint Ecology 2005

	Sandlings SPA
	the nominated site proposals. **Habitat Loss and Fragmentation** • Where proposals for design and build remain under development, the Nuclear NPS should seek to prioritise the avoidance of direct habitat impacts, for example through avoiding works to Lover's Lane as an access / infrastructure route, that protect the integrity of the designated site. **Disturbance (noise, light, visual)** • Disturbance events in relation to bird species are most significant when they are irregular/ sudden and unpredictable. Noise, light and visual impacts can be managed at a site level through phasing and timing that takes account of breeding and feeding cycles and should be supported by information on flight lines/ migration routes/ feeding and roosting areas should also be obtained. Precise detail and the nature of the measures required would need to be agreed with the Statutory Body prior to the commencement of development. These measures would form part of the wider site management plan that developers could be required to agree and implement prior to commencement. **Air Quality** • While air quality impacts are not assessed as being significant at this European site, it is appropriate that Nuclear NPS takes account of potential air quality impacts through requirements, particularly at a local level for sustainable transport plans including for example: the use of non-road transport where possible, phasing of development and robust monitoring at sites to track changes. In particular, the monitoring should account for the potential for cumulative impacts where the phasing between the existing power station and the new build overlaps.
Conclude no adverse effect on integrity?	• It is not possible at this stage of the development of the Nuclear NPS to say that proposals at Sizewell will not have significant adverse effects on the integrity of the interest features for Sandlings SPA as a result of changes to water quality, indirect effects associated with habitat loss/ fragmentation, disturbance and air quality.

Orfordness – Shingle Street SAC

- **Location: 520453 N / 013341 E**
- **Size (ha): 901.19**
- **Designation: SAC**

	Orfordness – Shingle Street SAC
Qualifying Features	Annex I habitats primary reason for selection: **1150 Coastal lagoons** * Priority feature **1210 Annual vegetation of drift lines** ***Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:*** **1220 Perennial vegetation of stony banks**
Conservation Objectives	Subject to natural change, to maintain in favourable condition: • Coastal lagoons, • Annual vegetation of drift lines • Perennial vegetation of stony banks.
Key Environmental Conditions (factors that maintain site integrity)	• **Coastal processes** - The conservation of the site features is dependent on the maintenance of erosional forces along the coastline. Many features, such as the shingle banks are rarely stable in the long term, exhibiting continuous longshore drift with shingle being transported and sorted by wave action. The dynamic nature is an important aspect of the qualifying interest features and colonising species are able to tolerate periodic disturbance, which may involve the total removal of the surface and subsequent recolonisation with vegetation. Species are also tolerant of saltwater inundation, as the beaches are often over-topped by the tide or subject to spray from waves breaking over the beach.

	Orfordness – Shingle Street SAC
	• **Manage public access and activities**- A key management requirement is to avoid or minimise surface disturbance, especially in the more open communities. Many of the vegetation types and species associated with shingle are fragile and vulnerable to damage from trampling. This breaks up the fine humus that develops in the upper layers of the shingle that is vital for the plants to survive. Where recreational pressures are significant enough to result in the loss of vegetation cover, or prevent its recovery, it may be necessary to take steps to manage access.
Vulnerabilities (includes existing pressures and trends)	• Physical damage / disturbance through trampling / recreational activities • Contamination by synthetic and/or non-synthetic toxic compounds • Damage by abrasion or selective extraction • Changes in nutrient and/or organic loading • Inappropriate management (including grazing) / neglect of heathland • Summer fires • Atmospheric deposition of nitrogen
Predicted Impacts ***What are the issues arising from the plan and how might the site be affected?***	**Water Resources and Quality** • Potential for toxic contamination from accidental leakage • Radioactive discharges (accidental and routine) **Habitat Loss and Fragmentation** • Interruption of sediment flows along coast through construction of sea wall / marine landing facility, resulting in reduced material for natural re-charge of shingle bank.
Potential In-combination effects (screening) ***What other plans and***	The following plans have the potential to contribute 'in-combination' impacts in relation to the key issues identified. In-combination impacts may be positive where the plans' function is to actively management those identified issues (for example Catchment Abstraction Management Strategies).

	Orfordness – Shingle Street SAC
programmes could lead to in-combinations effects?	**Water Resources and Quality** • Local Development Frameworks (Suffolk County Council, Suffolk Coastal District Council) • Decommissioning of Sizewell A (and possibly B) • Shoreline Management Plan • Aldeburgh Coast and Estuary Strategy **Habitat Loss and Fragmentation** • Local Development Frameworks (Suffolk County Council, Suffolk Coastal District Council) • Shoreline Management Plan • Decommissioning of Sizewell A (and possibly B) • Aldeburgh Coast and Estuary Strategy
Appropriate Assessment **Likelihood of adverse effect on integrity:**	**Water Resources and Quality** • Current Environment Agency data[36] indicates that where assessed; the ecological and chemical status of the coastal and estuarine environments near to Sizewell is assessed as 'moderate' and 'good' respectively. By 2015 the EA predicts that the ecological status will increase to 'good' and that chemical status will remain 'good'. Measurements taken from the tidal reaches of the rivers Alde and Ore reveal water quality here as of 'moderate' ecological status (chemical status is yet to be assessed). Phosphate was the only element noted to be currently achieving 'less than good' ecological status. No information on water quality within the lagoons was available. • Current assessments for the coastal water quality, further south from Sizewell along the Essex coastline indicate that the ecological and chemical status of the environments here are the same as those surrounding Sizewell but the prediction here is that the ecological status will remain 'moderate' or worse until 2015.

[36] Environment Agency River Basin Management Plans: Draft Anglian River Basin District, 2008. The data used in this assessment is taken from the Draft River Basin Management Plan, which was the most up to date plan available at the time. Draft plans were presented to the Government for approval in September 2009, with final plans published in December 2009
UKTG – Water Framework Directive Website: http://www.wfduk.org/

	Orfordness – Shingle Street SAC
	• There is a weak supply of material moving south past Aldeburgh. Beyond Aldeburgh net drifts tend to increase to Orford Ness and once beyond the Ness material moves south to Shingle Street. The key control points are Aldeburgh and East Lane with the entrance to the Alde-Ore estuary retaining and controlling material moving south[7]. It is these coastal processes that could potentially transport contaminants along the coastline from the nominated site and towards the mouth of the Alde-Ore estuary, where they could accumulate over time. • Radioactive discharges are subject to targets monitored by the EA and of the non-radioactive discharges, nitrate contributions are considered to be the most significant (research cited by the EA in the nuclear sector report). In particular it is noted that there can be measurable localised impacts on sea nutrient levels in the vicinity of discharges. • Given the available published information, it is not possible (without further information on discharge levels and quality) to conclude that discharges both radioactive and non-radioactive will not have an adverse effect on the SAC. **Habitat Loss and Fragmentation** • The feed of shingle that is transported around Thorpe Ness moves south beyond Aldeburgh to form the beaches of Orford Spit and Ness. Orfordness is defined as a downdrift accretion ness with downdrift accretion accompanied by erosion on the updrift side. The erosion includes the 'roll over' of shingle on to the backing marsh[7] • Without further assessment regarding the location, size and design of the proposed coastal defences and any marine landing facility, it is not possible to conclude that these structures will not result in degradation of the vegetated shingle communities of the SAC as a result of impacts to the shingle bank itself.
Possible Avoidance and Mitigation Measures – *includes recommendations for policy/proposals*	**Water Resource and Quality** • Avoiding adverse effects on surface, ground and estuarine waters is primarily the responsibility of the Water Companies (resource planning) and the Environment Agency (abstraction licensing and discharge regulation). However, the Nuclear NPS can direct requirements for efficiency of water use and require that issues relating to supply and discharge (including potential effects on European sites) are in place prior to the implementation of the nominated site proposals.

	Orfordness – Shingle Street SAC
	Habitat Loss and Fragmentation • The Nuclear NPS should require sensitive design of all coastal defences / marine landing structures which are permeable to sediment flows and do not interrupt coastal processes, thus protecting the integrity of the designated site.
Conclude no adverse effect on integrity?	• It is not possible at this stage of the development of the Nuclear NPS to say that proposals at Sizewell will not have significant adverse effects on Orfordness – Shingle Street SAC as a result of changes to water quality and indirect effects associated with this on the qualifying interest features.

Alde-Ore and Butley Estuaries SAC

- **Location: 013408 E/ 520606 N**
- **Size (ha): 1561.53**
- **Designation: SAC**

	Alde-Ore and Butley Estuaries SAC
Qualifying Features	***Annex I habitats that are a primary reason for selection of this site*** **1130 Estuaries** ***Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site*** **1140 Mudflats and sandflats not covered by seawater at low tide** **1330 Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)**
Conservation Objectives	Subject to natural change, to maintain in favourable condition: • Atlantic saltmeadows; including the following subfeatures: low/mid-marsh communities, upper marsh communities and upper marsh transitional communities; • Mudflats and sandflats not covered by the sea at low tide, including the following subfeatures: mud communities, muddy sand communities and sand and gravel communities; and • Estuaries, including the following subfeatures: Saltmarsh communities**,** intertidal mudflat and sandflat communities, subtidal mud communities, subtidal muddy sand communities and subtidal mixed sediment communities
Key Environmental Conditions (factors that maintain site integrity)	• In the absence of constraints such as flood banks and hard defences, the estuary would adjust to sea level rise by inland translocation of intertidal habitats. Where constraints occur, space to accommodate greater volumes of water is compressed and the extent and quality of intertidal habitats declines.

	Alde-Ore and Butley Estuaries SAC
	• Where saltmarshes require management this has traditionally been achieved by grazing, and previously used regimes should be continued. However, where there has not been a history of grazing, the saltmarsh will be able to maintain itself and grazing-sensitive species are likely to be present, therefore grazing should not be introduced. • Good water quality and sediment quality should be maintained, and the sediment budget within the estuarine or coastal system should not be restricted by anthropogenic influences. • The location and extent of mud or sandflats is dependent on the extent to which the estuary or coast where they occur is constrained from responding to sea level rise and changing sediment regimes. Management needs to create space to enable landward roll-back to take place in response to sea-level rise, and should also allow the system to be dynamic and retain the flexibility to respond to associated changes such as the movement of physical features within the system, i.e. migrating sub tidal communities. • A key management requirement is to avoid or minimise surface disturbance, especially in the more open communities. Many of the vegetation types and species associated with shingle are fragile and vulnerable to damage from trampling. This breaks up the fine humus that develops in the upper layers of the shingle that is vital for the plants to survive.
Vulnerabilities (includes existing pressures and trends)	• Physical loss of habitats (especially salt marsh) through sea level rise, sediment recycling, proposals for managed realignment scheme • Physical damage / disturbance through trampling / recreational activities • Disturbance to feeding / breeding and roosting birds • Contamination by synthetic and/or non-synthetic toxic compounds and bioaccumulation effects • Changes in salinity as a result of flooding of freshwater habitats • Damage by abrasion or selective extraction • Changes in nutrient and/or organic loading • Selective extraction of species from intertidal area – wildfowling and bait digging

	Alde-Ore and Butley Estuaries SAC
Predicted Impacts ***What are the issues arising from the plan and how might the site be affected?***	**Water Resources and Quality** • Potential for toxic contamination from accidental leakage • Radioactive discharges (accidental and routine) **Habitat Loss and Fragmentation** • Interruption of sediment flows along coast through construction of sea wall / marine landing facility, resulting in reduced material for natural re-charge of shingle bank at Orfordness. Depletion of the natural protection from coastal erosion could lead to loss / modification of qualifying habitats within the estuary.
Potential In-combination effects (screening) ***What other plans and programmes could lead to in-combinations effects?***	The following plans have the potential to contribute 'in-combination' impacts in relation to the key issues identified. In-combination impacts may be positive where the plans' function is to actively management those identified issues (for example Catchment Abstraction Management Strategies). **Water Resources and Quality** • Local Development Frameworks (Suffolk County Council, Suffolk Coastal District Council) • Decommissioning of Sizewell A (and possibly B) • Shoreline Management Plan • Aldeburgh Coast and Estuary Strategy **Habitat Loss and Fragmentation** • Local Development Frameworks (Suffolk County Council, Suffolk Coastal District Council) • Shoreline Management Plan • Decommissioning of Sizewell A (and possibly B) • Aldeburgh Coast and Estuary Strategy
Appropriate Assessment	**Water Resources and Quality**

	Alde-Ore and Butley Estuaries SAC
Likelihood of adverse effect on integrity:	• Current Environment Agency data[37] indicates that where assessed; the ecological and chemical status of the coastal and estuarine environments near to Sizewell is assessed as 'moderate' and 'good' respectively. By 2015 the EA predicts that the ecological status will increase to 'good' and that chemical status will remain 'good'. Measurements taken from the tidal reaches of the rivers Alde and Ore reveal water quality here as of 'moderate' ecological status (chemical status is yet to be assessed). Phosphate was the only element noted to be currently achieving 'less than good' ecological status. • Current assessments for the coastal water quality, further south from Sizewell along the Essex coastline indicate that the ecological and chemical status of the environments here are the same as those surrounding Sizewell but the prediction here is that the ecological status will remain 'moderate' or worse until 2015. • There is a weak supply of material moving south past Aldeburgh. Beyond Aldeburgh net drifts tend to increase to Orford Ness and once beyond the Ness material moves south to Shingle Street. The key control points are Aldeburgh and East Lane with the entrance to the Alde-Ore estuary retaining and controlling material moving south[7]. It is these coastal processes that could potentially transport contaminants along the coastline from the nominated site and towards the mouth of the Alde-Ore estuary, where they could accumulate over time. • Radioactive discharges are subject to targets monitored by the EA and of the non-radioactive discharges, nitrate contributions are considered to be the most significant (research cited by the EA in the nuclear sector report). In particular it is noted that there can be measurable localised impacts on sea nutrient levels in the vicinity of discharges. • Current data suggests that the inter-tidal qualifying features are currently under environmental stress as a result of other factors, including, it is believed, sea level rise which is causing loss of salt marsh due to excessive submergence.

[37] Environment Agency River Basin Management Plans: Draft Anglian River Basin District, 2008. The data used in this assessment is taken from the Draft River Basin Management Plan, which was the most up to date plan available at the time. Draft plans were presented to the Government for approval in September 2009, with final plans published in December 2009
UKTG – Water Framework Directive Website: http://www.wfduk.org/

	Alde-Ore and Butley Estuaries SAC
	• Given the available published information, it is not possible (without further information on discharge levels and quality) to conclude that discharges both radioactive and non-radioactive will not have an adverse effect on the SAC. **Habitat Loss and Fragmentation** • The feed of shingle that is transported around Thorpe Ness moves south beyond Aldeburgh to form the beaches of Orford Spit and Ness. Orfordness is defined as a downdrift accretion ness with downdrift accretion accompanied by erosion on the updrift side. The erosion includes the 'roll over' of shingle on to the backing marsh[7] • The Alde-Ore estuary is in many respects not a typical estuary; essentially it consists of two tidal rivers, the Alde-Ore and the Butley River, with a tidal basin near the head of the Alde and does not display the trumpet plan shape which is characteristic of many typical estuaries. The unusual morphology of the Alde-Ore results primarily from the development and southwards growth of the Orfordness spit during the later Holocene. Freshwater input and tidal ranges for the River Alde and Butley River are relatively small and consequently tidal flows in and out of the estuaries are relatively weak[38]. These factors suggest that the maintenance of the shingle barrier at Orfordness is essential for the maintenance of estuary morphology. • Without further assessment regarding the location, size and design of the proposed coastal defences and any marine landing facility, it is not possible to conclude that these structures will not result in degradation of the shingle bank at Orfordness with resulting impacts on qualifying habitats within this SAC.
Possible Avoidance and Mitigation Measures – *includes*	**Water Resource and Quality** • Avoiding adverse effects on surface, ground and estuarine waters is primarily the responsibility of the Water Companies (resource planning) and the Environment Agency (abstraction licensing and discharge regulation).

[38] Pye, K. (2005) Alde and Ore Estuary Flood Management Strategy- Assessment of Background Evidence and Recommendations for Further Action: External Investigation Report EX509

	Alde-Ore and Butley Estuaries SAC
recommendations for policy/proposals	However, the Nuclear NPS can direct requirements for efficiency of water use and require that issues relating to supply and discharge (including potential effects on European sites) are in place prior to the implementation of the nominated site proposals. **Habitat Loss and Fragmentation** • The Nuclear NPS should require sensitive design of all coastal defences / marine landing structures which are permeable to sediment flows and do not interrupt coastal processes, thus protecting the integrity of the designated site.
Conclude no adverse effect on integrity?	• It is not possible at this stage of the development of the Nuclear NPS to say that proposals at Sizewell will not have significant adverse effects on Alde-Ore Estuary SAC as a result of changes to water quality as well as through indirect habitat loss / fragmentation effects.

Alde-Ore Estuary SPA

- **Location: 520458 N / 013303 E**
- **Size (ha): 2416.87**
- **Designation: SPA**

	Alde- Ore Estuary SPA
Qualifying Features	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*, 104 pairs representing at least 17.6% of the breeding population in Great Britain • **Little Tern** *Sterna albifrons*, 48 pairs representing at least 2.0% of the breeding population in Great Britain • **Marsh Harrier** *Circus aeruginosus*, 3 pairs representing at least 1.9% of the breeding population in Great Britain • **Sandwich Tern** *Sterna sandvicensis*, 169 pairs representing at least 1.2% of the breeding population in Great Britain Over winter; • **Avocet** *Recurvirostra avosetta*, 766 individuals representing at least 60.3% of the wintering population in Great Britain 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: During the breeding season; • **Lesser Black-backed Gull** *Larus fuscus*, 21,700 pairs representing at least 17.5% of the breeding Western Europe/Mediterranean/Western Africa population (Count as at 1998)

	Alde- Ore Estuary SPA
	Over winter; • **Redshank** *Tringa totanus*, 1,919 individuals representing at least 1.3% of the wintering Eastern Atlantic - wintering population **Assemblage qualification: A seabird assemblage of international importance** • The area qualifies under **Article 4.2** of the Directive (79/409/EEC) by regularly supporting at least 20,000 seabirds • During the breeding season, the area regularly supports 59,118 individual seabirds (Count period ongoing) including: Herring Gull *Larus argentatus*, Black-headed Gull *Larus ridibundus*, Lesser Black-backed Gull *Larus fuscus*, Little Tern *Sterna albifrons*, Sandwich Tern *Sterna sandvicensis*. **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 24,962 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: Black-tailed Godwit *Limosa limosa islandica*, Dunlin *Calidris alpina alpina*, Lapwing *Vanellus vanellus*, Shoveler *Anas clypeata*, Teal *Anas crecca*, Wigeon *Anas penelope*, Shelduck *Tadorna tadorna*, White-fronted Goose *Anser albifrons albifrons,* Redshank *Tringa totanus*, Avocet *Recurvirostra avosetta*.
Conservation Objectives	The conservation objectives for this site are that, subject to natural change, the habitats listed below should be maintained in favourable condition: • Shingle • Shallow coastal waters • Intertidal mudflats and sandflats

	Alde- Ore Estuary SPA
	• Saltmarsh
Key Environmental Conditions (factors that maintain site integrity)	The important bird populations and assemblages at this site require a functional estuary which is capable of supporting intertidal habitat for feeding and roosting. The most important factors related to this are: • Current extent and distribution of suitable feeding and roosting habitat (for example saltmarsh, mudflats); • Sufficient prey availability (for example small fish, crustaceans and worms); • Levels of disturbance consistent with maintaining conditions for bird feeding and roosting; • Water quality necessary to maintain intertidal plant and animal communities; and • Water quantity and salinity gradients necessary to maintain saltmarsh conditions suitable for bird feeding and roosting.
Vulnerabilities (includes existing pressures and trends)	• Physical loss of habitats (especially salt marsh) through sea level rise, sediment recycling, proposals for managed realignment scheme • Physical damage / disturbance through trampling / recreational activities • Disturbance to feeding / breeding and roosting birds • Contamination by synthetic and/or non-synthetic toxic compounds and bioaccumulation effects • Changes in salinity as a result of flooding of freshwater habitats • Damage by abrasion or selective extraction • Changes in nutrient and/or organic loading • Selective extraction of species from intertidal area – wildfowling and bait digging
Predicted Impacts ***What are the issues arising from the plan and how might the site be affected?***	**Water Resources and Quality** • Potential for toxic contamination from accidental leakage • Radioactive discharges (accidental and routine) **Habitat Loss and Fragmentation**

	Alde- Ore Estuary SPA
	• Interruption of sediment flows along coast through construction of sea wall / marine landing facility, resulting in reduced material for natural re-charge of shingle bank at Orfordness. Depletion of the natural protection from coastal erosion could lead to loss / modification of qualifying habitats within the estuary.
Potential In-combination effects (screening) ***What other plans and programmes could lead to in-combinations effects?***	The following plans have the potential to contribute 'in-combination' impacts in relation to the key issues identified. In-combination impacts may be positive where the plans' function is to actively management those identified issues (for example Catchment Abstraction Management Strategies). **Water Resources and Quality** • Local Development Frameworks (Suffolk County Council, Suffolk Coastal District Council) • Decommissioning of Sizewell A (and possibly B) • Shoreline Management Plan • Aldeburgh Coast and Estuary Strategy **Habitat Loss and Fragmentation** • Local Development Frameworks (Suffolk County Council, Suffolk Coastal District Council) • Shoreline Management Plan • Decommissioning of Sizewell A (and possibly B) • Aldeburgh Coast and Estuary Strategy
Appropriate Assessment **Likelihood of adverse effect on integrity:**	**Water Resources and Quality** • Current Environment Agency data[39] indicates that where assessed; the ecological and chemical status of the coastal and estuarine environments near to Sizewell is assessed as 'moderate' and 'good' respectively. By

[39] Environment Agency River Basin Management Plans: Draft Anglian River Basin District, 2008. The data used in this assessment is taken from the Draft River Basin Management Plan, which was the most up to date plan available at the time. Draft plans were presented to the Government for approval in September 2009, with final plans published in December 2009
UKTG – Water Framework Directive Website: http://www.wfduk.org/

	Alde- Ore Estuary SPA
	2015 the EA predicts that the ecological status will increase to 'good' and that chemical status will remain 'good'. Measurements taken from the tidal reaches of the rivers Alde and Ore reveal water quality here as of 'moderate' ecological status (chemical status is yet to be assessed). Phosphate was the only element noted to be currently achieving 'less than good' ecological status. • Current assessments for the coastal water quality, further south from Sizewell along the Essex coastline indicate that the ecological and chemical status of the environments here are the same as those surrounding Sizewell but the prediction here is that the ecological status will remain 'moderate' or worse until 2015. • There is a weak supply of material moving south past Aldeburgh. Beyond Aldeburgh net drifts tend to increase to Orford Ness and once beyond the Ness material moves south to Shingle Street. The key control points are Aldeburgh and East Lane with the entrance to the Alde-Ore estuary retaining and controlling material moving south[7]. It is these coastal processes that could potentially transport contaminants along the coastline from the nominated site and towards the key supporting habitats for the SPA at the mouth of the Alde-Ore estuary, where they could accumulate and potentially impact qualifying interest features either through bioaccumulation and changes to prey availability • Radioactive discharges are subject to targets monitored by the EA and of the non-radioactive discharges, nitrate contributions are considered to be the most significant (research cited by the EA in the nuclear sector report). In particular it is noted that there can be measurable localised impacts on sea nutrient levels in the vicinity of discharges. • Information on waterbird trends at this site and their regional (sub-national) and national contexts contained within Wetland Bird Survey (WeBS) Reports were consulted and revealed that two species (European White-fronted Goose and Shelduck are considered to be on 'high alert' for this site). However, this assessment is caveated by the fact that these recent declines mirror national trends and annual variabilties and may not necessarily be attributed to site-specific conditions. Redshank and Dunlin are also on 'medium alert' and the reasons for the fall in numbers of these species is thought to be a combination of large-scale and local factors.[40] • Given the available published information, it is not possible (without further information on discharge levels and quality) to conclude that discharges both radioactive and non-radioactive will not have an adverse effect on the SPA.

[40] www.bto.org/survey/webs/webs-alerts-index.htm

	Alde- Ore Estuary SPA
	Habitat Loss and Fragmentation • The feed of shingle that is transported around Thorpe Ness moves south beyond Aldeburgh to form the beaches of Orford Spit and Ness. Orfordness is defined as a downdrift accretion ness with downdrift accretion accompanied by erosion on the updrift side. The erosion includes the 'roll over' of shingle on to the backing marsh[7] • The Alde-Ore estuary is in many respects not a typical estuary; essentially it consists of two tidal rivers, the Alde-Ore and the Butley River, with a tidal basin near the head of the Alde and does not display the trumpet plan shape which is characteristic of many typical estuaries. The unusual morphology of the Alde-Ore results primarily from the development and southwards growth of the Orfordness spit during the later Holocene. Freshwater input and tidal ranges for the River Alde and Butley River are relatively small and consequently tidal flows in and out of the estuaries are relatively weak[41]. These factors suggest that the maintenance of the shingle barrier at Orfordness is essential for the maintenance of estuary morphology. • Without further assessment regarding the location, size and design of the proposed coastal defences and any marine landing facility, it is not possible to conclude that these structures will not result in degradation of the shingle bank at Orfordness with resulting impacts on supporting habitats within this SPA.
Possible Avoidance and Mitigation Measures – *includes recommendations for policy/proposals*	**Water Resource and Quality** • Avoiding adverse effects on surface, ground and estuarine waters is primarily the responsibility of the Water Companies (resource planning) and the Environment Agency (abstraction licensing and discharge regulation). However, the Nuclear NPS can direct requirements for efficiency of water use and require that issues relating to supply and discharge (including potential effects on European sites) are in place prior to the implementation of the nominated site proposals.

[41] Pye, K. (2005) Alde and Ore Estuary Flood Management Strategy- Assessment of Background Evidence and Recommendations for Further Action: External Investigation Report EX509

	Alde- Ore Estuary SPA
	Habitat Loss and Fragmentation • The Nuclear NPS should require sensitive design of all coastal defences / marine landing structures which are permeable to sediment flows and do not interrupt coastal processes, thus protecting the integrity of the designated site.
Conclude no adverse effect on integrity?	• It is not possible at this stage of the development of the Nuclear NPS to say that proposals at Sizewell will not have significant adverse effects on Alde-Ore Estuary SPA as a result of changes to water quality as well as through indirect habitat loss / fragmentation effects.

Alde-Ore Estuary Ramsar

- **Location: 520458 N/ 013303 W**
- **Size (ha): 2546.99**
- **Designation: Ramsar**

	Alde-Ore Estuary Ramsar
Qualifying Features	Ramsar criterion 2: • The site supports a number of nationally-scarce plant species and British Red Data Book invertebrates. Ramsar criterion 3: • The site supports a notable assemblage of breeding and wintering wetland birds. Ramsar criterion 6 – species/populations occurring at levels of international importance. Qualifying Species/populations (as identified at designation): Species regularly supported during the breeding season: • Lesser Black-backed Gull , *Larus fuscus graellsii*,: W Europe/Mediterranean/W Africa 5790 apparently occupied nests, representing an average of 3.9% of the breeding population (Seabird 2000 Census) Species with peak counts in winter: • Pied Avocet, Recurvirostra avosetta, Europe/Northwest Africa 1187 individuals, representing an average of 1.6% of the population (5 year peak mean 1998/9-2002/3) • Common Redshank, *Tringa totanus totanus*, 2368 individuals, representing an average of 2% of the GB population (5 year peak mean 1998/9-2002/3)
Conservation Objectives	The conservation objectives for this site are that, subject to natural change, the habitats listed below should be maintained in favourable condition: • Shingle • Shallow coastal waters • Intertidal mudflats and sandflats • Saltmarsh

	Alde-Ore Estuary Ramsar
Key Environmental Conditions (factors that maintain site integrity)	The important bird populations and assemblages at this site require a functional estuary which is capable of supporting intertidal habitat for feeding and roosting. The most important factors related to this are: • Current extent and distribution of suitable feeding and roosting habitat (for example saltmarsh, mudflats); • Sufficient prey availability (for example small fish, crustaceans and worms); • Levels of disturbance consistent with maintaining conditions for bird feeding and roosting; • Water quality necessary to maintain intertidal plant and animal communities; and • Water quantity and salinity gradients necessary to maintain saltmarsh conditions suitable for bird feeding and roosting.
Vulnerabilities (includes existing pressures and trends)	• Physical loss of habitats (especially salt marsh) through sea level rise, sediment recycling, proposals for managed realignment scheme • Physical damage / disturbance through trampling / recreational activities • Disturbance to feeding / breeding and roosting birds • Contamination by synthetic and/or non-synthetic toxic compounds and bioaccumulation effects • Changes in salinity as a result of flooding of freshwater habitats • Damage by abrasion or selective extraction • Changes in nutrient and/or organic loading • Selective extraction of species from intertidal area – wildfowling and bait digging
Predicted Impacts ***What are the issues arising from the plan and how might the site be affected?***	**Water Resources and Quality** • Potential for toxic contamination from accidental leakage • Radioactive discharges (accidental and routine) **Habitat Loss and Fragmentation** • Interruption of sediment flows along coast through construction of sea wall / marine landing facility, resulting in reduced material for natural re-charge of shingle bank at Orfordness. Depletion of the natural protection from coastal erosion could lead to loss / modification of qualifying habitats within the estuary.

	Alde-Ore Estuary Ramsar
Potential In-combination effects (screening) ***What other plans and programmes could lead to in-combinations effects?***	The following plans have the potential to contribute 'in-combination' impacts in relation to the key issues identified. In-combination impacts may be positive where the plans' function is to actively management those identified issues (for example Catchment Abstraction Management Strategies). **Water Resources and Quality** • Local Development Frameworks (Suffolk County Council, Suffolk Coastal District Council) • Decommissioning of Sizewell A (and possibly B) • Shoreline Management Plan • Aldeburgh Coast and Estuary Strategy **Habitat Loss and Fragmentation** • Local Development Frameworks (Suffolk County Council, Suffolk Coastal District Council) • Shoreline Management Plan • Decommissioning of Sizewell A (and possibly B) • Aldeburgh Coast and Estuary Strategy
Appropriate Assessment **Likelihood of adverse effect on integrity:**	**Water Resources and Quality** • Current Environment Agency data[42] indicates that where assessed; the ecological and chemical status of the coastal and estuarine environments near to Sizewell is assessed as 'moderate' and 'good' respectively. By 2015 the EA predicts that the ecological status will increase to 'good' and that chemical status will remain 'good'. Measurements taken from the tidal reaches of the rivers Alde and Ore reveal water quality here as of 'moderate' ecological status (chemical status is yet to be assessed). Phosphate was the only element noted to be currently achieving 'less than good' ecological status.

[42] Environment Agency River Basin Management Plans: Draft Anglian River Basin District, 2008. The data used in this assessment is taken from the Draft River Basin Management Plan, which was the most up to date plan available at the time. Draft plans were presented to the Government for approval in September 2009, with final plans published in December 2009
UKTG – Water Framework Directive Website: http://www.wfduk.org/

	Alde-Ore Estuary Ramsar
	• Current assessments for the coastal water quality, further south from Sizewell along the Essex coastline indicate that the ecological and chemical status of the environments here are the same as those surrounding Sizewell but the prediction here is that the ecological status will remain 'moderate' or worse until 2015. • There is a weak supply of material moving south past Aldeburgh. Beyond Aldeburgh net drifts tend to increase to Orford Ness and once beyond the Ness material moves south to Shingle Street. The key control points are Aldeburgh and East Lane with the entrance to the Alde-Ore estuary retaining and controlling material moving south[7]. It is these coastal processes that could potentially transport contaminants along the coastline from the nominated site and towards the key supporting habitats for the Ramsar criterion species at the mouth of the Alde-Ore estuary, where they could accumulate and potentially impact qualifying interest features either through bioaccumulation and changes to prey availability • Radioactive discharges are subject to targets monitored by the EA and of the non-radioactive discharges, nitrate contributions are considered to be the most significant (research cited by the EA in the nuclear sector report). In particular it is noted that there can be measurable localised impacts on sea nutrient levels in the vicinity of discharges. • Information on waterbird trends at this site and their regional (sub-national) and national contexts contained within Wetland Bird Survey (WeBS) Reports were consulted and revealed that two species (European White-fronted Goose and Shelduck are considered to be on 'high alert' for this site). However, this assessment is caveated by the fact that these recent declines mirror national trends and annual variabilties and may not necessarily be attributed to site-specific conditions. Redshank and Dunlin are also on 'medium alert' and the reasons for the fall in numbers of these species is thought to be a combination of large-scale and local factors.[43] • Given the available published information, it is not possible (without further information on discharge levels and quality) to conclude that discharges both radioactive and non-radioactive will not have an adverse effect on the Ramsar. **Habitat Loss and Fragmentation** • The feed of shingle that is transported around Thorpe Ness moves south beyond Aldeburgh to form the beaches

[43] www.bto.org/survey/webs/webs-alerts-index.htm

	Alde-Ore Estuary Ramsar
	of Orford Spit and Ness. Orfordness is defined as a downdrift accretion ness with downdrift accretion accompanied by erosion on the updrift side. The erosion includes the 'roll over' of shingle on to the backing marsh[7]. • The Alde-Ore estuary is in many respects not a typical estuary; essentially it consists of two tidal rivers, the Alde-Ore and the Butley River, with a tidal basin near the head of the Alde and does not display the trumpet plan shape which is characteristic of many typical estuaries. The unusual morphology of the Alde-Ore results primarily from the development and southwards growth of the Orfordness spit during the later Holocene. Freshwater input and tidal ranges for the River Alde and Butley River are relatively small and consequently tidal flows in and out of the estuaries are relatively weak[44]. These factors suggest that the maintenance of the shingle barrier at Orfordness is essential for the maintenance of estuary morphology. • Without further assessment regarding the location, size and design of the proposed coastal defences and any marine landing facility, it is not possible to conclude that these structures will not result in degradation of the shingle bank at Orfordness with resulting impacts on qualifying and supporting habitats within the Ramsar.
Possible Avoidance and Mitigation Measures – *includes recommendations for policy/proposals*	**Water Resource and Quality** • Avoiding adverse effects on surface, ground and estuarine waters is primarily the responsibility of the Water Companies (resource planning) and the Environment Agency (abstraction licensing and discharge regulation). However, the Nuclear NPS can direct requirements for efficiency of water use and require that issues relating to supply and discharge (including potential effects on European sites) are in place prior to the implementation of the nominated site proposals. **Habitat Loss and Fragmentation** • The Nuclear NPS should require sensitive design of all coastal defences / marine landing structures which are permeable to sediment flows and do not interrupt coastal processes, thus protecting the integrity of the designated site.

[44] Pye, K. (2005) Alde and Ore Estuary Flood Management Strategy- Assessment of Background Evidence and Recommendations for Further Action: External Investigation Report EX509

	Alde-Ore Estuary Ramsar
Conclude no adverse effect on integrity?	• It is not possible at this stage of the development of the Nuclear NPS to say that proposals at Sizewell will not have significant adverse effects on Alde-Ore Estuary Ramsar as a result of changes to water quality as well as through indirect habitat loss / fragmentation effects.

Outer Thames Estuary SPA

- **Location: 1154431E/51342546N**
- **JNCC Site Code: Not yet allocated**
- **Size: 393,734.18 ha**
- **Designation: SPA**

The majority of information for the Outer Thames SPA has been obtained from Natural England Consultation documents found at the following location: http://www.naturalengland.org.uk/ourwork/marine/sacconsultation/default.aspx

	Outer Thames Estuary SPA
Qualifying Features	The site regularly supports more than 1% of the GB population of the following species listed on Annex I of the EC Birds Directive: • Red-throated Diver *Gavia stellata* – 6,486 individuals wintering between 1989 – 2006/07. The site is the most important wintering site in the UK for this species.
Conservation Objectives	Subject to natural change, maintain in favourable condition the internationally important populations of the regularly occurring Annex I species: • Red-throated Diver – and its supporting habitats and species. Relevant habitats include shallow coastal waters and areas in the vicinity of sub-tidal sandbanks.
Key Environmental Conditions (factors that maintain site integrity)	• Wintering Red-throated Divers occur mainly in waters between 0-20m deep (less frequently in depths of around 30m) and in areas with extensive sandy substrate. Sublittoral, shallow (<20m) sandbank habitat is therefore very important for the species. • There is also some evidence of association with areas of salinity change (for example, where low salinity river water meets higher salinity sea level water). Such areas tend to fluctuate with state of tide, volume

	Outer Thames Estuary SPA
	of river flow and wind conditions. • The diet of the Red-throated Diver is principally small fish of a variety of species (particularly of the cod family, herring and sprats) and there is evidence to suggest that, in some areas, the higher numbers of birds are associated with shoals of sprats.
Vulnerabilities (includes existing pressures and trends)	Red-throated Divers in the Outer Thames Estuary are sensitive to the following: **Physical loss of supporting habitat (**for example, offshore development, disposal of dredge spoil) Physical loss by removal or smothering of any of the habitats on which Red-throated Divers depend may result in the loss of foraging sites and therefore the reduction of a food resource for the overwintering population. **Physical damage to habitat** (for example, siltation, abrasion, selective extraction) Red-throated Divers are known to associate with sandbank features and, although benthic sandbank communities are, in general, relatively resilient to physical damage, repeated damage to the habitats on which the species depends may result in a reduction in their value as foraging sites for the overwintering population. **Non physical disturbance** Red-throated Divers are highly sensitive to non-physical disturbance by noise and visual presence during the winter. Feeding can be disturbed by movements of objects (for example, boats and wind turbine rotors) and increases in noise disturbance displacing birds from their feeding grounds. These can cause birds to cease feeding or fly away and in response they could a) increase their energy requirements at their present (disturbed) feeding sites or b) move to an alternative less favoured feeding or roosting site. Such a response affects energy budgets and food intake and possibly survival. Overwintering birds, which are frequently subject to harsh weather conditions and must lay down fat reserves in order to migrate to breeding grounds, are particularly susceptible to adverse effects resulting from disturbance. **Toxic contamination of Red-throated Divers and their supporting habitats** A number of operators will discharge effluent upstream into the Thames Estuary and into the adjacent coastal waters (including low levels of radionuclides and heavy metals). Significant dilution of these low inputs, together with high energy environments associated with sandbanks, mean that the habitat has a moderate sensitivity to

	Outer Thames Estuary SPA
	toxic contamination from these sources. In the case of the Red-throated Diver, the sensitivity to synthetic chemicals such as PCBs is moderate. PCBs accumulate through the food chain in the tissues of marine organisms and could be considerable once they reach the fish on which Red-throated Divers feed. If marine pollution were to occur, there is the potential for exposure to PCBs to change. Large oil and chemical spills affecting shallow sandbank habitats can have a detrimental effect on bird populations by significantly affecting food sources and presenting a threat to diving and feeding seabirds. Birds are particularly vulnerable when moulting. Dispersants used to disperse the oil may also be harmful to the species. Princes Channel (which runs through the southern area of the Outer Thames SPA) carries a significant amount of vessel traffic in and out of the ports of the Thames Estuary. In addition Fisherman's Gat is an active commercial shipping channel and smaller vessels use the shallower inshore channels across the site. The risk of contamination by accidental spillages or fuel cargo is therefore increased and a small level of contamination will exist as a result of normal shipping activities. Large ports in the area also increase the risk of exposure. **Non-toxic contamination of Red-Throated Divers and their supporting habitats** Non-toxic contamination through nutrient loading, organic loading and changes to thermal regime could impact upon prey species and distribution. Non toxic contamination through the impact from an oil spill could be significant. Oil on the feathers of birds could lead to loss of insulation, reduced buoyancy and possible drowning. **Selective extraction of prey species** Removal of fish species and larger molluscs, for example, can have significant impacts upon the structure and functioning of benthic communities over and above the physical effects of fishing methods, particularly as some fish species fill upper roles in the trophic web. In addition, it has the potential to directly remove prey species. The mechanisms for these pressures to impact upon Red-throated Divers may be a direct or indirect reduction in food availability for the overwintering population. **Non-selective extraction of Red-throated Divers** Non-selective extraction can occur through entanglement in nests or through bird strike. Static nets can be

	Outer Thames Estuary SPA
	considered a significant risk to the species through entanglement and reduction of food availability. Entanglement in static nets is a major cause of known mortality in Red-throated Divers. Impacts may also occur from collision with wind turbines if birds fly at a height above 20m. However it has been observed that they generally fly below this height.
Predicted Impacts ***What are the issues arising from the plan and how might the site be affected?***	**Water Resources and Quality** • Increased/ altered drainage from earthworks and excavation (for example, could lead to nutrient enrichment). • Potential for toxic contamination of Red-throated Divers and their prey from accidental leakage • Radioactive discharges (accidental and routine) • Alteration of flow from abstraction • Changes to water temperature and possible local abrasion of habitats from discharge **Habitat (and species) Loss and Fragmentation** • Potential loss of feeding habitat used by Red–throated Divers (for example, sandbanks) to accommodate water cooling infrastructure, marine landing facility and upgraded coastal protection. • Potential loss of feeding habitat used by Red-throated Divers (for example, sandbanks) as a result of changes to sediment regimes from upgraded coastal protection. **Disturbance (noise, light and visual)** • Potential impacts on Red-throated Divers from noise and visual disturbance in particular. **Air Quality** • Local level impacts (reduced air quality, NOx gases from road/ transport/ generation sources) arising from construction, operation, decommissioning activities.
Potential In-combination	Unknown at the current time, as no other plans or programmes are noted which address this SPA. In

	Outer Thames Estuary SPA
effects (screening) ***What other plans and programmes could lead to in-combinations effects?***	combination impacts from the following current and proposed economic activities in the Outer Thames Estuary could, however, arise: **Aggregate extraction** The Anglian Offshore (East Coast) region and the Thames Region, within which the SPA lies, are both strategically important areas for this industry. Despite a decrease in extraction levels from the East Coast region there remain large quantities of primary aggregate and the Thames region is increasing steadily since production from newly discovered large resources started in 2005. Depending on local demand and depletion of land-won aggregates, intensity may increase in the next ten years. Furthermore, Crown Estate data (www.thecrownestate.co.uk/dredge_areas_statistics) indicate that the industry is investigating potential for extraction in areas located partially in the SPA. Whilst marine aggregate extraction is a heavily regulated activity (on-going and new plans or projects), a sudden increase in new licence applications could cause displacement and disturbance of Red-throated Divers, loss of / damage to supporting habitat through extraction and dredging as well as indirect impacts on prey distribution and abundance through disturbance to the seabed and increased turbidity in the water column. **Oil and Gas** A number of pipeline routes have been reviewed for transporting CO_2 from The Thames Cluster to the Hewett Gas Field, including an off-shore route, which would pass through the SPA for approximately 143km (Capturing Carbon, Tackling Climate Change: A Vision for a CCS Cluster in the South East, E-ON, April 2009). No environmental supporting information was available for the above (un-consented) proposal. However, it is likely that vessels used to maintain, supply or construct structures in the SPA could result in potentially significant levels of disturbance of the Red-throated Divers. In addition, if the gas pipelines within the site were to leak, this could potentially cause toxic contamination of the site (though this is likely to be a temporary impact). **Renewables** Two operating wind farms (Kentish Flats and Scroby Sands) are fully and partially located within the site respectively. The Gunfleet Sands (GS) wind farm, which is located fully within the site, consists of a Round 1 project and a Round 2 project and is currently under construction off the Essex Coast at Clacton-on-Sea. The proposed Round 2 extension is a 64MW offshore wind farm comprising up to 22 turbines and associated inter-turbine cables. An Environmental Statement for GS Round 2 was prepared in June 2007 and took into account

	Outer Thames Estuary SPA
	the possible future designation of the Outer Thames SPA. Extensive surveys showed that GS2 is located in an area of relatively low bird density, although species are present that are of conservation importance, including Red-throated Diver. A systematic assessment of the potential impacts on birds arising from the proposed construction, operation and decommissioning of the wind farm, alone and in-combination with other developments in the Thames Estuary, has been undertaken. Potential impacts assessed included displacement from the wind farm site due to the presence of turbines, collision mortality, habitat loss and the risk of creating a 'barrier' to migratory birds. Possible effects upon the Thames Estuary SPA were also assessed and it was predicted that GS2, either alone or in-combination with other developments or activities, will have no impact upon the SPA. Construction on Phase 1 (up to 175 turbines) of the London Array wind farm project is likely to start in spring 2011 and will cover an area of approximately 100km. Phase 2 of the London Array project has consent, but permission to construct is dependent on the results of monitoring from Phase 1 demonstrating no significant impact on the Red-throated Diver population. London Array Phases I and 2 are both fully within the SPA. The noise from pile driving the monopiles and the noise and visual presence of vessels used for construction are likely to disturb and displace Red-throated Divers (Outer Thames pSPA Draft Consultation Impact Assessment, November 2009). There is a licence condition for the development, which specifies that from 1 November to 31 March all vessels involved in construction operations must approach the site from the south using main shipping channels and leave by the same route to minimise any potential disturbance to Red-throated Divers. In terms of future development of renewables within the Outer Thames, the Crown Estate has issued an Invitation to Tender to developers for the Round 3 offshore wind farm leasing programme for the delivery of up to 25 Giga Watt (GW) in capacity of potential new offshore wind farm sites by 2020. Round 3 overlaps with 7.8% of the total area of the SPA. **Cables** A number of operational telecommunication cables pass through the site amounting to a total length of 225km. Most planned cable laying activity is replacement or upgrading of existing cables and could potentially disturb and displace Red-throated Divers, although the effects are likely to be localised and temporary.

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	Fisheries The Thames Estuary supports important commercial fisheries, as well as estuarine and marine recreational angling. Approximately 180 fishing commercial fishing boats operate within the area of the estuary. Fishing intensity may change in the future. However, the impacts of the fisheries industry on the SPA are difficult to predict given the paucity of information on the likely intensity of fishing over the next ten years. The presence of vessels fishing in the site could potentially disturb and displace Red-throated Divers, particularly in the areas where there are more productive fisheries. In addition, fishing could directly reduce the abundance of fish that the designated species feed upon, both through extraction of target species and as by-catch. **Shipping (including dredging of channels)** The Port of London is one of the UK's largest ports and the Port of London Authority (PLA) is the body responsible for ensuring safe navigation in the tidal Thames. Part of the PLA's operations is to ensure that shipping channels and berths are maintained or, in some limited cases, created. This requires occasional maintenance dredging of existing shipping channels that have suffered from siltation or capital dredging where a new channel or berth is required. This could potentially result in loss/ damage to supporting habitats for Red-throated Divers, as well as disturbance from vessels. The port of Felixstowe is the UK's largest container port and is capable of handling the world's largest container ships. It is currently undergoing considerable expansion. In addition, new port capacity at Great Yarmouth is currently under construction and is expected to accommodate container traffic in various forms. Such expansions will lead to more shipping movements within the Outer Thames, which may lead to additional disturbance events, although, as Red-throated Divers are known to avoid existing shipping channels, use of those channels may not have any further impact on birds. Increased shipping activity within the area, including ship-to-ship oil transfers, could result in an increased likelihood of introduction of toxic contamination within the SPA. **Recreation** There is a high level of use of the site by all forms of recreational vessels. The majority of these activities are restricted to inshore waters of the estuaries and coast, although there are a large number of yacht clubs within

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	the site which use waters further offshore. The presence of people using the water for recreation and the associated noise could disturb and displace Red-throated Divers whilst anchoring could potentially cause physical damage to supporting habitats. However, such effects are lessened to a certain extent by that fact that recreational activity is at its lowest when the birds are present within the Outer Thames. **Land based sources of pollution** Toxic and non-toxic pollutants enter the Thames Estuary and adjacent coastal waters from direct point source discharges of effluents or diffuse sources, such as agricultural run-off via rivers. Toxic and non-toxic discharges could potentially affect supporting habitats, and hence prey availability, through contamination of sediment, nutrient loading and changes in turbidity, water temperature and salinity. Point source discharges are currently controlled through licensing by the Environment Agency.
Appropriate Assessment **Likelihood of adverse effect on integrity:**	**Water Resources and Quality** • Radioactive discharges are subject to targets monitored by the EA and, of the non-radioactive discharges, nitrate contributions are considered to be the most significant (research cited by the EA in its sector report for the nuclear industry).[45] In particular, it is noted that there can be measurable localised impacts on sea nutrient levels in the vicinity of discharges. • Assessments made by the Environment Agency in 2004 under the Water Framework Directive (WFD) and updated in the draft River Basin Management Plans[46] in 2009 indicate that the transitional (including estuarine) and coastal waters within the area are at risk of failing to reach the environmental standards that are required under the WFD[47] and organic source pollution in particular is identified as a potential future risk. The WFD will, however, be addressing coastal water quality issues and discharges will be controlled to meet 'Good Ecological Status' as specified by the Directive. The areas of the SPA beyond 12 nautical miles are so far offshore that they are unlikely to be significantly affected by pollution from the land.

45 http://publications.environment-agency.gov.uk/pdf/GEHO1105BJVG-e-e.pdf
[46]] The data used in this assessment is taken from the Draft River Basin Management Plan, which was the most up to date plan available at the time. Draft plans were presented to the Government for approval in September 2009, with final plans published in December 2009
[47] http://www.environment-agency.gov.uk/researc/planning/33292.aspx

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	• The sheltered coastal areas and transitional water types of the SPA are at most risk from impacts related to water resources and quality. The more exposed offshore areas of the SPA are less at risk, as there is greater dilution and dispersion of contaminants. A number of operators discharge effluent into the Thames Estuary and into adjacent coastal waters. Direct discharges into the SPA include low levels of radionuclides, and heavy metals. However, significant dilution afforded to these low inputs, together with the high energy environments associated with sandbanks, mean that they have a moderate sensitivity to toxic contamination from these sources. • Although discharges will be strictly monitored by the Environment Agency, it is not possible (without further information on discharge levels and quality and quantity) to conclude that discharges, both radioactive and non-radioactive, will not have an adverse effect on Red-throated Divers that use inshore/transitional waters of the SPA. Toxic and non-toxic contamination could potentially affect the habitats of fish/invertebrates that the birds feed upon through contamination of sediment, increases in nutrients and changes in turbidity, water temperature and salinity. **Habitat (and species) Loss and Fragmentation** • Loss of sandbank habitat within the SPA could result in significant effects on Red-throated Divers, which rely on this habitat for feeding. It is thought that sandbanks may have a functional role (as nursery, spawning, feeding or in providing shelter) in supporting fish species that form the prey of Red-throated Divers. Overall sensitivity of the Red-throated Divers to damage to supporting habitat is considered to be moderate. • Sandbanks are dynamic systems and are constantly changing. The Thames Estuary is subject to two distinct tidal influences. North Sea tides enter the estuary from the northeast and are responsible for the formation of sandbanks running in a northeast – southwest direction in the northern part of the estuary. The second tidal influence is from the English Channel, with these tides entering the southern part of the estuary around the North Kent coast and influencing the formation of banks lying in an east – west orientation in the southern part of the estuary. • Any disturbance which interferes with the hydrological regime in the vicinity of sandbanks can be detrimental, as maintenance of sandbanks is dependent on current direction and speed. Adjacent coastal development and construction of sea defences can potentially change hydrological regimes.

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	• As only locations of cooling water infrastructure, upgraded costal protection and a marine landing facility have been provided, the extent of loss (either directly or indirectly) of sandbank habitat within the SPA from construction activities along the coastal foreshore is currently unknown and the significance in the context of wider habitat changes cannot be assessed. Of most concern would be any sandbanks which occur within the inter-tidal zone close to the nominated site. • At this strategic stage, where detailed development plans are unknown, it is not possible to conclude that that there will not be adverse effects on the integrity of the SPA through habitat loss or damage. **Disturbance (noise, light and visual)** • Red-throated Divers are particularly sensitive to noise and visual disturbance from human activity and the screening assessment noted the potential for construction and decommissioning phases in particular to create disturbance events. This could lead to displacement of birds from favoured feeding areas and could affect their chances of survival. • Initial results of monitoring undertaken from some operational offshore wind farms, has shown displacement of 80-100% divers from the development footprint and the surrounding buffer area (although further work is required to corroborate these findings). This disturbance is thought to be caused by the turbines and boat-based maintenance activities. • Other research has found that Red-throated Divers usually take off ahead of boats of all sizes, which may disturb individuals as far as 2 km away. Red-throated Divers have also been shown to be absent from the major shipping lanes off north-west Germany during winter, yet undisturbed waters either side and between the separation lanes carry the expected number of birds. • During survey work carried out within the Greater Thames between 1989 and March 2005, Red-throated Divers were found to occur throughout the entire area of the Outer Thames Estuary, but were at greatest density and with greatest frequency off the coast of Suffolk and over sandbanks in the centre of the estuary and those extending towards the coast of south Essex and part of north Kent. These findings would indicate that presence of Red-throated Divers along the coastline immediately adjacent to the nominated site must be assumed. • As the nominated site lies directly adjacent to the SPA, and given that the full extent and nature of the development proposals is currently unknown, it is not possible to determine how the nature or timing of the

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	development may affect interest feature birds or to conclude that there will be no significant effect. **Air Quality** • Information provided by the UK Air Pollution Information System[48] indicates that air quality within the area (centred on the nominated site and including the immediately adjacent areas of the SPA, up to a distance of 5km) is generally good, with pollution levels for all key pollutants (sulphur dioxide, particulates, nitrogen dioxide etc.) typically low. • The Environment Agency assesses that non-radioactive aerial emissions (sulphur dioxide, nitrogen oxides and volatile organic compounds) from nuclear power stations are extremely low compared with other regulated industries and does not consider them to be an environmental priority. • The Environment Agency's most recent available assessment of radioactive aerial emissions indicates that all fall within authorised limits.[49] • Information provided by the Air Pollution Information System (APIS)[50] indicates that air quality in the area is good, with pollution levels for all key pollutants (sulphur dioxide, nitrogen dioxide etc.) being low. • Air quality is not specified as a vulnerability for Red-throated Divers or their supporting habitats and, given the large size of the SPA (393734.18ha), it is considered unlikely that any local level air quality impacts will reach a level that results in the integrity of the SPA being compromised.
Possible Avoidance and Mitigation Measures – *includes recommendations for policy/proposals*	**Water Resource and Quality** • Avoiding adverse effects on surface, ground and estuarine waters is primarily the responsibility of the water companies (resource planning) and the Environment Agency (abstraction licensing and discharge regulation). However, the Nuclear NPS can direct requirements for efficiency of water use and require that issues relating to supply and discharge (including potential effects on N2K sites) are in place prior to the implementation of the nominated site proposals. **Habitat (and species) Loss and Fragmentation**

[48] http://www.apis.ac.uk/
[49] Measuring Environmental Performance: Sector Report for the Nuclear Industry (Environment Agency, Nov 2005).
[50] Air Pollution Information System http://www.apis.ac.uk/

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	• Where proposals for design and build remain under development, the Nuclear NPS should seek to prioritise the avoidance of direct habitat impacts on the SPA through careful consideration of site layout and design of any development within the coastal fringe (for example, cooling water culverts, marine landing facility and coastal protection measures). In the event of any habitat being lost these should be re-created elsewhere. Any direct impacts that cannot be avoided, including through alternatives, or mitigated should be addressed by compensation measures agreed with the Statutory Bodies and implemented prior to the commencement of development proposals. • The Nuclear NPS should seek to prioritise the use of technologies/methods which could be used to minimise impacts to habitats. Examples include use of soft engineering for any upgraded coastal protection, use of permeable materials for the marine landing facility (so that sediment flows along the coast are not interrupted) and scour protection at the point of cooling water discharge. • In addition, protection measures should be incorporated into water intake systems so as to avoid depleting important food sources for birds, such as fish/invertebrates **Disturbance (noise, light, visual)** • Disturbance events in relation to bird species are most significant when they are irregular, sudden and unpredictable. Noise, light and visual impacts can be managed at a site level through phasing and timing that takes account of feeding cycles and should be supported by information on flight lines/ migration routes/ feeding and roosting areas. Precise detail and the nature of the measures required would need to be agreed with the Statutory Body prior to the commencement of development. These measures would form part of the wider site management plan that developers would be required to agree and implement prior to commencement. **Air Quality** • Air quality impacts are not assessed as being significant in relation to the SPA. However, it is appropriate that the Nuclear NPS takes account of potential air quality impacts through requirements, particularly at a local level for sustainable transport plans, including, for example, the use of non-road transport where possible, phasing of development and robust monitoring at sites to track changes. In particular, the monitoring should account for the potential for cumulative impacts where the phasing between the

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	operation and de-commissioning of the existing power station at Sizewell and the new power station overlaps.
Conclude no adverse effect on integrity?	It is not possible at this stage of the development of the Nuclear NPS to say that the development of a nuclear power station on the nominated site would not have significant adverse effects on the Outer Thames Estuary SPA as a result of impacts to water quality, through disturbance, or from habitat loss/ fragmentation.

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