

Norfolk Minerals and Waste Local Plan

Minerals Site Specific Allocations Development Plan Document (DPD) – Single Issue Silica Sand Review

Habitats Regulations Assessment – Appropriate Assessment

Regulation 61 of the Conservation of Habitats and Species Regulations 2010

February 2016

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Development Plan Document
(DPD) – Single Issue Silica Sand
Review**

**Habitats Regulations
Assessment – Appropriate
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**Regulation 61 of the
Conservation of Habitats and
Species Regulations 2010**

February 2016

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Acronyms and Abbreviations

AA	Appropriate Assessment
DPD	Development Plan Document
LDF	Local Development Framework
RDB	Red Data Book
RSPB	Royal Society for the Protection of Birds
SAC	Special Area of Conservation
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
TOLS	Test of Likely Significance
Zol	Zone of Influence

Summary

S.1 Background

The Silica Sand Review of the Minerals Site Specific Allocations Development Plan Document (DPD) is produced through the assessment of the proposed specific site put forward by a mineral company, in response to a 'call for sites', and definition of areas of search within which sites for future silica sand extraction may be granted planning permission in the future. Ten defined areas of search and the proposed specific site were included in the Preferred Options Consultation document (October 2015) and a Habitats Regulations Assessment – Task 1 Screening, was carried out on all areas of search and the proposed specific site in September 2015. Following public consultation in November and December 2015, a Pre-Submission version of the Silica Sand Review has been prepared. The Pre-Submission version includes six defined areas of search and one specific site.

The Silica Sand Review of the Minerals Site Specific Allocations DPD must be considered in the wider context of the other documents of the Minerals and Waste Local Development Framework (M&W LDF). The 'Core Strategy and Minerals and Waste Development Management Policies Development Plan Document' (the 'Core Strategy') was adopted in 2011 and contains strategic objectives and policies that will guide where minerals extraction and waste management facilities should and should not occur in Norfolk. Development Management policies will also ensure that development will happen in a sustainable way at those locations assessed as being appropriate for development. The Minerals Site Specific Allocations DPD (adopted in 2013) allocated 28 sites for mineral extraction (sand and gravel, carstone and silica sand) in Norfolk during the plan period to 2026.

The Silica Sand Review of the Minerals Site Specific Allocations DPD is planned to be adopted by the end of 2016 and will operate until the end of 2026, with the purpose to plan for mineral extraction in the most sustainable way that minimises potential adverse impacts on amenity and environmental resources.

In accordance with Article 6 paragraph (3) of the Council Directive 92/43/EEC) on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive) (as amended), as transposed into UK law under the Conservation of Habitats and Species Regulations 2010 (as amended), assessments are required where a plan (or project) not directly connected with or necessary to the management of the designated site may give rise to significant effects upon a Natura 2000 site. The competent authority shall then agree to the plan only after having ascertained that the plan will not adversely affect the integrity of the site concerned.

Following the detailed review of the potential areas of search for silica sand extraction and the formulation of the Task 1 Test of Likely Significance (TOLS) screening matrix, two areas of search were identified which could potentially result in likely significant effects on European and/or Ramsar designated sites.

This report is a Task 2 Appropriate Assessment on the potential for the Silica Sand Review of the Minerals Site Specific Allocations DPD to affect the Natura 2000 sites within or adjacent to the planning area. This assessment is a high-level review as details regarding specific site operations at this stage are limited; however, this assessment will provide a view on the likely effects the development could have on the designated sites and the type of mitigation that should be put in place to ensure their integrity.

Developers wanting to extract silica sand from specific sites or land within an areas of search contained in the Silica Sand Review will still need to apply for and be granted planning

permission before mineral extraction can take place. Planning permissions are often subject to conditions to mitigate potential adverse impacts from site operations.

S.2 Summary of the Task 1 Screening and Recommendations for Task 2

Following the detailed review of the proposed specific site and ten areas of search defined for the Silica Sand Review of the Mineral Site Specific Allocations DPD and the formulation of the Task 1 Appropriate Assessment screening, two areas of search were identified which could potentially result in likely significant effects on European and Ramsar designated sites. These are:

The Wash Ramsar: Areas of Search AOS A (land west of Snettisham, Ingoldisthorpe and Dersingham) and AOS B (land south of Heacham); likely significant effects, alone and in-combination were identified for criterion 5 and 6 of the Ramsar site.

The Wash SPA: Areas of Search AOS A and AOS B; likely significant effects, alone and in-combination, were identified for all features of the SPA.

The Wash and North Norfolk Coast SAC: Areas of Search AOS A and AOS B; uncertain significant effects, alone and in-combination were identified for all features of the SAC.

The remaining designated sites are sufficiently distant from the proposed specific site and defined areas of search so that likely impacts are not considered significant. Nevertheless, best practice should be followed for future silica sand extraction at the proposed site and the areas of search.

Based on this assessment Areas of Search AOS A and AOS B, must go through a Task 2 Appropriate Assessment. At this stage, impacts are re-evaluated, a more detailed assessment is conducted and appropriate mitigation measures are proposed, if needed. In addition, it is also recommended that:

- Best practice should be followed at all times. This is most relevant where water dependent habitats are features of the designated sites.
- Monitoring programmes should be implemented where relevant to ensure that any changes to designated features are identified and preventive measures are implemented as soon as possible, therefore preventing an adverse effect.

The Natural Environment and Rural Communities Act, the NERC Act (2006), states that public authorities must have regard to the purpose of conserving biodiversity including the restoration or enhancing of a population or habitat. When restoration is one of the objectives of the activity, the conservation objectives of the European site need to be considered where reasonable. In addition, although the sites are located outside the designated sites boundaries, the restoration or enhancing of a population or habitat should be integrated with plans such as the Green Infrastructure Strategy, Biodiversity Action Plans and Norfolk Ecological Networks.

S.3 Summary and recommendations of the Task 2 Assessment

Area of Search B (land south of Heacham) is not allocated in the Pre-Submission version of the Silica Sand Review and therefore no further Habitats Regulations Assessment is required of AOS B.

The boundaries of AOS A (land west of Snettisham, Ingoldisthorpe and Dersingham) have been amended in the Pre-Submission document to reduce the size and move the boundary of AOS A further away from The Wash designated sites.

The Wash SPA and Ramsar site AOS A is 1km inland from The Wash SPA and Ramsar site. Due to the distance of AOS A from The Wash SPA and Ramsar site, there will be no adverse effects on the designated habitats of The Wash SPA or on criterion 1 and criterion 3

of The Wash Ramsar from silica sand extraction within AOS A. There will also be no adverse effects on the structural habitat of the designated species of The Wash SPA and on criterion 5 and criterion 6 of The Wash Ramsar from silica sand extraction within AOS A.

Therefore, the key issue for the Task 2 Appropriate Assessment to address is the effect on foraging habitat for the qualifying bird species of The Wash SPA and Ramsar site. This assessment concludes that there should be no adverse effect on the integrity of The Wash SPA and Ramsar site from silica sand extraction within AOS A. This is because of the quantity of arable field habitat that will remain in this locality as foraging habitat for qualifying bird species outside of the designated sites of The Wash. Therefore, no adverse effects are expected on the integrity of The Wash SPA and Ramsar site.

The Wash and North Norfolk Coast SAC AOS A is 1km inland from The Wash and North Norfolk Coast SAC. Therefore there would be no likely significant effect on the designated habitats of the SAC. Due to the distance between the SAC and the boundary of AOS A, there would be no likely significant effect on the designated species of the SAC from noise disturbance. Therefore, no adverse effects are expected on the integrity of the SAC.

1 Introduction

1.1 Silica Sand Review of the Minerals Site Specific Allocations DPD

Silica sand is a nationally important industrial mineral and the primary use for silica sand extracted in Norfolk is glass making. The silica sand resource in Norfolk is found in a relatively narrow band which runs north to south just to the east of King's Lynn. The northern extent of the silica sand resource is at Heacham and the southern extent around Hilgay. The area of current extraction is centred on the parish of Leziate. A silica sand processing plant is located at Leziate, together with a railhead. The majority of the processed silica sand is transported out of Norfolk by rail.

The Silica Sand Review of the Minerals Site Specific Allocations DPD is produced through the assessment of the proposed specific site put forward by a mineral company, in response to a 'call for sites', and the definition of areas of search within which sites for future silica sand extraction may be granted planning permission in the future.

The National Planning Practice Guidance (paragraphs 27-008/009) states that mineral planning authorities should plan for the steady and adequate supply of minerals in one or more of the following ways (in order of priority):

- Specific sites – where viable mineral resources are known to exist, landowners are supportive of minerals development and the proposal is likely to be acceptable in planning terms.
- Preferred areas – areas of known mineral resources where planning permission might reasonably be anticipated.
- Areas of search – where knowledge of mineral resources may be less certain, but within which planning permission may be granted, particularly if there is a potential shortfall in supply.

Sufficient specific sites were not submitted in response to the 'call for sites' which took place in June 2015, therefore planning officers defined potential areas of search to meet the shortfall. The resulting ten potential areas of search and the proposed specific site were included in the Preferred Options Consultation document (October 2015) and a Habitats Regulations Assessment – Task 1 Screening, was carried out on all areas of search and the proposed specific site in September 2015. Following public consultation in November and December 2015, a Pre-Submission version of the Silica Sand Review has been drafted. The Pre-Submission version includes six areas of search and one specific site.

The Silica Sand Review of the Mineral Site Specific Allocations DPD must be considered in the wider context of the other documents of the Minerals and Waste Local Development Framework (M&W LDF). The 'Core Strategy and Minerals and Waste Development Management Policies Development Plan Document' (the 'Core Strategy') was adopted in 2011 and contains the strategic objectives and policies that will guide where minerals extraction and waste management facilities should and should not occur in Norfolk. Development Management policies will also ensure that development will happen in a sustainable way at those locations assessed as being appropriate for development. The Minerals Site Specific Allocations DPD (adopted in 2013) allocates 28 sites for mineral extraction (sand and gravel, carstone and silica sand) in Norfolk during the plan period to 2026.

The Silica Sand Review of the Minerals Site Specific Allocations DPD is planned to be adopted by the end of 2016 and will operate until the end of 2026, with the purpose to plan for silica sand extraction in the most sustainable way that minimises potential adverse impacts on amenity and environmental resources.

1.2 Legislative Framework

The need for an appropriate assessment originally arose under the requirements of the EC Habitats Directive (92/43/EEC) and its implementation in the UK under the Conservation (Natural Habitats &c.) Regulations 1994. The Conservation of Habitats and Species Regulations 2010 consolidated the legislation, updated and incorporated the various amendments made to the Conservation (Natural Habitats &c.) Regulations 1994 (the 1994 Regulations). On 25 July 2012, Defra laid 'The Conservation of Habitats and Species Amendment Regulations 2012' before Parliament. These Regulations came into force on 16 August 2012. Under this legislation, assessment is required where a plan (or project) not directly connected with or necessary to the management of the site may give rise to significant effects upon a Natura 2000 site.

Regulations 61 (5) states that "In the light of the conclusions of the assessment, and subject to regulation 62 (considerations of overriding public interest), the competent authority may agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site". Regulation 61 (6) also states "In considering whether a plan or project will adversely affect the integrity of the site, the authority must have regard to the manner in which it is proposed to be carried out or to any conditions or restrictions subject to which they propose that the consent, permission or other authorisation should be given".

Natura 2000 sites, referred to as 'European designated sites', include Special Protection Areas, and Special Areas for Conservation.

Special Protection Areas (SPAs) are sites classified in accordance with Article 4 of the EC Directive on the conservation of wild birds (79/409/EEC), more commonly known as the Birds Directive. The classification is for rare and vulnerable birds, listed in Annex I of the Birds Directive, and for regularly occurring migratory species. Regulations 8 of the 2012 Regulations substitutes Regulation 9 of the 2010 Regulations, to provide public bodies must exercise their conservation functions specifically to comply with the Birds Directive.

SACs are sites classified in accordance with EC Directive 92/43/EEC on the Conservation of Natural Habitats of Wild Flora and Fauna (the Habitats Directive). Article 3 of this Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive.

Ramsar sites are sites qualifying under the International Convention on Wetlands of International Importance, 1971, known as the Ramsar Convention (amended by the Paris Protocol, 1992). Protection for Ramsar sites in UK law is not through the Birds and Habitats Directives; however, Parliament has decreed that, unless otherwise specified, procedures relating to SPAs and SACs shall apply to Ramsar sites, as well. This is reiterated in the National Planning Policy Framework (DCLG, 2012).

In assessing whether a plan may affect a Nature 2000 site, it is important to recognise that the assessment should be appropriate to the likely scale, importance and impact of the development. A key outcome of the Appropriate Assessment is to identify whether the integrity of the European designated site may be affected by the plans, and whether the conservation status of the primary interest features of the site could be impacted. An adverse effect on the integrity of the site is one that prevents the site from maintaining the same contribution to favourable status for the relevant feature or features, as it did when the site was qualifying. Only where a plan or project can be determined by the competent authority as not having an adverse effect on site integrity can it be allowed to proceed. The favourable conservation status of the site is defined through the site's conservation objectives and it is against these objectives that the effects of the plan or project must be assessed.

When plans and projects are being formulated, it is not always clear whether an Appropriate Assessment is required or not. Rather than undertaking a detailed Appropriate Assessment a “Task 1 Appropriate Assessment: Test of Likely Significance” can be undertaken to identify whether or not an Appropriate Assessment is required (see Figure 1.1 for the different stages in the Appropriate Assessment process). A Test of Likely Significance also identifies whether the plan or project has the potential to impact on a European designated site.

Guidance on how to undertake a Task 1 Screening Assessment and Task 2 Appropriate Assessment is detailed in the following document *‘Assessment of plans and projects significantly affecting Natura 2000 sites, methodological guidance on the provisions of Article 6 (3) and (4) of the Habitats Directive 92/43/EEC* (European Commission, 2001).

1.3 Scope of Work

The purpose of this report is to provide the Competent Authority with the necessary information to assess the potential for the Silica Sand Review of the Minerals Site Specific Allocations DPD to affect the Natura 2000 sites within or adjacent to the planning area.

Following the detailed review of the ten areas of search and the specific site contained in the Preferred Options Consultation document, and the formulation of the Task 1 Test of Likely Significance (TOLS) screening matrix, two areas of search (AOS A and AOS B) were identified which could potentially result in likely significant effects on European and Ramsar designated sites.

Following the Task 1 screening and the Preferred Options consultation on the Silica Sand Review of the Minerals Site Specific Allocations DPD, the Pre-Submission version of the Silica Sand Review has been drafted. Area of Search B (land south of Heacham) is not allocated in the Pre-Submission version of the Silica Sand Review and therefore no further Habitats Regulations Assessment is required of AOS B. This Task 2 Appropriate Assessment only considers area of search AOS A, which is allocated in the draft Pre-Submission version of the Silica Sand Review.

This report is a Task 2 Appropriate Assessment to identify the potential for the Silica Sand Review of the Minerals Site Specific Allocations DPD to affect the Natura 2000 sites within or adjacent to the planning area. This assessment is a high-level review because details regarding specific site operations at this stage are limited; however, this assessment will provide a view on the likely effects the development could have on the designated sites and the type of mitigation that should be put in place to ensure their integrity. If the development is considered likely to have the potential to affect the designated site, then a more detailed Stage 3 Appropriate Assessment would be required to propose suitable mitigation against possible predicted effects, and whether there are any residual impacts likely to affect the condition and integrity of the designated site.

Developers wanting to extract silica sand from specific sites or land within an areas of search contained in the Silica Sand Review will still need to apply for and be granted planning permission before mineral extraction can take place. Planning permissions are often subject to conditions to mitigate potential adverse impacts from site operations.

1.4 Methodology

The Habitats Regulations Assessment is undertaken through a series of tasks that correspond with the Article 6 Assessments prescribed by the Habitats Directive. The outcome of each task determines whether further stages in the process are required. There are four key stages in the HRA process. These are as set out in Table 1.1 below.

Table 1.1 Summary of the stages of the HRA process

Task One – Screening	This identifies if there will be any potential effects on the European Designated sites and considers whether or not the effects are likely to be significant.
Task Two – Appropriate Assessment	This stage considers the impact on the integrity of a European site/s of the project or plan, either alone or in-combination with other projects or plans, with respect to the site’s structure and function and its conservation objectives.

Task Three – Assessment of Alternative Solutions	If the mitigation measures prescribed at Stage 2 cannot avoid adverse impacts on the integrity of a European site, this process examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of the European site.
Task Four – Assessment where no alternative solutions exist and where adverse impacts remain	If no suitable alternatives are available, this stage requires an assessment of compensatory measures where, in the light of the assessment of Imperative Reasons or Overriding Public Interest (IROPI), it is deemed that the project or plan must go ahead.

This Task 2 Appropriate Assessment was formulated by undertaking the following activities:

- A review of the information in the Task 1 assessment, including the main threats and pressures to the qualifying features of the site; and
- An assessment of the potential adverse effects on the integrity of the site as defined by the conservation objectives and status of the site.

The Task 2 Appropriate Assessment was undertaken in accordance with EC (2001) 'Assessment of plans and projects significantly affecting Natura 2000 sites'. Methodological guidance on the provisions of Article 6 (3) and (4) of the Habitats Directive 92/43/EEC. Brussels, November 2001.

1.5 Zone of Influence

Plans and/or projects have the potential to impact on designated sites beyond the confines of the individual sites themselves. The Institute of Ecology and Environmental Management guidance (Guidelines for Ecological Impact Assessment in the United Kingdom, available from <http://www.ieem.net/ecia/index.html>) states that potential impacts should be investigated which occur within the Zone of Influence (Zol) which arises during the whole lifespan of the proposed development or plan. The potential Zone of Influence is defined as:

- Areas directly within the land take for the proposed development or plans;
- Areas which will be temporarily affected;
- Areas likely to be impacted by hydrological disruption, and;
- Areas where there is a risk of pollution and noise disturbance.

The Zone of Influence for the Task 2 'Appropriate Assessment and ascertaining the effect on site integrity' includes the proposed area of search itself, plus designated sites that could potentially be directly affected, as highlighted within the Task 1 TOLS. To assess in-combination impacts, the Local Plans of all planning authorities, in which the potentially affected designated sites are located, have been assessed.

The designated sites within the Zone of Influence for the Task 2 Appropriate Assessment are:

The Wash SPA
 The Wash Ramsar
 The Wash and North Norfolk Coast SAC

Definitions for the conservation status, integrity and significance used in this report are in accordance with EU guidance (see Table 1.2).

Table 1.2: Conservation Status, Integrity and Significance

Status	Description
Favourable conservation status – species	When the population is maintaining itself on a long-term basis as a viable component of its natural habitat, the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and there is and will probably continue to be a sufficiently large habitat to maintain its population on a long-term basis.
Favourable conservation status – habitats	When its natural range and the area it covers within that range are stable or increasing, and the species structure and function which are necessary for its long-term maintenance exist and likely to continue to exist for the foreseeable future, and the conservation status of its typical species is favourable.
Integrity of a site	The integrity of a site is the coherence of its ecological structure and function, across its whole area, which enables it to sustain the habitat, complex of habitat and/or the levels of population of the species for which it is classified.
Significant effect	A significant effect is defined when a plan or project is likely to undermine the site’s conservation objectives. Note that a significant effect cannot be excluded on the basis of objective information. A significant effect on a bird population is defined when a plan or project is likely to undermine at least 1% or more of the relevant population (biogeographical, national, SAC/ SPA/ Ramsar site).

1.6 Consultation

Consultation with stakeholders is a key component of the Appropriate Assessment process.

An ‘Initial Consultation’ on the Silica Sand Review took place from 9 March to 20 April 2015. Question 3 in the Initial Consultation, asked: “Should enhanced evidence on the potential effects of silica sand extraction on the Wash and North Norfolk Coast SAC, The Wash SPA and The Wash Ramsar be provided in areas closer than 250 metres from the SAC/SPA/Ramsar, or should a different distance from these sites be used?” Louise Oliver, from Natural England, responded to the Initial Consultation to state that a 500 metre distance from The Wash SPA, The Wash Ramsar and The Wash and North Norfolk Coast SAC may be more appropriate (than a 250 metre distance), to avoid noise and lighting from extraction activities disturbing birds, which are the main features of these designated sites in The Wash.

Under the AA guidance consultation with Natural England, where there is the potential for a project or plan to potentially impact on a European designated site, is mandatory. Natural England was formally consulted on the Task 1 TOLS, in addition to other statutory and non-statutory consultees, such as the Environment Agency.

Louise Oliver, from Natural England, responded to the consultation on the Habitats Regulations Assessment (Task 1) on 21 December 2015. Natural England’s response was as follows:

“Natural England notes that your authority, as competent authority under the provisions of the Habitats Regulations, has screened the proposal to check for the likelihood of significant effects. We agree with the conclusion of no likely significant effect from any of the AOS on Roydon Common & Dersingham Bog SAC & Ramsar sites.

Your assessment concludes that your authority cannot rule out the likelihood of significant effects arising from the AOS A and AOS B, either alone or in-combination in relation to The Wash and North Norfolk SAC, The Wash Ramsar and The Wash Special Protection

Area (SPA). On the basis of information provided, Natural England concurs with this view and notes that it mainly relates to disturbance to birds (which are designated features) using agricultural land outside the designated sites.

We note that an Appropriate Assessment will now be undertaken, in order to assess the implications of these AOS for the European sites, in view of the site conservation objectives. Natural England is a statutory consultee at the Appropriate Assessment stage of the Habitats Regulations Assessment process. The following advice is provided to support the conclusions drawn and to assist your authority to undertake an Appropriate Assessment. The Appropriate Assessment must contain clear conclusions, and clear recommendations in relation to bird disturbance about how the plan should change in terms of the AOS allocations and/or mitigation measures. It needs to demonstrate how any necessary measures that have been identified have been incorporated into the plan to be in a position to conclude no likely significant effect or no adverse effect on integrity.”

These comments have been taken into account in the Task 2 Appropriate Assessment on the Silica Sand Review. No other comments were received in response to the consultation on the Task 1 TOLS.

Natural England will be formally consulted on the Task 2 appropriate assessment, in addition to other statutory and non-statutory consultees, such as the Environment Agency.

2 Task 1 Screening

For each designated site, an assessment of likely significant effects of the potential impacts of proposed areas of search and specific site for silica sand extraction located within 5km was conducted. This assessment was contained in the Habitats Regulations Assessment (Task 1) (September 2015). Proposed specific sites and areas of search located more than 5 km from the designated site were excluded because the potential impacts of mineral extraction on designated sites are not expected to occur over a distance greater than 5km.

The Task 1 assessment also tested in-combination impacts that may arise from other relevant plans and policies. The Local Plans of all planning authorities, in which the potentially affected designated sites are located, were assessed to determine in-combination impacts.

The screening matrix contained in the Habitats Regulations Assessment (Task 1) is a high level review of the potential impacts arising from the implementation of the Silica Sand Review of the Mineral Site Specific Allocations DPD.

Potential impacts that might occur to European designated sites and features from potential mineral sites are listed below.

- Habitat loss;
- Disturbance (including light and noise) from site activities and traffic from heavy vehicles to and from the site;
- Vibration and ground trepidation resulting from heavy vehicles;
- Dust;
- Water runoff from site and from access roads to the site;
- Lowering of local groundwater and surface water levels from extraction operations.

2.1 Summary and Recommendations for Task 2

Following the review of the ten areas of search and one proposed silica sand site in the Silica Sand Review Preferred Options Consultation document and the formulation of the Task 1 Test of Likely Significance screening matrix, two European and Ramsar designated sites were identified where likely significant effects could occur:

The Wash SPA: Areas of Search AOS A (land west of Snettisham, Ingoldisthorpe and Dersingham) and AOS B (land south of Heacham); likely significant effects, alone and in-combination were identified for all features of the SPA. Adverse impacts might result from:

- Disturbance of designated species, caused by noise from silica sand operations in proximity to the SPA.
- Loss of functional habitats on land outside the SPA, used by designated bird species, due to silica sand extraction.

The Wash Ramsar: Areas of Search AOS A and AOS B; likely significant effects, alone and in-combination, were identified for Criterion 5 and Criterion 6 of the Ramsar. Adverse impacts might result from:

- Disturbance of designated species caused by noise from silica sand operations in proximity to The Wash.
- Loss of functional habitats on land outside the Ramsar, used by designated bird species, due to silica sand extraction.

One European designated site has been identified where uncertain effects, alone and in-combination could occur:

The Wash and North Norfolk Coast SAC: Areas of Search AOS A and AOS B, uncertain effects, alone and in-combination were identified for all features of the SAC. Significant impacts might include: Disturbance of designated species, caused by noise from silica sand extraction operations in proximity to the SAC.

The effects were considered significant on these three designated sites because the likely impacts might affect the conservation objectives of the designated sites and jeopardise the achievement of favourable conditions.

The remaining designated sites are considered sufficiently distant from the proposed site and ten areas of search so that likely impacts are not significant. Nevertheless, for silica sand extraction within any of the areas of search and the proposed specific site, best practice, described in the appropriate guidance for each activity, should be followed at all times.

Based on this assessment, Areas of Search A and B should go through a Task 2 Appropriate Assessment where a more detailed assessment of potential impacts from silica sand extraction within the Areas of Search will be conducted against each designated feature for each European site. In the case that adverse impacts are found to be significant, mitigation measures can be proposed to minimise impacts.

In addition, the following measures are also recommended:

- Best practice should be followed at all times. This is most relevant where water dependent habitats are features of the designated sites.
- Monitoring programmes should be implemented where relevant to ensure that any changes to designated features are identified and preventive measures are implemented as soon as possible, therefore preventing an adverse effect.

The Natural Environment and Rural Communities Act, the NERC Act (2006), states that public authorities must have regard to the purpose of conserving biodiversity including the restoration or enhancing of a population or habitat. When restoration is one of the objectives of the activity, the conservation objectives of the European site need to be considered where reasonable. In addition, although the sites are located outside the designated sites boundaries, the restoration or enhancing of a population or habitat should be integrated with plans such as the Green Infrastructure Strategy, Biodiversity Action Plans and Norfolk Ecological Networks.

Following public consultation in November and December 2015, a Pre-Submission version of the Silica Sand Review has been drafted. The Pre-Submission version includes six defined areas of search and one specific site.

Area of Search B (land south of Heacham) is not allocated in the Pre-Submission version of the Silica Sand Review and therefore no further Habitats Regulations Assessment is required of AOS B.

3. Habitats Regulations Assessment – Task 2 Appropriate Assessment

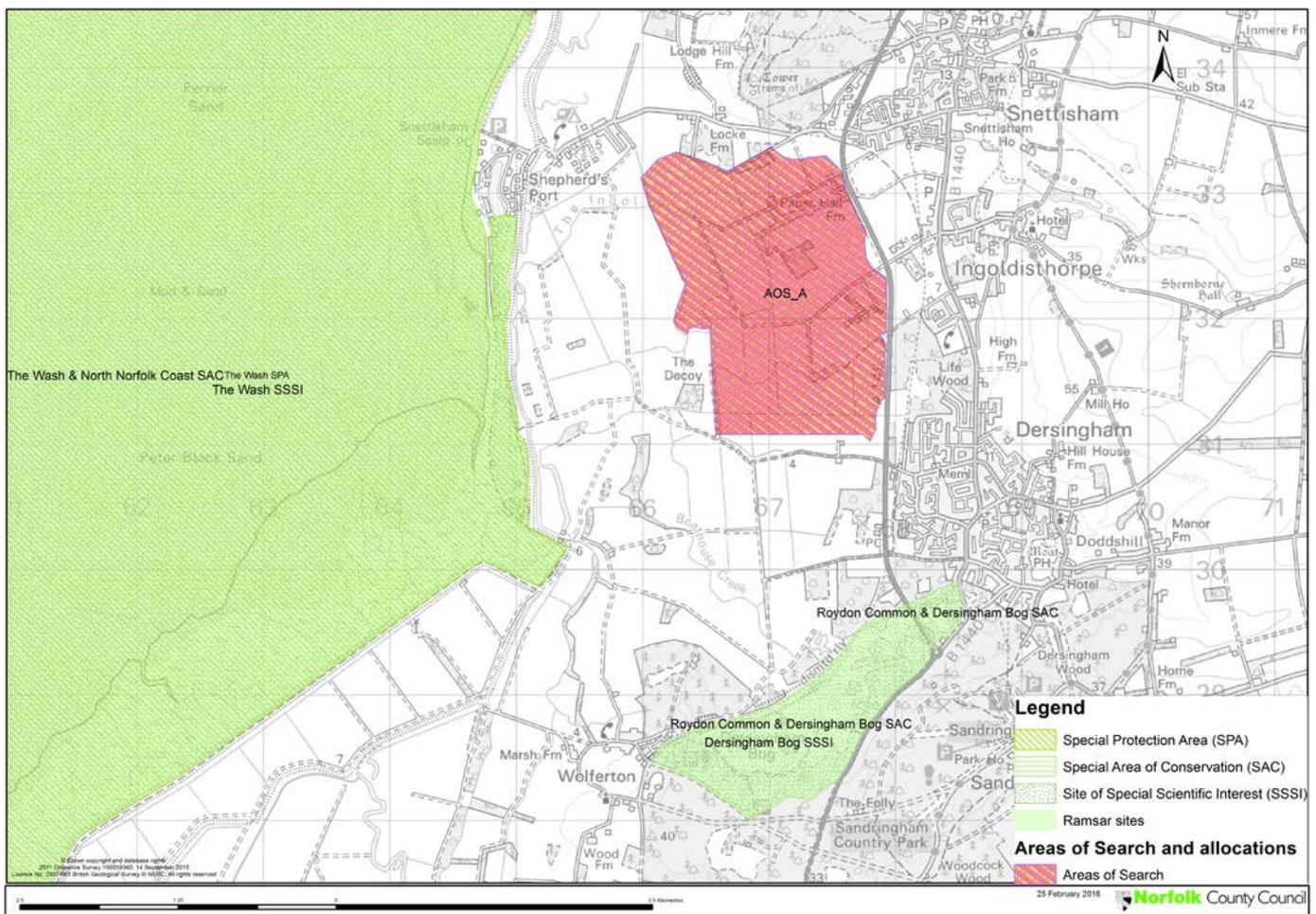
AOS A – land west of Snettisham, Ingoldisthorpe and Dersingham

3.1 Area of search location and description

AOS A covers 328 hectares within the parishes of Snettisham, Ingoldisthorpe and Dersingham. It is located immediately west of the A149 on land which consists largely of drained coastal marsh, which is in agricultural use, with small areas of woodland. To the east of the A149 are Snettisham to the north, Ingoldisthorpe to the east and Dersingham to the south-east. AOS A is close to the Norfolk Coast AONB. 69% of AOS A is in Flood Zones 2 and 3 (medium and high risk) for flooding from the sea. AOS A is located over 1km east of The Wash SPA, The Wash Ramsar and The Wash and North Norfolk Coast SAC.

Following public consultation in November and December 2015, a Pre-Submission version of the Silica Sand Review has been drafted. The Pre-Submission version includes six defined areas of search and one specific site. The boundaries of AOS A have been amended in the Pre-Submission document to reduce the size (from 548 to 328 hectares) and move the boundary of AOS A further away from The Wash designated sites (from 250 metres to 1km).

AOS A is allocated as an area of search for silica sand extraction. Development will be subject to compliance with the Core Strategy and Development Management Policies and the Areas of Search Policy.



3.2 Potential Impacts on The Wash and North Norfolk Coast SAC

The qualifying features of The Wash and North Norfolk Coast SAC are:

H1110. Sandbanks which are slightly covered by sea water all the time; Subtidal sandbanks

H1140. Mudflats and sandflats not covered by seawater at low tide; Intertidal mudflats and sandflats

H1150. Coastal lagoons

H1160. Large shallow inlets and bays

H1170. Reefs

H1310. *Salicornia* and other annuals colonizing mud and sand; Glasswort and other annuals colonizing mud and sand

H1330. Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

H1420. Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)

S1355. Common seal *Phoca vitulina*

S1365. Otter *Lutra lutra*

The site description, qualifying features, conservation objectives and vulnerabilities of The Wash and North Norfolk Coast SAC are detailed in Appendix A. The sensitivities of the qualifying features are detailed in Appendix B.

The Wash and North Norfolk Coast SAC includes The Wash SSSI and the North Norfolk Coast SSSI. The Wash SSSI is assessed by Natural England as: 68% in favourable condition, 31.6% in unfavourable recovering condition and 0.4% in unfavourable declining condition. The North Norfolk Coast SSSI is assessed by Natural England as: 99.4% favourable condition and 0.6% unfavourable – recovering condition.

At the Task 1 Screening stage, undertaken in September 2015, uncertain effects alone and in-combination were identified for all features of the SAC due to silica sand extraction located within AOS A. At the Task 1 Screening stage, the boundary of AOS A was located 250 metres from The Wash and North Norfolk Coast SAC in the Preferred Options Consultation document. In the draft Pre-Submission document the boundary of AOS has been moved 1km inland.

Therefore, due to the 1km distance from AOS A to The Wash and North Norfolk Coast SAC there would be no likely significant effect on the designated habitats of the SAC from silica sand extraction within AOS A.

The vehicles and machinery used in mineral extraction operations produce noise that can cause disturbance. Noise limits, operational hours and vehicle movements can all be controlled through planning conditions. Vehicle access would be onto the A149, potentially via other existing side roads. Due to the 1km distance between the SAC and the boundary of AOS A, there would be no likely significant effect on the designated species of the SAC (Common Seal and Otter) from noise disturbance.

Therefore, due to the distance between the SAC and AOS A, no adverse effects, either alone or in-combination, are expected on the integrity of the SAC from silica sand extraction within AOS A.

3.3 Potential Impacts on The Wash SPA and Ramsar site

The site description, qualifying features, conservation objectives and vulnerabilities of The Wash SPA are detailed in Appendix A. The sensitivities of the qualifying features are detailed in Appendix B. The site description, criteria for designation and vulnerabilities of The Wash Ramsar site are detailed in Appendix A. The sensitivities of the criteria for designation are detailed in Appendix B.

The Wash SPA and Ramsar site include The Wash SSSI. The Wash SSSI is assessed by Natural England as: 68% in favourable condition, 31.6% in unfavourable recovering condition and 0.4% in unfavourable declining condition.

3.3.1 Direct

Table 3.1: Potential Impacts arising from the proposed development

Impact		Assessment
Physical habitat loss – removal	AOS A is 1km inland from The Wash SPA and Ramsar site. Therefore silica sand extraction within AOS A will not lead to the loss of SPA or Ramsar habitat	No adverse effect on the integrity of the SPA or Ramsar site
Physical habitat loss – smothering	AOS A is 1km inland from The Wash SPA and Ramsar site. Dust emissions from silica sand extraction can be mitigated to acceptable levels within 250 metres of the extraction site. Dust management and monitoring would be controlled through planning conditions. Therefore dust emissions would not lead to habitat loss by smothering on The Wash.	No adverse effect on the integrity of the SPA or Ramsar site
Physical damage - due to land management including over- and under-grazing	AOS A is 1km inland from The Wash SPA and Ramsar site. Therefore silica sand extraction within AOS A will not lead to the loss of SPA or Ramsar habitat	No adverse effect on the integrity of the SPA or Ramsar site
Physical damage – due to recreational pressure	AOS A is 1km inland from The Wash SPA and Ramsar site. Silica sand extraction within AOS A would not lead to increased recreational pressure at the SPA or Ramsar site.	No adverse effect on the integrity of the SPA or Ramsar site
Coastal Squeeze due to sea level rise and coastal defences	AOS A is 1km inland from The Wash SPA and Ramsar site. Silica sand extraction within AOS A would not lead to increased coastal squeeze on the SPA or Ramsar site.	No adverse effect on the integrity of the SPA or Ramsar site
Disturbance – noise/visual	AOS A is 1km inland from The Wash SPA and Ramsar site. The vehicles and machinery used in mineral extraction operations produce noise that can cause disturbance. Noise limits, operational hours and vehicle movements would all be controlled through planning conditions. Vehicle access would be onto the A149,	No adverse effect on the integrity of the SPA or Ramsar site

Impact		Assessment
	<p>potentially via other existing side roads. Due to the 1km distance between the boundary of AOS A and The Wash, there would be no likely significant effect on the designated species using land within the designated sites, from noise or visual disturbance.</p>	
<p>Water quality and water pollution</p>	<p>It is likely that silica sand extraction within AOS A would take place into the water table due to the depth of the silica sand resource in relation to the water table.</p> <p>The areas of search policy will require a planning application for silica sand extraction within AOS A to include a Hydrogeological Risk Assessment. The Hydrogeological Risk Assessment must be based on proportionate evidence, identify potential impacts to groundwater quality, quantity and levels; and propose appropriate mitigation to protect any abstraction points, ecosystems and surface water features that are reliant on groundwater, in particular SSSIs, SACs and SPAs. The assessment will need to consider the precautionary principal as it related to European designations. The Assessment should include a programme of mitigation measures to address identified potential impacts, and comply with the requirements of policies CS14, DM1 and DM3.</p> <p>Due to this policy requirement, and the distance of AOS A from The Wash, there should be no adverse effect on the integrity of The Wash from water pollution or changes to water quality.</p>	<p>No adverse effect on the integrity of the SPA or Ramsar site</p>
<p>Air pollution</p>	<p>AOS A is 1km from The Wash SPA and Ramsar site. Dust emissions from silica sand extraction can be mitigated to acceptable levels within 250 metres of the extraction site. Dust management and monitoring would be controlled through planning conditions. The areas of search policy will require a planning application for silica sand extraction within AOS A to include an air quality assessment of the potential for any emissions, including dust, together with suitable mitigation measures to address these potential impacts on humans, for and fauna. The Air Quality Assessment will need to be compliant with Policy DM13.</p> <p>Therefore dust emissions would not lead to an adverse air pollution impact on The Wash.</p>	<p>No adverse effect on the integrity of the SPA or Ramsar site</p>
<p>Nutrient enrichment</p>	<p>Silica sand extraction within AOS A would not lead to nutrient enrichment of The Wash.</p>	<p>No adverse effect on the integrity of the SPA or Ramsar site</p>
<p>Loss of functional habitat</p>	<p>Some of the designated bird species of The Wash use the agricultural land near The Wash for foraging. For example, pink-footed geese forage within agricultural and pasture land, and the same areas provide overspill foraging for curlew, oystercatcher, dunlin and black tailed</p>	<p>No adverse effect on the integrity of the SPA or Ramsar site</p>

Impact		Assessment
	<p>godwit during high tides.</p> <p>AOS A consists of 328 hectares of mainly arable farmland with some small wooded areas and hedgerow. AOS A is generally 1.3km from the boundary of The Wash on its western boundary, and is 1km at its closest point in the north west corner by a caravan park at Shepherd's Port. Silica sand extraction within this area of search is likely to lead to a permanent loss of arable land due to the depth of silica sand extraction and the height of the water table. However, it is expected that no more than 40 hectares of land would be required for silica sand extraction, in the plan period up to 2026, from all of the six areas of search and the one specific site allocated in the Silica Sand Review (which total 1,405 hectares in size).</p> <p>The area of land between AOS A and The Wash comprises of similar arable field habitat to AOS A and there is also a similar sized area of farmland to the south of AOS A. Due to the quantity of arable land surrounding AOS A, and the area of land needed for silica sand extraction within the plan period, there is not likely to be a significant adverse effect on the area of arable fields available as foraging habitat for qualifying bird species outside of the designated sites of The Wash.</p> <p>The vehicles and machinery used in mineral extraction operations produce noise that can cause disturbance to birds using agricultural land for foraging. Noise limits, operational hours and vehicle movements would all be controlled through planning conditions. Vehicle access would be onto the A149, potentially via other existing side roads.</p> <p>Therefore, no adverse effects are expected on the integrity of The Wash SPA and Ramsar site from silica sand extraction within AOS A due to the quantity of arable field habitat that will remain in this locality.</p>	

3.3.2 In-combination

Table 3.2: Potential in-combination effects arising from the proposed development

Other Plans and Policies		Impact
Mineral and Waste Site Specific Allocations DPD	Allocated site WAS 05 is located on the northern edge of King's Lynn, approximately 2km from The Wash SPA and Ramsar. Site WAS 05 is allocated for processing of recyclables, mixed waste processing, thermal treatment and other forms of residual waste treatment (estimated capacity 150,000 tonnes per annum). A Habitats Regulations Assessment of the Waste Site Specific Allocations was published in December 2011. The Habitats Regulations Assessment concluded that no adverse effects on the integrity	No adverse effect on the integrity of the SPA or Ramsar

Other Plans and Policies		Impact
	<p>of The Wash SPA and Ramsar, from the development of this site, should be achievable with the specified mitigation and control measures.</p> <p>Allocated site WAS 65 is located on the southern edge of King's Lynn, approximately 6.5km from The Wash SPA and Ramsar. Site WAS 65 was allocated for composting, anaerobic digestion, processing of recyclables, mixed waste processing, thermal treatment and other forms of residual waste treatment (estimated capacity up to 250,000 tpa). The Habitats Regulations Assessment concluded that no adverse effects on the integrity of The Wash SPA and Ramsar, from the development of this site, should be achievable with the specified mitigation and control measures.</p> <p>The nearest mineral site specific allocation (MIN 71 - sand and gravel extraction at Holt) is located more than 6km from The Wash. No likely significant effects are expected from this site, due to distance.</p>	
Existing mineral extraction and waste management sites	<p>The following Waste Water Treatment Works are located within 5km of The Wash SPA/Ramsar: King's Lynn WWTW, Heacham WWTW and Ingoldisthorpe WWTW. Discharges from these WWTWs are permitted and controlled by the Environment Agency.</p> <p>There is also an existing composting facility at South Wootton (2.3km from the The Wash SPA/Ramsar) and a carstone quarry at Snettisham (2.5km from the The Wash SPA/Ramsar). Due to the differing types of operations taking place at these existing sites compared to silica sand extraction, and specifically,</p> <ul style="list-style-type: none"> • The location and low intensity of carstone extraction at Snettisham, and • the feedstock at the composting facility, and the method of composting, <p>no adverse cumulative effects are expected from silica sand extraction within AOS A in the Silica Sand Review.</p>	No adverse effect on the integrity of the SPA or Ramsar
King's Lynn and West Norfolk LDF	<p>The Wash SPA and Ramsar site are located off the West Norfolk coast.</p> <p>The King's Lynn and West Norfolk Core Strategy was adopted in 2011. A Habitats Regulations Assessment of the Core Strategy was published in July 2009 and updated in November 2010. The HRA concluded that potential adverse effects on the integrity of European sites have been adequately avoided or mitigated for and the policies will not adversely affect the integrity of the European sites.</p> <p>The King's Lynn and West Norfolk Site Allocations and Development Management Policies Plan was submitted to the Secretary of State in April 2015 and the examination of the plan is currently taking place.</p> <p>A Habitats Regulations Assessment of the proposed submission document was published in September 2015. Each site allocation individually was concluded not likely to</p>	No adverse effect on the integrity of the SPA or Ramsar

Other Plans and Policies		Impact
	<p>have a significant effect on the European sites. The development management policies individually were concluded not likely to have a significant effect on the European sites. However, the combined effects of increased recreational pressure from a total of 515 new houses at Hunstanton, Heacham, Snettisham, Ingoldisthorpe, Dersingham, Sedgeford and Burnham Market were considered likely to cause a significant effect on SPA birds. Combined effects from outside the Borough were also considered likely because of the mixed nature of users (local, day trippers and tourists). A Natura 2000 Sites Monitoring and Mitigation Strategy was developed and endorsed by the Borough Council's Cabinet which will provide for funding of monitoring and small scale mitigation of impacts of European sites. It will also provide for a Habitat Mitigation Advisory Panel.</p> <p>Specific mitigation for the combined effect of housing proposals on the Wash SPA are proposed in addition to monitoring and management measures, for green infrastructure provision, plus a programme of permanent public information will be sufficient to ensure reduction of likely impacts to an insignificant level and no adverse effect on site integrity. These measures are included in policy DM19 – <i>Green Infrastructure/Habitats Monitoring and Mitigation</i>.</p> <p>The Habitats Regulations Assessment concluded that the Natura 2000 Sites Monitoring and Mitigation Strategy provides the required certainty that future developments will not result in adverse effects on European sites within the Borough.</p>	
North Norfolk LDF	<p>The Wash SPA and Ramsar site are located off the North Norfolk coast.</p> <p>North Norfolk's Core Strategy (incorporating Development Control Policies) was adopted in 2008 (and updated with one policy in 2011). A Task 1 appropriate assessment for the Core Strategy was published in June 2007 and concluded that there were no policies identified which are likely to cause significant effects on Nature 2000 sites and therefore there was not a need for a Task 2 appropriate assessment to be carried out.</p> <p>North Norfolk's additional policy HO9 was also assessed in 2010 and concluded that there was no likely significant effect from the policy on Natura 2000 sites.</p> <p>North Norfolk's Site Allocations DPD was adopted in 2011. An appropriate assessment for the Site Allocations was published in February 2010. It was considered that new development in North Norfolk could impact on Natura 2000 sites through impacts on water quality, impacts on water resources and disturbance associated with human presence, residence or visitation. The HRA concluded that, both alone and in combination with other plans and policies, there is no adverse effect on the integrity of international sites from the North Norfolk District Council Site Specific Proposals assessed. However, this is dependent on NNDC to undertake</p>	No adverse effect on the integrity of the SPA or Ramsar

Other Plans and Policies		Impact
	<p>two series of measures, where the existence of a potential impact is unclear, and to respond to additional information they produce in such a way as to avoid future impacts:</p> <ol style="list-style-type: none"> 1. A programme of visitor activity and impacts at designated sites, and identification of targeted management responses are required for North Norfolk Coast sites and The Broads/Broadland sites. 2. Further water quality assessment for the River Wensum, The River Thurne and The River Ant <p>Therefore, the Site Allocations DPD is assessed to have no adverse effect on the integrity of The Wash SPA or Ramsar.</p>	
Breckland Local Development Framework	<p>The Breckland Core Strategy and Development Control Policies DPD was adopted in 2009. A Habitats Regulations Assessment was published in November 2008. The planned 19,000 new homes within the district by 2026 and the promotion of tourism related development were considered likely to have a significant effect due to increased levels of recreation to the Norfolk Coast (including the Wash). This could potentially result in disturbance and other recreational impacts to important species and habitats in the coastal strip and from increased water discharges to meet additional waste water treatment needs. The additional 9,000 jobs planned in the district were considered likely to have a significant effect due to increased water discharges.</p> <p>The HRA concluded that the Core Strategy and DC Policies DPD would have no likely significant effect on Natura 2000 sites due to:</p> <ul style="list-style-type: none"> - policies stating: <ol style="list-style-type: none"> i. the numbers of housing that can be taken forward with the current waste water, infrastructure capacity, to protect water quality, ii. the quantity that can only be taken forward with the committed works in place and operational in time to meet the demands of development, and iii. the housing that cannot be taken forward prior to a plan review and the revisit of the HRA. - tourism policy including specific reference to only promoting tourism that ensures the protection of European sites - The Wash is located outside Breckland District and mitigation measures would need to be undertaken in partnership with neighbouring authorities and other relevant partners, with the Norfolk Coast Partnership suggested as a lead partner. <p>The Breckland Site Specific Policies and Proposals DPD was adopted in 2012. A Habitats Regulations Assessment was published in 2011. The HRA considered that for The Wash SPA/Ramsar the potential impacts from recreational impacts as a result of increased day trips etc will not be relevant to these sites as the Core Strategy HRA has addressed the issues at a strategic level and for the entire</p>	No adverse effect on the integrity of the SPA or Ramsar

Other Plans and Policies		Impact
	<p>district. Issues relating to water quality may well remain for The Wash. Therefore, in relation to Swaffham and Watton waste water treatment works which discharge via the River Wissey to The Wash, it will be necessary to match location and phasing of development with available WWTW capacity.</p> <p>The Thetford Area Action Plan was adopted in 2012. A Habitats Regulations Assessment was published in July 2011. The HRA considered that for The Wash SPA and Ramsar site: the potential impacts from recreational impacts as a result of increased day trips etc will not be relevant to these sites as the TAAP is well to the south of the Breckland District and well outside a relevant travel time (see Core Strategy HRA). The Water Cycle Study states that Thetford WWTW (which discharges into the Little Ouse) is not currently impacting on any ecologically designated sites downstream. Because there is no proposal to increase flow above the current consent, it is therefore considered that there would be no downstream impact in protected sites as a result of growth in Thetford.</p>	
Lincolnshire Minerals and Waste Local Plan	<p>The Wash SPA and Ramsar site are located off the coast of Lincolnshire. The Minerals and Waste Local Plan – Core Strategy and Development Management Policies document was submitted to the Secretary of State in June 2015 and the examination of the plan is currently taking place. A Habitats Regulations Assessment (Screening) was published in December 2015. It concluded “that no likely significant effects on European Sites, either alone, or in-combination with other projects and plans will result from the implementation of the Plan”.</p> <p>The Site Locations document, which will identify individual sites and areas for waste and mineral development, is currently at the Preferred Sites and Areas stage (January 2016). A HRA (Screening) was published in June 2015. The HRA recommends that aggregate recycling operations should be located more than 1km from The Wash SPA to avoid any risk of noise disturbance to birds or seals. The HRA concluded that it is considered unlikely that waste development or minerals development sites contained in the Site Locations document will result in harm being caused to the nature conservation interests of The Wash SPA/Ramsar, but any detailed proposals for development should be subject to close scrutiny and control to avoid any potential harm to the Wash SPA/Ramsar. A Pre-Submission draft document will be published later in 2016.</p>	No adverse effect on the integrity of the SPA or Ramsar
South East Lincolnshire Local Plan	<p>The Wash SPA and Ramsar site are located off the coast of South Holland and Boston Districts. South Holland and Boston District Councils are producing a new Local Plan (2011-2036) jointly with Lincolnshire County Council. The draft South East Lincolnshire Local Plan was published for consultation during January and February 2016. A Habitats Regulations Assessment published in January 2016 concluded that at this stage, the effect of developing over 18,000 houses in SE</p>	No adverse effect on the integrity of the SPA or Ramsar

Other Plans and Policies		Impact
	<p>Lincolnshire cannot be screened out of the HRA process in relation to The Wash SPA and Ramsar due to recreational pressure. The new open space provision includes significant space for informal recreation and walking, but it is not clear if it is viable for all the open space standards to be achieved. A Pre-Submission draft document will be published later in 2016.</p> <p>There will not be increased recreational pressure, or other impacts from disturbance caused by the Silica Sand Review on the SPA or Ramsar site and therefore no in-combination effects are expected.</p>	
East Lindsey Local Plan	<p>The Wash SPA and Ramsar site is located off the coast of East Lindsey District Council. East Lindsey District Council is in the process of producing a Local Plan, and the most recent consultation was on the Core Strategy in January 2013. A draft Habitats Regulations Assessment (Screening) was published in August 2012. However, due to the absence of information relating to the quantum of growth in the East Lindsey Local Plan at that stage, it was not possible for the HRA to conclude no likely significant effect. However, the plan is still at an early stage and the HRA results will inform the Local Plan process, including policy wording.</p>	No adverse effect on the integrity of the SPA or Ramsar
Fenland Local Plan	<p>The Wash SPA and Ramsar site are located approximately 9km from the boundary of Fenland District Council. The Fenland Local Plan – Core Strategy was adopted in May 2014. A Habitats Regulations Assessment (Screening) was carried out in September 2013. The HRA concluded that there would be no likely significant effect on The Wash SPA/Ramsar from the Core Strategy policies.</p>	No adverse effect on the integrity of the SPA or Ramsar
Norfolk Coast AONB Management Plan 2014-19	<p>Parts of The Wash SPA and Ramsar site are located within the Norfolk Coast AONB. A Habitats Regulations Assessment (Screening) was undertaken on the Norfolk Coast AONB Management Plan 2014-19. The policies in the plan were assessed as either having no significant impacts on the designated sites or potentially having a positive impact on the designated sites.</p>	No adverse effect on the integrity of the SPA or Ramsar
The Wash Shoreline Management Plan	<p>The Wash Shoreline Management Plan (August 2010) aims to identify the best ways to manage flood and erosion risk over the short (up to 2025), medium (2025-2055) and long-term (2055-2105). It includes parts of The Wash SPA and Ramsar site. A Habitats Regulations Assessment of the Shoreline Management Plan (SMP) was carried out in August 2010. The HRA states that, in relation to the SMP policy for Policy Development Zone (PDZ) 1, Gibraltar Point to Wolferton Creek, it cannot be concluded not to have an adverse effect on the integrity of international sites. Therefore, the SMP is concluded to have an adverse effect on the integrity of international sites (including The Wash SPA and Ramsar site). However, the SMP policies for PDZ2, PDZ3 and PDZ 4 (Wolferton Creek to Hunstanton Cliffs) are assessed to have no adverse effect on the integrity of The Wash SPA and Ramsar site.</p>	No adverse effect on the integrity of the SPA or Ramsar

Other Plans and Policies		Impact
	AOS A is located 1km inland of The Wash and is located inland of PDZ2 where the SMP is concluded to have no adverse impact on the integrity of The Wash designated sites, therefore no in-combination effects are expected with the Silica Sand Review.	
Norfolk Local Flood Risk Management Strategy	The Norfolk Local Flood Risk Management Strategy was adopted in July 2015. It addresses the potential flood risk arising from local sources within Norfolk. A Habitats Regulations Assessment (Screening) was published in April 2015. The HRA concluded that the policies and measures within the Norfolk LFRMS will not result in likely significant effects to any European sites.	No adverse effect on the integrity of the SPA or Ramsar

3.4 Conclusion, Mitigation and Recommendations

Due to the distance of AOS A from The Wash SPA and The Wash Ramsar site, there will be no adverse effects on the designated habitats of The Wash SPA or on criterion 1 and criterion 3 of The Wash Ramsar from silica sand extraction within AOS A.

Due to the distance of AOS A from The Wash SPA and The Wash Ramsar site, there will be no adverse effects on the structural habitat of the designated species of The Wash SPA and on criterion 5 and criterion 6 of The Wash Ramsar from silica sand extraction within AOS A.

Therefore, the key issue for the Task 2 Appropriate Assessment to address is the effect on foraging habitat for the qualifying bird species of The Wash SPA and Ramsar. This assessment concludes that there should be no adverse effect on the integrity of The Wash SPA and Ramsar site from silica sand extraction within AOS A. This is because of the quantity of arable field habitat that will remain in this locality as foraging habitat for qualifying bird species outside of the designated sites of The Wash.

In addition, the Areas of Search Policy contains the following relevant requirements that a planning application for silica sand extraction would need to address:

- Provision of an air quality assessment and appropriate mitigation measures if required
- Provision of a Hydrogeological Risk Assessment and appropriate mitigation measures if required
- Provision of a protected species assessment and appropriate mitigation measures if required
- A comprehensive working and restoration plan, which is compliant with Policy DM14, in particular considering the opportunities, on restoration, for ecological enhancement, the improvement of public access and geological exposures for further study.

Worked areas of silica sand extraction within AOS A are unlikely to be suitable for restoration back to arable land due to the mineral excavation depth required. The land should therefore be restored to nature conservation habitats, e.g. heathland, acid grassland, woodland and open water. This would be an enhancement for biodiversity and would have potential to provide a further feeding area for the designated bird species of The Wash.

No adverse effects are expected on the integrity of The Wash SPA and The Wash Ramsar site.

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Appendix A Designated Sites and Qualifying Features

A.1 The Wash SPA (site code: UK9008021)

Site Description and Qualifying Features

The Wash is located on the west coast of Norfolk and is the largest estuarine system in the UK. It is fed by the rivers Witham, Welland, Nene and Great Ouse that drain much of the east Midlands of England. The Wash comprises very extensive saltmarshes, major intertidal banks of sand and mud, shallow waters and deep channels. The sheltered nature of The Wash creates suitable breeding conditions for shellfish, which constitute important food sources for some waterbirds such as oystercatchers *Haematopus ostralegus*. The Wash is of outstanding importance for a large number of geese, ducks and waders, both in spring and autumn migration periods, as well as through the winter. The SPA is especially notable for supporting a very large proportion (over half) of the total population of Canada/Greenland breeding knot *Calidris canutus islandica*. In summer, the Wash is an important breeding area for terns and as a feeding area for marsh harrier *Circus aeruginosus* that breed just outside the SPA.

To the north, the coastal habitats of The Wash are continuous with Gibraltar Point SPA, whilst to the east The Wash adjoins the North Norfolk Coast SPA.

SPA Qualifying Features – Species

- A037. *Cygnus columbianus bewickii*; Bewick's swan (Non-breeding)
 - A040. *Anser brachyrhynchus*; Pink-footed goose (Non-breeding)
 - A046a. *Branta bernicla bernicla*; Dark-bellied brent goose (Non-breeding)
 - A048. *Tadorna tadorna*; Common shelduck (Non-breeding)
 - A050. *Anas penelope*; Eurasian wigeon (Non-breeding)
 - A051. *Anas strepera*; Gadwall (Non-breeding)
 - A054. *Anas acuta*; Northern pintail (Non-breeding)
 - A065. *Melanitta nigra*; Black (common) scoter (Non-breeding)
 - A067. *Bucephala clangula*; Common goldeneye (Non-breeding)
 - A130. *Haematopus ostralegus*; Eurasian oystercatcher (Non-breeding)
 - A141. *Pluvialis squatarola*; Grey plover (Non-breeding)
 - A143. *Calidris canutus*; Red knot (Non-breeding)
 - A144. *Calidris alba*; Sanderling (Non-breeding)
 - A149. *Calidris alpina alpina*; Dunlin (Non-breeding)
 - A156. *Limosa limosa islandica*; Black-tailed godwit (Non-breeding)
 - A157. *Limosa lapponica*; Bar-tailed godwit (Non-breeding)
 - A160. *Numenius arquata*; Eurasian curlew (Non-breeding)
 - A162. *Tringa totanus*; Common redshank (Non-breeding)
 - A169. *Arenaria interpres*; Ruddy turnstone (Non-breeding)
 - A193. *Sterna hirundo*; Common tern (Breeding)
 - A195. *Sterna albifrons*; Little tern (Breeding)
- Waterbird assemblage

Conservation Objectives

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the Qualifying Features' listed above), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintain or restoring;

- The extent and distribution of the habitats of the qualifying features
- The structure and function of the habitats of the qualifying features
- The supporting processes on which the habitats of the qualifying features rely
- The populations of each of the qualifying features, and,
- The distribution of the qualifying features within the site.

Vulnerability

The main threats and pressures to the Qualifying Features of the SPA are:

1. Inappropriate water levels: Structures which control water along the North Norfolk Coast have fallen into disrepair. The issue is preventing appropriate water level controls for breeding birds.

2. Public access/disturbance: The Wash and North Norfolk coast is a very popular area for recreational activity and visitor numbers are likely to grow, for example, as a result of the English Coastal path and housing development. The range of recreational activities may have adverse impacts on the sites (boating, motor boating, water skiing, jet skis, commercial and non-commercial wildlife tours, commercial shipping, kites, moorings, access to moorings, motorised vehicles, bikes, hovercraft, bird/wildlife watching, (dog) walking, samphire collection, shellfish collection, bait digging, reed cutting, beachcombing, sea lavender gathering, beach barbecues, littering, wildfowling). Conflicts with the management of fragile habitats and species which can be easily disturbed by recreational activity will need to be carefully managed. To overcome these challenges further collaboration between stakeholders and local people may be needed with the aim of more holistic management of the area.

3. Fisheries: recreational marine and estuarine: Recreational sea fishing and shoreline angling is a large scale activity with potential to impact on fish stocks as a resource for designated birds, but the size of the activity locally and its impact is not known.

4. Inappropriate coastal management: Following the tidal event in December 2013 there may now be conflicts between flood risk management and the protection and provision of SPA/SAC habitats.

5. Fisheries: commercial marine and estuarine: Hydraulic dredging, dredges and benthic trawls are categorised as 'Red' for the sub-feature subtidal boulder and cobble communities and Sabellaria spinulosa reef. Hydraulic dredges, dredges, benthic trawls and shore based activities are categorised as 'red' for the Zostera attribute of the muddy sand subfeature. Adaptive management measures will be used to protect features from 'red' categorised activities.

6. Predation: Lack of predator control, where appropriate, is having an impact on the ability of sites to support breeding bird populations.

9. Coastal squeeze at this site may lead to gradual loss of intertidal and coastal habitats due to sea level rise and the erection and maintenance of coastal defences. The Wash Shoreline Management Plan and the North Norfolk Coast Shoreline Management Plan are subject to Habitats Regulations Assessment. Some areas of compensatory habitat still need to be designated.

10. Public access/Disturbance: Low altitude, non-military flying aircraft (microlites, paragliders, hang gliders) have a negative impact on many features. High risk locations are identified through the EMS management scheme. The EMS scheme has mechanisms to reduce damage from recreational activity.

A.2 The Wash and North Norfolk Coast SAC (site code: UK0017075)

Site Description and Qualifying Features

The Wash and North Norfolk Coast form one of the most important sedimentary marine areas in the UK and European North Sea coast. The subtidal sandbanks vary in composition and include coarse sand through to mixed sediment at the mouth of the embayment. These support a diverse range of communities from the shallow to the deeper parts of the embayment including large areas of dense brittlestar beds and the reef-building worm *Sabellaria spinulosa* (ross worm).

The Wash is the largest marine embayment in Britain, with the second largest expanse of intertidal sediment flats in the country. These include extensive fine sands and drying banks of coarser sand, which support a diverse community characterised by large numbers of polychaetes, bivalves and crustaceans.

The site is also selected for Mediterranean saltmarsh scrubs, and is one of three sites in the UK. The halophilous vegetation develops in the uppermost levels of saltmarshes where there is a transition from saltmarsh to dunes, or where dunes are overly shingle.

The area is important for breeding and moulting of one of Europe's largest populations of the common seal *Phoca vitulina*. The extensive intertidal mud and sand flats provide the ideal conditions for breeding and haul-out sites for the common seal, where the subtidal sandbanks provide important feeding areas.

SAC Qualifying features- Habitats

H1110. Sandbanks which are slightly covered by sea water all the time; Subtidal sandbanks
H1140. Mudflats and sandflats not covered by seawater at low tide; Intertidal mudflats and sandflats

H1150. Coastal lagoons

H1160. Large shallow inlets and bays

H1170. Reefs

H1310. *Salicornia* and other annuals colonising mud and sand; Glasswort and other annuals colonising mud and sand

H1330. Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

H1420. Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*);
Mediterranean saltmarsh scrub

SAC Qualifying features- Species

S1355. Common seal *Phoca vitulina*

S1365. Otter *Lutra lutra*

Conservation Objectives

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed above), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;

- The extent and distribution of qualifying natural habitats and habitats of qualifying species
- The structure and function (including typical species) of qualifying natural habitats
- The structure and function of the habitats of qualifying species
- The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely
- The populations of qualifying species, and,
- The distribution of qualifying species within the site.

Vulnerability

The main threats and pressures to the Qualifying Features of the SAC are:

1. **Public access/disturbance:** The Wash and North Norfolk coast is a very popular area for recreational activity and visitor numbers are likely to grow, for example, as a result of the English Coastal path and housing development. The range of recreational activities may have adverse impacts on the sites (boating, motor boating, water skiing, jet skis, commercial and non-commercial wildlife tours, commercial shipping, kites, moorings, access to moorings, motorised vehicles, bikes, hovercraft, bird/wildlife watching, (dog) walking, samphire collection, shellfish collection, bait digging, reed cutting, beachcombing, sea lavender gathering, beach barbecues, littering, wildfowling). Conflicts with the management of fragile habitats and species, which can be easily disturbed by recreational activity, will need to be carefully managed. To overcome these challenges further collaboration between stakeholders and local people may be needed with the aim of more holistic management of the area.
2. **Siltation:** Sediment accretion is occurring in the Wash, and in such a dynamic system may be natural. However, activities associated with the Lincshire beach nourishment program may contribute to changes in sediment movement in the site. It is difficult to separate natural from anthropogenic change.
3. **Fisheries: recreational marine and estuarine:** Recreational sea fishing and shoreline angling is a large scale activity with potential to impact on fish stocks as a resource for designated birds, but the size of the activity locally and its impact is not known.
4. **Invasive species:** There is a risk of introduction and spread of non-native /invasive species (e.g. American Razor Clam, Slipper limpet, Pacific Oyster, oyster parasite *Bonamia*) from future fisheries and mussel lay stocking. There is also a risk of translocation of invasive species through ballast water transfer and discharge.
5. **Inappropriate coastal management:** Following the tidal event in December 2013 there may now be conflicts between flood risk management and the protection and provision of SPA/SAC habitats.

6. Fisheries: commercial marine and estuarine: Hydraulic dredging, dredges and benthic trawls are categorised as 'Red' for the sub-feature subtidal boulder and cobble communities and Sabellaria spinulosa reef. Hydraulic dredges, dredges, benthic trawls and shore based activities are categorised as 'red' for the Zostera attribute of the muddy sand subfeature. Adaptive management measures will be used to protect features from 'red' categorised activities.

7. Coastal squeeze at this site may lead to gradual loss of intertidal and coastal habitats due to sea level rise and the erection and maintenance of coastal defences. The Wash Shoreline Management Plan and the North Norfolk Coast Shoreline Management Plan are subject to Habitats Regulations Assessment. Some areas of compensatory habitat still need to be designated.

8. Change in land management: Grazing management. Areas of saltmarsh may be over and under-grazed throughout the site.

9. Air pollution: impact of atmospheric nitrogen deposition: Nitrogen deposition exceeds the critical loads for some sensitive habitats. Scrub encroachment in (unfavourable recovering) dune habitats may be exacerbated by atmospheric nitrogen.

A.3 The Wash Ramsar

Site Description and Qualifying Features

The Wash is the largest estuarine system in Britain which includes extensive saltmarshes, intertidal banks of sand and mud, shallow waters and deep canals. It is fed by the rivers Withem, Welland, Nene and Great Ouse. The site is the most important staging post and over-wintering site for migrant wildfowl and wading birds in the eastern England. It supports one of the North Sea's largest breeding populations of common seal *Phoca vitulina* and some grey seals *Halichoerus grypus*.

Ramsar criteria for designation

Criterion 1: The Wash comprises very extensive saltmarshes, major intertidal banks of sand and mud, shallow water and deep channels.

Criterion 3: The site is important for the inter-relationship between its various components including saltmarshes, intertidal sand and mud flats and the estuarine waters. The saltmarshes and the plankton in the estuarine water provide a primary source of organic material which, together with other organic matter, forms the basis for the high productivity of the estuary.

Criterion 5: The site classifies under this criterium due to the waterfowl assemblages of international importance.

Criterion 6: The site is important for the presence of several bird species/populations occurring at levels of international importance. This includes the species: oystercatcher, *Haematopus ostralegus ostralegus*; grey plover, *Pluvialis squatarola*; knot, *Calidris canutus islandica*; sanderling, *Calidris alba*; curlew, *Numenius arquata arquata*; redshank, *Tringa totanus totanus*; pink-footed goose, *Anser brachyrhynchus*; dark-bellied brent goose, *Branta bernicla bernicla*; shelduck, *Tadorna tadorna*; pintail, *Anas acuta*; dunlin, *Calidris alpina alpina*, and the bar-tailed godwit, *Limosa lapponica lapponica*.

Vulnerability

No current factors are reported in the Ramsar citation. However, the main issues affecting the site should be the same as affecting the SAC and SPA designations for the same area. These are:

1. Inappropriate water levels: Structures which control water along the North Norfolk Coast have fallen into disrepair. The issue is preventing appropriate water level controls for breeding birds.

2. Public access/disturbance: The Wash and North Norfolk coast is a very popular area for recreational activity and visitor numbers are likely to grow, for example, as a result of the English Coastal path and housing development. The range of recreational activities may have adverse impacts on the site. Conflicts with the management of fragile habitats and species which can be easily disturbed by recreational activity will need to be carefully managed. .

3. Siltation: Sediment accretion is occurring in the Wash, and in such a dynamic system may be natural. However, activities associated with the Lincshire beach nourishment program may contribute to changes in sediment movement in the site. It is difficult to separate natural from anthropogenic change.

4. Fisheries: recreational marine and estuarine: Recreational sea fishing and shoreline angling is a large scale activity with potential to impact on fish stocks as a resource for designated birds, but the size of the activity locally and its impact is not known.

5. Invasive species: There is a risk of introduction and spread of non-native /invasive species (e.g. American Razor Clam, Slipper limpet, Pacific Oyster, oyster parasite *Bonamia*) from future fisheries and mussel lay stocking. There is also a risk of translocation of invasive species through ballast water transfer and discharge.

6. Inappropriate coastal management: Following the tidal event in December 2013 there may now be conflicts between flood risk management and the protection and provision of SPA/SAC habitats.

7. Fisheries: commercial marine and estuarine: Hydraulic dredging, dredges and benthic trawls are categorised as 'Red' for the sub-feature subtidal boulder and cobble communities and *Sabellaria spinulosa* reef. Hydraulic dredges, dredges, benthic trawls and shore based activities are categorised as 'red' for the *Zostera* attribute of the muddy sand subfeature. Adaptive management measures will be used to protect features from 'red' categorised activities.

8. Predation: Lack of predator control, where appropriate, is having an impact on the ability of sites to support breeding bird populations.

9. Coastal squeeze at this site may lead to gradual loss of intertidal and coastal habitats due to sea level rise and the erection and maintenance of coastal defences. The Wash Shoreline Management Plan and the North Norfolk Coast Shoreline Management Plan are subject to Habitats Regulations Assessment. Some areas of compensatory habitat still need to be designated.

10. Public access/Disturbance: Low altitude, non-military flying aircraft (microlites, paragliders, hang gliders) have a negative impact on many features. High risk locations are identified through the EMS management scheme. The EMS scheme has mechanisms to reduce damage from recreational activity.

11. Change in land management: Grazing management. Areas of saltmarsh may be over and under-grazed throughout the site.

12. Air pollution: impact of atmospheric nitrogen deposition: Nitrogen deposition exceeds the critical loads for some sensitive habitats. Scrub encroachment in (unfavourable recovering) dune habitats may be exacerbated by atmospheric nitrogen.

Appendix B Sensitivity of Qualifying Features Analysis

Not all the SACs are currently vulnerable and not all the vulnerabilities to these habitats are addressed, either positively or negatively, in these statements.

B.1 Sensitivities of the Qualifying Habitats

B.i Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)

Corine code: 2190

Designated sites with qualifying feature: The Wash and North Norfolk Coast SAC

Sensitivity of the feature to disturbance:

- Physical loss/damage: this feature is highly sensitive to physical loss through direct land reclamation and construction.
- Sea level rise: can squeeze this habitat against sea walls resulting in habitat loss.
- Recreational activities: through abrasion and selective extraction.
- Exploitation: the selective extraction of *Salicornia* as a traditional activity may lead to habitat loss and damage due to trampling of the plants. Although this activity is seen as sustainable the commercial exploitation of this species is not.
- Biological disturbance: through the introduction of non native species such as common cord-grass *Spartina anglica*.

B.ii Coastal Lagoons

Corine code: 1150

Designated sites with qualifying feature: The Wash and North Norfolk Coast SAC

Sensitivity of the feature to disturbance: This type of habitat is most vulnerable to erosion.

B.iii Large shallow inlets and bays

Corine code: 1160

Designated sites with qualifying feature: The Wash and North Norfolk Coast SAC

Sensitivity of the feature to disturbance:

- Physical loss/damage: this feature is sensitive to loss resulting from removal or smothering of the habitats which can lead to changes in coastal processes and different sedimentation patterns. Communities supported by this habitat, such as reefs of *Sabellaria spinosa* are particularly sensitive to benthic fishing activities.
- Toxic contamination: from introduction of synthetic compounds, such as polychlorinated biphenols (PCBs). PCBs are known to be toxic under low concentrations and have the potential to increase concentration through bioaccumulation within the food chain.

- Biological disturbance; through changes in the communities and food chain due to selective extraction of species.

B.iv Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)

Corine code: 2190

Designated sites with qualifying feature: The Wash and North Norfolk Coast SAC

Sensitivity of the feature to disturbance:

- Physical loss/damage: this feature is highly sensitive to physical loss through direct land reclamation and construction. It is also sensitive to sea defence maintenance and construction which may result in physical damage.
- Sea level rise: can squeeze this habitat against sea walls resulting in habitat loss.
- Recreational activities: through abrasion and selective extraction. In addition this feature is found in marshy areas more exposed to traffic from walkers and vehicles

B.v Mudflats and sandflats not covered by seawater at low tide

Fixed dunes with *Corine code:* 2190

Designated sites with qualifying feature: The Wash and North Norfolk Coast SAC

Sensitivity of the feature to disturbance:

- Physical loss/damage: this feature is sensitive to loss resulting from removal or smothering of the habitats, which can lead to changes in coastal processes and different sedimentation patterns. Land claim and construction of training walls resulted in the expansion of saltmarshes at the expense of intertidal habitats. Mudflats are important as they support very diverse invertebrate communities, key elements in the food chain of fish and birds. In addition, mudflats support other habitats through sediment supply. Loss of these intertidal habitats will affect the ability to effectively support associated habitats and species.
- Sea level rise: can squeeze this habitat against sea walls resulting in habitat loss.
- Siltation, abrasion and selective extraction: all leading to physical damage which in turn result in an increase in erosion and ultimately to habitat loss.
- Toxic contamination: from introduction of synthetic compounds, such as polychlorinated biphenols (PCBs). These are known to be toxic under low concentrations and have the potential to increase concentration through bioaccumulation within the food chain. All features of the intertidal mudflats and sandflats are considered to be highly sensitive to toxic contamination by these compounds.
- Nutrient enrichment: from riverine input, for example. Nutrient can lead to elevated growth of algae such as *Enteromorpha* spp. which may form algae mats. Ultimately, this can result in anoxic conditions in the sediments with negative effects in the invertebrate communities and in the species supported by these.
- Biological disturbance; through changes in the communities and food chain due to selective extraction of species (including bait digging). Also the introduction and spread of non-native species may result in changes in species composition and in the communities functioning.

B.vi Reefs

Corine code: 1170

Designated sites with qualifying feature: The Wash and North Norfolk Coast SAC

Sensitivity of the feature to disturbance:

- Physical loss/damage: this feature is mostly vulnerable from removal or damage due to benthic fishing activities. This includes dredging for oysters and mussels, trawling for shrimp or fin fish, net fishing and potting. Aggregate extraction is also detrimental but is not considered to be as significant a threat as commercial fisheries. This feature is also vulnerable to obstruction (e.g. gas and renewables industry and cables) and Smothering (due to aggregate dredging, demersal trawling and benthic dredging and turbine installation and disposal or drill arisings).
- Physical damage by physical disturbance or abrasion (aggregate abstraction, demersal trawling and benthic dredging and turbine and cable installation), changes in suspended sediment (due to aggregate dredging, demersal trawling, maintenance dredging, renewable energy infrastructure).
- Biological disturbance: selective extraction of species (by demersal trawling, benthic dredging)
- Toxic contamination: introduction of synthetic and non-synthetic compounds (shipping),
- Non-toxic contamination: changes in turbidity (due to demersal trawling, aggregate dredging, renewable energy infrastructure and benthic dredging).

B.vii *Salicornia* and other annuals colonising mud and sand

*Corine code:*1310

Designated sites with qualifying feature: The Wash and North Norfolk Coast SAC

Sensitivity of the feature to disturbance:

- Physical loss/damage: through removal due to land claim and coastal developments. Changes made to coastal processes may also change the tidal regime and in turn affect the suitability of the site for this feature.
- Recreational activities: resulting in abrasion and damage to this habitat.
- Exploitation: the selective extraction of *Salicornia* as a traditional activity may lead to habitat loss and damage due to trampling of the plants. Although this activity is seen as sustainable the commercial exploitation of this species is not.
- Biological disturbance: through the introduction of non native species such as common cord-grass *Spartina anglica*.

B.viii Sandbanks which are slightly covered by sea water all the time

Corine code: 1110

Designated sites with qualifying feature: The Wash and North Norfolk Coast SAC

Sensitivity of the feature to disturbance.

- Physical loss/damage: this feature is sensitive to loss resulting from removal or smothering of the habitats; can lead to changes in coastal processes and different sedimentation patterns.
- Sea level rise: can squeeze this habitat against sea walls resulting in habitat loss.
- Siltation, abrasion and selective extraction: all leading to physical damage which in turn result in an increase in erosion and ultimately to habitat loss.
- Toxic contamination: from introduction of synthetic compounds, such as polychlorinated biphenols (PCBs). PCBs are known to be toxic under low concentrations and have the potential to increase concentration through bioaccumulation within the food chain. All features of the sandbanks are considered to be highly sensitive to toxic contamination by these compounds.
- Non-toxic contamination: by changes in turbidity.
- Nutrient enrichment: from riverine input, for example. High nutrient concentration can lead to changes in the species composition. In addition, if very high concentrations occur may result in anoxic conditions in the sediments with negative effects in the invertebrate communities and in the species support by these.
- Biological disturbance; through changes in the communities and food chain due to selective extraction of species (such as crabs, lobsters, flatfish shrimps and mussels). Also the introduction and spread of non-native species may result in changes in species composition and in the communities functioning.

B.2 Sensitivities of the Qualifying Species – Birds

B.ix Brent Goose (A046a)

Designated sites with qualifying feature: The Wash SPA/Ramsar

Legal Protection: It is afforded general protection under the Wildlife and Countryside Act (1981).

Habitat: The brent goose is a winter visitor to Britain (Robinson, 2005). Breeding birds from the Russian high Arctic ('Dark-bellied', *B. b. bernicla*) begin to arrive on their wintering grounds in Britain from October. Large concentrations of dark-bellied brent geese can be found around The Wash and along the Norfolk, Essex and north Kent coasts where they feed on *Zostera*, *Enteromorpha* and a small range of littoral plants (Stroud *et al.*, 2001). Breeding birds from the western Arctic ('Pale-bellied', *B. b. hrota*) spend the winter in Ireland, Northern England and Wales.

Sensitivity: The internationally important British winter population of dark-bellied brent geese is thought to be approximately 98,100 (Barker *et al.*, 2006), representing 32.7% of the northwest European population, of which 94% is held in the UK SPA suite (Stroud *et al.*, 2001). The population on the North Norfolk Coast Ramsar site constitutes 3.8% of the biogeographic population (Stroud *et al.*, 2001). The population on The Wash Ramsar site constitutes 12.1 % of the biogeographic population (Stroud *et al.*, 2001).

A 29 % decline in the numbers of these birds since the 1990s has triggered a 'medium-term' Medium Alert (Maclean and Austin, 2006). With an unfavourable European conservation status and an internationally important population in the UK concentrated on 10 or fewer sites this species qualifies as an 'Amber List' bird of conservation concern (Gregory *et al.*, 2002).

The loss of coastal sites resulting from sea-level rise, increased recreational disturbance, conflicts from farming interests are all seen as potential threats (Holden and Cleeves, 2006).

B.x Common Tern (A193)

Designated sites with qualifying feature: The Wash SPA

Legal Protection: It is afforded general protection under the Wildlife and Countryside Act (1981) and full legal protection under Annex 1 of the EU Wild Birds Directive (1979).

Habitat: Common tern is a migrant breeder and passage visitor in Britain (Robinson, 2005). Breeding birds arrive from their West African wintering grounds in April. They breed in coastal areas mainly on small rocky islets, shingle beaches, sand-spits and dunes (Stroud *et al.*, 2001).

Sensitivity: The British breeding population is estimated at 10,134 pairs (Barker *et al.*, 2006), representing approximately 10% of the biogeographic population, of which 46% is held within the UK SPA suite (Stroud *et al.*, 2001). Breydon Water SPA and the North Norfolk Coast SPA hold 1.3% and 3.7% of the national population respectively (Stroud *et al.*, 2001). The Wash SPA contributes to, at least 1.2% of the breeding population in Great Britain.

In England there has been a >50% increase in the population between 1994-2006 (Raven *et al.*, 2007) although some colonies have been lost to habitat changes, e.g. coastal developments, and increased disturbance, especially recreational. Predation is a problem in some areas, especially where North American Mink *Mustela vison* are prevalent (Stroud *et al.*, 2001). This is a species of minimal conservation concern and is listed as a 'Green List' bird of conservation concern (Gregory *et al.*, 2002).

Particularly at risk from disturbance during the breeding season, the presence of humans or loud noises can cause birds to leave nesting areas and expose eggs and chicks to an increased risk of predation by gulls and crows etc. Disturbance can also affect site fidelity and adult survival. Beach engineering works and offshore dredging can affect the integrity of coastal features such as beaches and shingle ridges, making them unsuitable for nesting. Natural succession and more frequent storm damage as a result of climatic changes can cause further habitat loss.

B.xi Wigeon (A050)

Designated sites with qualifying feature: The Wash SPA/ Ramsar

Legal Protection: It is afforded general protection under the Wildlife and Countryside Act (1981).

Habitat: Wigeon is a resident breeder and winter visitor to Britain (Robinson, 2005). Breeding birds from Iceland, Scandinavia and Russia arrive on their wintering grounds in Britain from May to October. Large concentrations can be found on the Ribble Estuary, the Ouse Washes, the Somerset Levels and the North Norfolk coast. It prefers coasts with shallow, fairly sheltered waters and extensive tracts of tidal mud, sand, or salt-marsh as well as lagoons and flooded grassland (Cramp and Simmons, 2004).

Sensitivity: The internationally important British winter population of wigeon is thought to be approximately 406,000 (Barker *et al.*, 2006), 25% of the northwest European population (Banks *et al.*, 2006). The UK SPA suite holds approximately 79% of the British population (Stroud *et al.*, 2001) which has shown great variability in the past albeit with an underlying increasing trend (Banks *et al.*, 2006). The population on the North Norfolk Coast Ramsar site constitutes 1.1% of the biogeographic population (Stroud *et al.*, 2001). The population on The Wash Ramsar site constitutes 19.5% of the biogeographic population.

With at least 20% of the northwest European population in the UK and at least 50% of this concentrated on 10 or fewer sites, wigeon qualifies as an 'Amber List' bird of conservation concern (Gregory *et al.*, 2002).

The obvious flight response to the presence of humans (and/or in response to loud noise) means this species, as with other waterbird species, is considered highly sensitive to disturbance.

B.xii Gadwall (A051)

Designated sites with qualifying feature: The Wash SPA/Ramsar

Legal Protection: It is afforded general protection under the Wildlife and Countryside Act (1981).

Habitat: Gadwall is a resident breeder, migrant and winter visitor to Britain (Robinson, 2005). This duck is a winter visitor to Britain and countries around the North Sea especially when its breeding range in eastern Europe and elsewhere in continental Russia is subject to winter freezing (Stroud *et al.*, 2001). In Britain, the breeding population is spread throughout south-east England, East Anglia and the Midlands, with the breeding stronghold in Norfolk (Stroud *et al.*, 2001). It prefers fairly shallow, eutrophic, standing or slow-flowing, open water, offering plenty of cover from patches or fringes of emergent vegetation and dry banks or islands (Cramp and Simmons, 2004).

Sensitivity: The internationally important British winter population of Gadwall is thought to be approximately 17,100 (Barker *et al.*, 2006), 26% of the northwest European population (Banks *et al.*, 2006). The UK SPA suite holds approximately 43% of the British population (Stroud *et al.*, 2001) which has shown a long-term upwards trend (Banks *et al.*, 2006). The population on The Wash Ramsar site constitutes 19.5% of the biogeographic population (Stroud *et al.*, 2001).

With an unfavourable European conservation status, at least 50% of the breeding population in the UK concentrated on 10 or fewer sites and at least 20% of the northwest European population in winter, this species qualifies as an 'Amber List' bird of conservation concern (Gregory *et al.*, 2002).

The obvious flight response to the presence of humans (and/or in response to loud noise) means this species, as with other waterbird species, is considered highly sensitive to disturbance.

B.xiii Little Tern (A195)

Designated sites with qualifying feature: The Wash SPA

Legal Protection: It is afforded full legal protection under Schedule 1 of the Wildlife and Countryside Act (1981) and Annex 1 of the EU Wild Birds Directive (1979).

Habitat: Little tern is a migrant breeder and passage visitor in Britain (Robinson, 2005). They arrive in Britain from their wintering grounds along the west coast of Africa in April and embark on the return journey in August and September. An exclusively marine foraging species it nests in well-camouflaged shallow scrapes on sand and shingle beaches, spits or inshore islets (Dunn *et al.*, 2004). Breeding activity peaks in mid-May and early June.

Sensitivity: The British breeding population of 1,947 pairs (Barker *et al.*, 2006) represents approximately 8% of the biogeographic population, of which 67% is held within the UK SPA suite (Stroud *et al.*, 2001). Great Yarmouth North Denes SPA (9.2%) and North Norfolk Coast SPA/Ramsar (15.8%) hold 25% of the national population (Stroud *et al.*, 2001). Great Yarmouth North Denes SPA and the North Norfolk Coast SPA hold internationally important populations comprising 1.1% and 1.8% of the biogeographic population respectively (Stroud *et al.*, 2001). The Wash SPA population represents at least 1.4% of the breeding population in Great Britain.

The population has declined until the 1970s with some subsequent increases since then (Stroud *et al.*, 2001). With a moderate decline in the breeding population in the past 25 years, an unfavourable European conservation status and more than 50% of the UK population concentrated on 10 or fewer sites this species qualifies as an 'Amber List' bird of conservation concern (Gregory *et al.*, 2002).

Little terns are particularly vulnerable to human disturbance as a result of their habitat selection. The period of greatest decline, from the 1930s to the 1960s, coincided with a large increase in the numbers of people making trips to the seaside. Disturbance can also affect site fidelity and adult survival. Beach engineering works and offshore dredging can affect the integrity of coastal features such as beaches and shingle ridges, making them unsuitable for nesting. Natural succession and more frequent storm damage as a result of climatic changes can cause further habitat loss.

B.xiv Pintail (A054)

Designated sites with qualifying feature: The Wash SPA/ Ramsar

Legal Protection: It is afforded general protection under the Wildlife and Countryside Act (1981).

Habitat: Pintail is a rare migrant breeder and winter visitor to Britain (Robinson, 2005). Breeding birds from Fennoscandia and Russia congregate in estuarine habitats in significant numbers in the east of England where they feed largely on *Hydrobia* snails as well as seeds, tubers and aquatic plants (Stroud *et al.*, 2001).

Sensitivity: The British winter population of 27,900 (Barker *et al.*, 2006) represents approximately 50% of the northwest European population (Stroud *et al.*, 2001). The UK SPA suite holds 31.7% of the biogeographic population with the North Norfolk Coast Ramsar site holding 1.9% (Stroud *et al.*, 2001)

The number of pintail has declined in recent years across northwest Europe although numbers have increased in regions of England including the south-east (Stroud *et al.*, 2001). With an unfavourable European conservation status and an internationally important population in the UK concentrated on 10 or fewer sites this species qualifies as an 'Amber List' bird of conservation concern (Gregory *et al.*, 2002).

Recent declines in the north-west European population have been attributed primarily to habitat loss and degradation (Stroud *et al.*, 2001).

B.xv Pink-footed Goose (A040)

Designated sites with qualifying feature: The Wash SPA/Ramsar

Legal Protection: It is afforded general protection under the Wildlife and Countryside Act (1981).

Habitat: The pink-footed goose is a winter visitor to Britain (Robinson, 2005). Breeding birds from Greenland arrive on their wintering grounds in October and depart in April (Holden and Cleeves, 2006). They frequent the estuaries of eastern Scotland, North Norfolk and Lancashire where they graze on coastal food plants and agricultural crops (Stroud *et al.*, 2001). They roost on estuaries and large lakes and reservoirs and move short distances to feed (Stroud *et al.*, 2001).

Sensitivity: The internationally important British winter population is estimated at 241,000 (Barker *et al.*, 2006), representing at least 20% of the northwest European population, of which 82% is held within the UK SPA suite (Stroud *et al.*, 2001). The population on the North Norfolk Coast Ramsar site constitutes 10.6% of the biogeographic population (Stroud *et al.*, 2001). The population of the Wash Ramsar represents an average of 12.1% of the population.

With an internationally important winter population concentrated on 10 or fewer sites this species qualifies as an 'Amber List' bird of conservation concern (Gregory *et al.*, 2002).

It is sensitive to disturbance and prefers large, open areas in which to feed (Stroud *et al.*, 2001).

B.xvi Knot (A143)

Designated sites with qualifying feature: The Wash SPA/Ramsar

Legal Protection: It is afforded general protection under Schedule 1 of the Wildlife and Countryside Act (1981).

Habitat: Knot is a passage and winter visitor to Britain (Robinson, 2005). Breeding birds from Arctic Canada (*C. c. islandica*) arrive in Britain in August and stay until May (Holden and Cleeves, 2006). A smaller number of breeding birds from the central Russian Arctic (*C. c. canutus*) pass through Britain en route to and from their wintering grounds in west and southern Africa (Stroud *et al.*, 2004). This species is almost exclusively estuarine and feeds on shellfish.

Sensitivity: The internationally important UK wintering population is estimated at approximately 283,600 birds (Barker *et al.*, 2006), representing 70% of the East Atlantic Flyway population, of which 84% is held in the UK SPA suite (Stroud *et al.*, 2001). The North Norfolk Coast SPA holds an internationally important number of birds with 3.1% of the biogeographic population (Stroud *et al.*, 2001). The population of the Wash Ramsar represents an average of 15.3% of the population

This species is known to be prone to fluctuations in numbers (Maclean and Austin, 2006) and decreased sharply (>40%) between the 1970s and 1980s. Since then, there has been a short-term increase of 9% with an underlying 4% decrease over the past 10 years (Maclean and Austin, 2006). Although the British population remains stable with a 29% increase in the past 25 years this species qualifies as an 'Amber List' bird of conservation concern because it has an unfavourable conservation status in Europe (Gregory *et al.*, 2002).

Poor breeding seasons as well as habitat changes and land reclamation at wintering sites have been implicated in the decline of this species (Stroud *et al.*, 2001).

B.xvii Bewick's Swan (A037)

Designated sites with qualifying feature: The Wash SPA

Legal Protection: It is afforded full legal protection under Schedule 1 of the Wildlife and Countryside Act (1981) and Annex 1 of the EU Wild Birds Directive (1979).

Habitat: Bewick's swan is a winter visitor to Britain (Robinson, 2005). Breeding birds from northern Russia arrive on their traditional wintering grounds in mid-October and depart at end of March (Holden and Cleeves, 2006). This species has traditionally fed on aquatic vegetation but shifted to arable land and pasture as a result of land reclamation and drainage (Cramp and Simmons, 2004).

Sensitivity: Ninety-nine percent of the British winter population of 8,070 (Barker *et al.*, 2006), representing approximately 40% of the northwest European population, is held within the UK SPA suite (Stroud *et al.*, 2001). The population of The Wash SPA constitutes less than 1% of the UK population.

There has been a medium increase in the national population in the past 25 years (Maclean and Austin, 2006) although there has been a recent decline, probably as a result of milder winters (Stroud *et al.*, 2001). With an unfavourable European conservation status and an internationally important UK population concentrated on 10 or fewer sites this species qualifies as an 'Amber List' bird of conservation concern (Gregory *et al.*, 2002).

Wetland drainage and eutrophication continue to affect wintering and migratory sites (Cramp and Simmons, 2004) and has led to the current situation with nearly the entire British population on ten or fewer sites.

B.xviii Bar-tailed Godwit (A157)

Designated sites with qualifying feature: The Wash SPA/Ramsar

Legal Protection: General legal protection conferred by the Wildlife & Countryside Act 1981 (as amended). Extended protection is afforded by Annex 1 of the EU Wild Birds Directive.

Habitat: Bar-tailed godwit is a passage and winter visitor to Britain. The European winter distribution of bar-tailed Godwits is centred on the estuaries of Britain and Ireland, as well as the coasts of the southern North Sea (Stroud *et al.*, 2001). This species shows a high degree of fidelity to staging and wintering areas in succeeding years. Bar-tailed Godwits are almost entirely coastal in winter, feeding mainly on worms. East coast estuaries, such as The Wash, are used as moulting, non-breeding sites and stopping-off points en route to/from the winter quarters.

Sensitivity: The UK winter population is estimated at 61,590 which accounts for approximately 39% of the East Atlantic Flyway population. 70.1% of the national total is held on the SPA suite. As a mid- to high-Arctic nesting species, significant between-year population changes might be expected as a consequence of variation in weather and predation pressures on breeding areas. In addition to those factors affecting breeding success, between-year fluctuations in wintering numbers in Britain and Ireland are at least in part due to weather conditions, with influxes into east-coast estuaries occurring in severe conditions.

This species qualifies as an 'Amber List' bird of conservation concern based its unfavourable conservation status in Europe as well as the fact that more than 50% of the UK non-breeding population in 10 or fewer sites and more than 20% East Atlantic Flyway non-breeding population is found in the UK.

Bar-tailed Godwit is a qualifying species (Ramsar Criterion 6, Birds Directive Article 4.1,) for The Wash Ramsar and SPA designations. Based on peak counts in winter the internationally important Wash winter population is estimated to be 11,250 individuals which represents 21.4% of the British population and 9.8% of the East Atlantic Flyway population. The Wash population has increased by 53% in the past 20 years.

Threats: Bar-tailed godwit is threatened by the degradation of foraging sites due to land reclamation, pollution, human disturbance and reduced river flows.

B.xix Oystercatcher (A130)

Designated sites with qualifying feature: The Wash SPA/Ramsar

Legal Protection: General legal protection is conferred by the Wildlife & Countryside Act 1981 (as amended).

Habitat: A medium-sized, black and white wader, the oystercatcher *Haematopus ostralegus* is a migrant and resident breeder as well as a winter and passage visitor. In winter the British population consists of two sub-populations with limited interchange. The 'Atlantic' sub-population winters in Ireland, north and west Britain and is comprised of breeding birds from Iceland, Faroes, Britain and Ireland. The 'Continental' sub-population partly winters in eastern Britain and is comprised of breeding birds from Norway and the Low Countries. They inhabit shorelines colonized by molluscs, marine worms, and crustaceans which can be fed on at low tide.

Population Trends

The British winter population of 315,200 represents approximately 36% of the East Atlantic Flyway population; 51% of the British population occurs within the SPA suite.

With at least 50% of the UK winter population on 10 or fewer sites and with at least 20% of the East Atlantic Flyway breeding and non-breeding populations in the UK, this species qualifies as an 'Amber List' bird of conservation concern.

Based on peak counts the Wash has an estimated population of 21,702 individuals which represents approximately 6.8% of the British population and 2.1% of the East Atlantic Flyway population. The internationally important Wash population has declined by 23% in the past 25 years but has increase by 9% in the past five years. The proportion of the regional and national population hosted by this SPA has decreased and a High-Alert for the period since the SPA was designated and a medium-term Medium-Alert has been triggered. Large-scale population changes may be responsible in part but local activities such as shell-fishing are possibly a causal factor.

Sensitivity: The main threat to this species is from over-fishing of shellfish which are a main food source for the oystercatcher. Degradation of wintering habitats by land reclamation, pollution, human disturbance, coastal barrage construction and reduced river flows also pose a serious threat. Climate induced threats are not thought to be a significant threat to this species.

B.xx Shelduck (A048)

Designated sites with qualifying feature: The Wash SPA/Ramsar

Legal Protection: General legal protection is conferred by the Wildlife & Countryside Act 1981 (as amended).

Habitat: A large black and white duck, the shelduck *Tadorna tadorna* is a migrant and resident breeder as well as a winter migrant to Britain. Non-breeding shelduck in Britain are part of the northwest European population.

Shelduck wintering in Britain occur on most coasts with notable concentrations on the muddy estuaries of East Anglia and the south coast of England (Stroud et al. 2001) where they feed on marine invertebrates such as the laver spire shell *Hydrobia ulvae*. Generally, prey species include molluscs (*Hydrobia*, *Cardium*, *Macoma*, *Mytilus*, *Montacula*, *Cingula*, *Buccinum*, *Littorina*, *Skenea*, *Paludina*, *Tellina*, *Nucula*, *Mya*, and *Theodoxus*), crustaceans, insects small fish and spawn, annelid worms (*Nereidae* and *Arenicola*), and plant materials.

Population Trends

The British winter population of 78,000 represents approximately 20% of the northwest European population. Eighty four percent of the British population occurs within the SPA suite. The number of shelduck has remained relatively stable since 2001/02 suggesting a slowing of the decline seen since 1997/98.

With more than 50% of the internationally important UK population concentrated on 10 or fewer sites this species qualifies as an 'Amber List' bird of conservation concern.

Based on peak counts the Wash has an estimated population of 7,277 individuals which represents an approximately 9.3% of the British population and 2.4% of the northwest European population. The internationally important Wash population has seen a decline, in line with regional and national trends has triggered short- and medium-term Medium-Alerts and a since-designation High-Alert. Large-scale processes rather than adverse site conditions are primarily responsible for the downturn in numbers on this site although local impacts of shellfisheries may be a factor.

Sensitivity: The species is threatened by habitat loss as a result of tidal barrage schemes in Europe. Threats from climate change include spatial changes in prey distribution and sea level rise.

B.xxi Grey Plover (A141)

Designated sites with qualifying feature: The Wash SPA/Ramsar

Legal Protection: General legal protection is conferred by the Wildlife & Countryside Act 1981 (as amended).

Habitat: A medium-sized wader, the grey plover *Pluvialis squatarola* is a passage and winter visitor to Britain. Breeding birds from the Arctic arrive in Britain between July and August before starting a protracted post-breeding moult. Feeding on shellfish and marine invertebrates, grey plover spend the winter along the Atlantic coast of Europe south to the west coast of Africa. Males are known to winter further north than females and consequently the wintering population in Britain and Ireland may be predominantly males. They concentrate on intertidal mudflats and sandy beaches where they feed on a wide range of marine invertebrates including *Notomastus latericeus* and *Arenicola marina*.

Population Trends

The British winter population of 52,750 represents approximately 30% of the East Atlantic Flyway population; 90% of the British population occurs within the SPA suite.

With at least 50% of the UK non-breeding population on 10 or fewer sites and with at least 20% of the East Atlantic Flyway non-breeding population in the UK, this species qualifies as an 'Amber List' bird of conservation concern.

Based on peak counts the Wash has an estimated population of 11,866 individuals which represents approximately 22.4% of the British population and 4.7% of the East Atlantic Flyway population. The internationally important Wash population has increased by 266% in the past 25 years.

Sensitivity: The size of the European population could make it susceptible to the perceived risks associated with small populations however it is not thought to be in decline. Threats from climate change include sea level rise, habitat shifts as well as spatial and temporal changes in prey distribution.

B.xxii Sanderling (A144)

Designated sites with qualifying feature: The Wash SPA/ Ramsar

Legal Protection: General legal protection is conferred by the Wildlife & Countryside Act 1981 (as amended).

Habitat: A small wader, the sanderling *Calidris alba* is a passage and winter visitor to Britain. The winter population is thought to mostly originate from Siberia with birds from northeast Greenland passing through en route to and from wintering areas in western Africa. They can be found on estuaries and open coasts particularly in the northwest of England where they feed on small invertebrates.

Population Trends

The British winter population of 20,540 represents approximately 17% of the East Atlantic Flyway population. 15% of the British winter population occurs within the SPA suite. The British passage population is estimated at 30,000 individuals representing approximately 43% of the East Atlantic Flyway population.

Sanderling does not meet any of the bird of conservation concern criteria and therefore qualifies as a 'Green List' bird of conservation concern.

Based on peak counts the Wash has an estimated population of 558 individuals which represents approximately 2.7% of the British population. The nationally important Wash population has fluctuated markedly and the since site-designation Medium-Alert is not considered to be a major concern.

Sensitivity: The species is sensitive to disturbance from recreational activities and free-running dogs on beaches and intertidal areas. Threats from climate change include sea level rise, habitat shifts as well as spatial and temporal changes in prey distribution.

B.xxiii Dunlin (A149)

Designated sites with qualifying feature: The Wash SPA/Ramsar

Legal Protection: General legal protection is conferred by the Wildlife & Countryside Act 1981 (as amended).

Habitat: A small wader, the dunlin *Calidris alpina* is a migrant breeder, passage and winter visitor to Britain. British breeding birds (*C. a. schinzii*) over-winter in south-west Europe and North-west Africa whilst breeding birds from Greenland (*C. a. arctica*) pass through Britain on their way to wintering grounds in West Africa (Stroud et al., 2004). Birds over-wintering in Britain (*C. a. alpina*) arrive in the autumn from their breeding grounds in northern Scandinavia and Russia. In winter they are essentially coastal and feed on small marine invertebrates.

Population Trends

The internationally important British non-breeding population (*alpina*) of approximately 556,000 birds represents 39% of the East Atlantic Flyway population, with 78% of the British population found in the UK SPA suite.

A moderate decline (14%) in the number of birds over the past 25 years coupled by its unfavourable European conservation status and the concentration of the British population on 10 or fewer sites means this species qualifies as an 'Amber List' bird of conservation concern.

Based on peak counts the Wash population is estimated to be 37,598 individuals, which represents approximately 6.7% of the British population and 2.8% of the East Atlantic Flyway Population. The internationally important Wash population has declined by 26%, triggering a since site-designation Medium-Alert. This decline may be linked to overexploitation of shellfish during the late 1980s.

Sensitivity: This species is restricted to a small number of estuaries, so it is vulnerable to any changes in this habitat as well as disturbance on intertidal mudflats from construction work and people on adjacent footpaths. Threats from climate change include sea level rise, habitat shifts as well as spatial and temporal changes in prey distribution.

B.xxiv Curlew (A160)

Designated sites with qualifying feature: The Wash SPA/Ramsar

Legal Protection: General legal protection is conferred by the Wildlife & Countryside Act 1981 (as amended).

Habitat: A large-sized, long-legged wader, the curlew *Numerius arquata* is a migrant and resident breeding species with passage and over-wintering populations in Britain. Breeding predominantly takes place in upland Britain in areas of damp moorland and heathland up to 550 m. During winter, birds can be found around almost the entire British coastline with breeding birds from Scandinavia supplementing the resident population. They forage on intertidal habitats and wet grassland where they prey upon polychaete worms such as *Nereis diversicolor*, bivalves such as *Macoma balthica* and terrestrial invertebrates.

Population Trends

The British non-breeding population of 147,100 represents approximately 30% of the East Atlantic Flyway population, with 38% of the British population found within the SPA suite.

With an unfavourable European conservation status, at least 20% of the European breeding population in the UK and with at least 20% of the East Atlantic Flyway non-breeding population in the UK, this species qualifies as an 'Amber List' bird of conservation concern.

Based on peak counts the Wash has an estimated population of 9,442 individuals which represents approximately 6.3% of the British population and 1.1% of the East Atlantic Flyway population. The internationally important Wash population has increased by 40% since the past 25 years but has seen a short-term decline of 5% in the past five years.

Sensitivity: Wintering populations are threatened by: disturbance on intertidal mudflats from construction activities and people on adjacent footpaths; development on high-tide roosting sites, pollution; degradation of migration staging areas owing to land reclamation, pollution, human disturbance and reduced river flows. Threats from climate change include lower water tables, sea level rise and a higher frequency of drought.

B.xxv Redshank (A162)

Designated sites with qualifying feature: The Wash SPA/Ramsar

Legal Protection: General protection is conferred by the Wildlife & Countryside Act 1981 (as amended).

Habitat: A medium-sized wader, the redshank *Tringa totanus* is a migrant and resident breeder, passage and winter visitor to Britain. Whilst southern population are largely sedentary, northern populations are migratory. The British and Irish resident breeding population of the race *britannica* is supplemented in winter by birds of the race *robusta* from Iceland and the Faeroes with additional birds from the Western Atlantic population *totanus* (Stroud et al., 2004). Non-breeding birds can be found around most of the coast where they feed on marine invertebrates and small fish.

Population Trends

The British non-breeding population is estimated at approximately 116,100 birds, which represents approximately 64.4% of the East Atlantic Flyway population, with 48% of the British winter population and 46% of the passage population found within the UK SPA suite.

Whilst the winter population remains relatively stable there has been a significant decline of 29% in the UK breeding population (Risley et al., 2008). This decline, coupled with an unfavourable European conservation status means this species qualifies as an 'Amber List' bird of conservation concern.

Based on peak counts the Wash population is estimated to be 6,877 individuals, which represents 5.7% of the British population and 2.5% of the East Atlantic Flyway population. The internationally important Wash population has declined by 19% in the since site-designation but has increased by 39% in the past 25 years.

Sensitivity: Redshank is threatened by the loss of breeding and wintering habitats through wetland drainage, flood control, land reclamation, industrial development, coastal barrage construction. It is also threatened by disturbance on intertidal mudflats from construction work and from people on adjacent footpaths. Threats from climate change include sea level rise, higher frequency of drought and lower water tables.

B.xxvi Turnstone (A169)

Designated sites with qualifying feature: The Wash SPA/Ramsar

Legal protection: General legal protection is conferred by the Wildlife & Countryside Act 1981 (as amended).

Habitat

A small-sized wader, the turnstone *Arenaria interpres* is scarce breeder and a passage and winter visitor to Britain. The breeding population of northeast Canada and Greenland winter in Europe especially around the Irish and North Sea to Iberia. On rare occasions isolated pairs have bred in Scotland. Birds start to arrive in Western Europe from late July whilst the return journey back to the breeding grounds takes place in April and May. During winter this species is almost entirely coastal, favouring rocky shores covered in seaweed. It is an opportunistic feeder, taking a wide range of food items including carrion, mussels, barnacles, crabs and insects.

Population Trends

The British non-breeding population of 49,550 represents approximately 33% of the East Atlantic Flyway population with 13% of the British population found within the SPA suite.

With at least 20% of the East Atlantic Flyway non-breeding population in the UK, this species qualifies as an 'Amber List' bird of conservation concern.

Based on peak counts the Wash has an estimated population of 1,088 individuals, which represents an approximately 2.2% of the British population. The nationally important Wash population has declined by 30% in the past 25 years and 52% since site-designation, triggering since site-designation High-Alert and long-term Medium-Alerts. Evidence suggests the proportion of the regional total held by the Wash has declined and a combination of factors is likely to be responsible for these declines.

Sensitivity: Threats from climate change include sea level rise and habitat shifts.

B.3 Sensitivities of the Qualifying Species – Mammals

B.xxvii Harbour/Common Seal

Designated sites with qualifying feature: The Wash and North Norfolk Coast SAC, The Wash Ramsar

Habitat: Common seals require suitable haul-out sites where they can rest, moult and give birth to and raise their pups. They seal live mainly along shorelines and in estuaries. It is commonly seen resting on sandbanks, easily accessible beaches, reefs and protected tidal rocks. They give birth to their pups in June and July and moult in August.

Common seals are predominantly opportunistic feeders. They feed on a variety of prey including sandeels, whitefish, flatfish, herring and sprat, octopus and squid. Their diet can also include invertebrates such as cephalopods (including octopus and squid), gastropods and crustaceans but is often dominated by just a few key species and varies both seasonally and from region to region.

Sensitivity:

Phocine distemper virus (PDV): the spread of PDV through contact with Weddel seals as a result of global warming is of concern. In 1988 the common seal population in The Wash declined by 50% due to this disease.

Disturbance: from coastal development of harbour/dock areas and land bordering estuaries, limiting quiet haul out sites.

Killing: Shooting of seals around fishing nets and salmon traps

B.xxviii Otter

Designated sites with qualifying feature: The Wash and North Norfolk Coast SAC

Legal Protection: The otter is listed on Appendix 1 of CITES, Appendix II of the Bern Convention and Annexes II and IV of the Habitats Directive. It is protected under Schedule 5 of the WCA 1981 and Schedule 2 of the Conservation of Habitats and Species Regulations, 2010 (Regulation 40). The European sub-species is also listed as globally threatened on the IUCN/WCMC RDL.

Habitat: The otter *Lutra lutra* is a semi-aquatic mammal, which occurs in a wide range of ecological conditions, including inland freshwater and coastal areas. Populations in coastal areas utilise shallow, inshore marine areas for feeding but also require fresh water for bathing and terrestrial areas for resting and breeding holts.

Coastal otter habitat ranges from sheltered wooded inlets to more open, low-lying coasts. Inland populations utilise a range of running and standing freshwaters. These must have an abundant supply of food (normally associated with high water quality), together with suitable habitat, such as vegetated river banks, islands, reedbeds and woodland, which are used for foraging, breeding and resting.

Sensitivity: Otters are most sensitive to factors relating to food supply such as the siltation of riverbeds, riparian habitat removal, toxic pollution and eutrophication, which can lead to declines in fish stocks.

Direct effects of toxic pollution resulting in bioaccumulation are thought to coincide with declines in otter populations.

They are sensitive to obstructions which prevent their movement along the stream, especially if this results the otter crossing a road. Physical barriers such as weirs or piped water pose such a threat, as does artificially increased water velocity caused by channelisation.

There is concern with increasing numbers of otters killed in the roads.

Table C.1: Designated Species Sensitivities

Sensitivity	Nitrogen Deposition	Acidification	Dust	Direct toxicity	Eutrophication	Grazing	Agriculture	Water abstraction	Management techniques (cessation)	Erosion	Fragmentation	Physical modification	Water quality	Introduction of Non-native species	Recreational use	Coastal protection measures	Built development
Common seal																✓	
Otter	✓	✓		✓	✓						✓	✓	✓				✓
Bewick's swan			?	✓	✓	✓	✓	✓			✓	✓	✓		✓		✓
Pink-footed goose			?	✓	✓	✓	✓	✓			✓	✓	✓		✓		✓
Brent goose			?	✓	✓	✓	✓	✓			✓	✓	✓		✓		✓
Wigeon			?	✓	✓	✓	✓	✓			✓	✓	✓		✓		✓
Gadwall			?	✓	✓	✓	✓	✓			✓	✓	✓		✓		✓
Pintail			?	✓	✓	✓	✓	✓			✓	✓	✓		✓		✓
Knot			?	✓		✓	✓	✓		✓	✓	✓			✓	✓	✓
Little tern			?						✓	✓	✓	✓	✓	✓	✓	✓	✓
Common tern			?						✓	✓	✓	✓	✓	✓	✓	✓	✓
Bar-tailed Godwit			?	✓		✓	✓	✓	✓	✓	✓	✓			✓		✓
Oystercatcher			?	✓						✓	✓	✓			✓		✓
Shelduck			?	✓						✓	✓	✓			✓		✓
Grey Plover			?	✓						✓	✓	✓			✓		✓
Sanderling			?	✓						✓	✓	✓			✓		✓
Dunlin			?	✓						✓	✓	✓			✓		✓

Sensitivity	Nitrogen Deposition	Acidification	Dust	Direct toxicity	Eutrophication	Grazing	Agriculture	Water abstraction	Management techniques (cessation)	Erosion	Fragmentation	Physical modification	Water quality	Introduction of Non-native species	Recreational use	Coastal protection measures	Built development
Curlew			?	✓				✓		✓	✓	✓			✓		✓
Redshank			?	✓		✓	✓	✓	✓	✓	✓	✓			✓		✓
Turnstone			?	✓						✓	✓	✓			✓		✓

Table C.2: Designated Habitat Sensitivities

Sensitivity	Nitrogen Deposition	Photochemical Oxidants (ozone)	Acidification	Dust	Direct toxicity	Eutrophication	Grazing	Agriculture	Water abstraction	Management techniques (cessation)	Erosion	Fragmentation	Physical modification	Water quality	Introduction of Non-native species	Recreational use	Coastal protection measures	Built development
Coastal lagoons											✓							
Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)												✓		✓	✓	✓	✓	✓
Large shallow inlets and bays					✓							✓						✓
Mediterranean and thermo-Atlantic halophilous scrubs (<i>Sarcocornetea fruticosi</i>)										✓		✓			✓			
Mudflats and sandflats not covered by seawater at low tide					✓	✓				✓		✓		✓			✓	
Reefs																		✓
Salicornia and other annuals colonising mud and sand												✓		✓	✓		✓	✓
Sandbanks which are slightly covered by sea water all the time										✓	✓							