

APPENDIX 8.8: Information to Inform the Appropriate Assessment

Introduction

- 1 This Appendix provides the information to enable Norfolk County Council (NCC), the Competent Authority under the Habitat Regulations, to make a decision on whether or not the proposal to construct a biomass combined heat and power station (the Proposed Development) alongside the A134 Mundford Road to the north of Thetford (the Application Site) will adversely affect the integrity of the European sites that are within range of the potential effects arising from the Proposed Development.
- 2 The details of construction, operation and eventual decommissioning of the Proposed Development are described in Chapter 3 Description of the Environmental Statement.

The Legal and Policy Background

The Birds Directive

- 3 The EU Directive on the Conservation of Wild Birds (79/409/EEC), also known as the Birds Directive, provides a framework for the conservation and management of wild birds in Europe. The relevant provisions of the Directive are the identification and classification of Special Protection Areas (SPA) for rare or vulnerable species listed in Annex I of the Directive and for all regularly occurring migratory species (required by Article 4). The Directive requires national Governments to establish SPAs and to have in place mechanisms to protect and manage them. The SPA protection procedures originally set out in Article 4 of the Birds Directive have been replaced by the Article 6 provisions of the Habitats Directive.

The Habitats Directive

- 4 The EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC), also known as the Habitats Directive, provides a framework for the conservation and management of natural habitats, wild fauna (except birds) and flora in Europe. Its aim is to maintain or restore natural habitats and wild species at a favourable conservation status.
- 5 The relevant provisions of the Directive are the identification and classification of Special Areas of Conservation (SAC) (Article 4) and procedures for the protection of SACs and SPAs (Article 6). SACs are identified based on the presence of natural habitat types listed in Annex I and populations of the species listed in Annex II. The Directive requires national Governments to establish SACs and to have in place mechanisms to protect and manage them.

6 Article 6(3) of Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive) requires that:

“Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site’s conservation objectives.”

7 It then requires with respect to agreeing to that project:

“In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public.”

The Conservation (Natural Habitats etc) Regulations 1994 (as amended)

8 The Conservation (Natural Habitats &c) Regulations 1994, as subsequently amended, (referred to here as the ‘Habitats Regulations’) transposes the Birds Directive and the Habitats Directive into national law, operating in conjunction with the Wildlife and Countryside Act 1981. The Habitats Regulations place an obligation on ‘competent authorities’ to carry out an appropriate assessment of any proposal likely to affect a SAC or SPA, to seek advice from Natural England and not to approve an application that would have an adverse effect on a SAC or SPA except under very tightly constrained conditions that involve the decisions by the Secretary of State. Competent authorities are defined in the Regulations as “any Minister, government department, public or statutory undertaker, public body of any description or person holding a public office”.

9 The most relevant part is Regulation 48:

“(1) A competent authority, before deciding to undertake, or give consent, permission or other authorisation for a plan or project which –

(a) is likely to have a significant effect on a European site in Great Britain (either alone or in a combination of projects), and

(b) is not directly connected with or necessary to the management of the site, shall make an appropriate assessment of the site in view of the site’s conservation objectives”.

.....

(5) In the light of the conclusions of the assessment ... the authority shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site.

Circular Accompanying PPS9

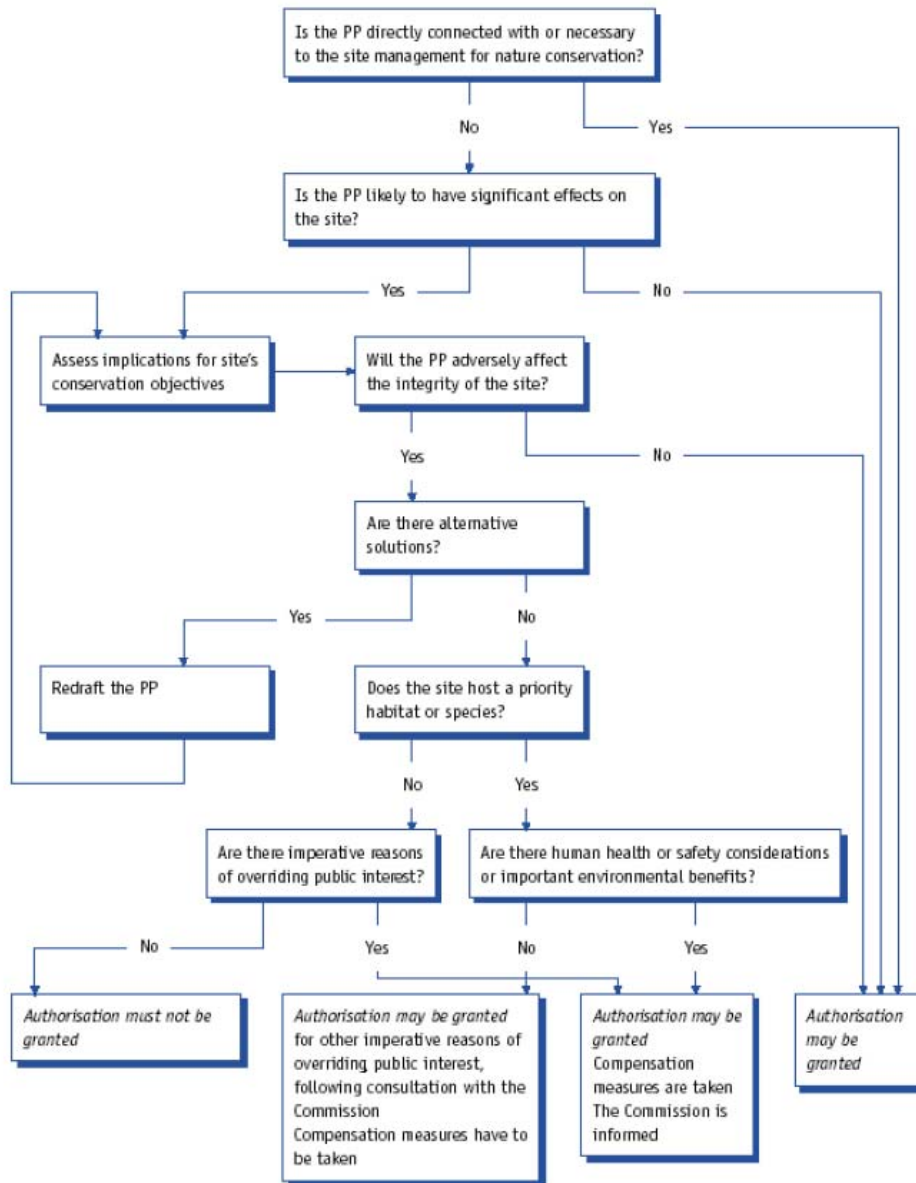
10 The government policy statement on biodiversity and geological conservation, PPS9 (ODPM 2005a), is accompanied by a Circular (ODPM 2005b) that provides administrative guidance on the application of the law relating to planning and nature conservation as it applies in England. Part 1 of the Circular includes a description of the process that a local planning authority, as a Competent Authority under the

Habitats Regulations, is required to go through in relation to development proposals and European and Ramsar sites. As a matter of UK Government policy Ramsar sites are afforded the same protection as SPAs and SACs and are expected to be treated in decision making processes in the same way as European sites.

Appropriate Assessment Methodology

- 11 This Appendix, containing the information to enable NCC to carry out the Appropriate Assessment, has been prepared in accordance with methodological guidance from English Nature (1997), the European Commission (2000, 2002) and ODPM (2005b). That guidance can be summarised as consisting of three key stages (European Commission 2002):
- i. Screening to identify whether a plan is likely to have a significant effect on a European site.
 - ii. Where likely significant effects have been found, appropriate assessment of the plan to ascertain whether it has an adverse effect on the integrity of the European site.
 - iii. Consideration of mitigation measures and alternative solutions where adverse effects on the integrity of a European site have been identified.
- 12 A complete picture of the steps to be taken is given in Figure 1 that is reproduced from Annex III of the European Commission guidance document (European Commission 2000).

Figure 1: The process of the consideration of a plan or project potentially affecting a Natura 2000 site



pp = plan or project

Consultation with the Competent Authority and its Statutory Adviser

- 13 Consultation with Natural England initially took place through a meeting on 18th February 2009. Discussion with Natural England focused on what information Natural England expected to accompany a planning application with a particular emphasis on the SPAs and SACs in the area. This was carried out in advance of the submission of the EIA and appropriate assessment scoping report to NCC.
- 14 A request for a scoping opinion on the need, and the information required by NCC, for an appropriate assessment was sent to NCC under cover of a letter dated 16th April 2009 and included a scoping report that related to both the EIA and appropriate assessment. NCC circulated the scoping report a range of consultees including Natural England.
- 15 The response from NCC was provided under cover of a letter dated 21st May 2009 and included within it was the formal advice from Natural England (dated 18th May 2009, ref LA 2.2 / EE4045). Natural England accepted that the scope of the proposed report to inform the Appropriate Assessment was satisfactory and requested that the proposal to extend Feltwell Quarry be considered as a potential in-combination effect.
- 16 Other issues raised by statutory bodies that were relevant to the scope of the appropriate assessment were:
- i. To take account of the studies already undertaken to inform the appropriate assessment of the Breckland Council Core Strategy DPD (Breckland DC).
 - ii. Assessment of light spill should extend to 1,500m (Breckland DC).

Potential Effects of the Proposal

- 17 In accordance with the requirement to take a precautionary approach to assessing potential effects on European or Ramsar sites, a very wide ranging consideration has been given to the potential sources of effects that may arise from the development. This initial consideration has been given without taking account of any mitigation actions. These potential sources of effects are set out below, sub-divided into the manner by which they might be manifest at the European or Ramsar site, should a pathway exist.

Habitat Loss

- 18 The loss of habitat of value to the interest features of European or Ramsar sites can occur in two ways:

- i. The direct loss of land within the designated site due to the development footprint.
- ii. The loss of land outside of the designated site that is used by species that are interest features of European or Ramsar sites.

Habitat Degradation

19 Habitat degradation within a designated site could result from a number of effects arising as a result of the Proposed Development:

- i. Emissions of compounds to the air from the combustion processes proposed in the development and from vehicle movements associated with the development.
- ii. Emissions of pollutants direct to watercourses or groundwater or indirectly to watercourses after discharge to the sewerage system and treatment at a waste water treatment works.
- iii. Rain water runoff from hard surfaces carrying with it polluting matter.
- iv. Abstraction of water direct from ground or surface waters.
- v. Interruption to groundwater movements through foundation structures

Effects on Species not Mediated Through Habitat

20 As well as the effects on habitats identified above that affect species utilising that habitat, there are also potential effects that affect species directly. Those that might arise as a result of the Proposed Development are:

- i. Noise causing disturbance to species.
- ii. Lighting causing disturbance to species.
- iii. Movement of people and vehicles on the Application Site causing disturbance to species.
- iv. Vehicle movements generating noise and light along routes to the Application Site causing disturbance to species.
- v. Recreational access to adjacent land by workers at the Application Site causing disturbance to species.
- vi. Recreational access by the public to adjacent land, enabled by car parking at the Application Site, causing disturbance to species`.
- vii. Predatory/scavenging animals attracted by food sources at the Application Site that then predate animals in the adjacent area.
- viii. Domestic pets (dogs/cats) kept by workers at the Application Site that then access adjacent land and predate or disturb species.

The European and Ramsar Sites Potentially Subject to Significant Effects

- 21 It is considered that any European and Ramsar sites out to a distance of 20km from the Application Site should be considered as to whether the Proposed Development is likely to have a significant effect on it. This distance of 20km for the initial consideration of effects has been set for two reasons:
- i. The greatest distance over which the effects of the atmospheric emissions of large combustion plants might be expected, based on generic advice from the Environment Agency (2003), is 15km.
 - ii. 20km was the distance used in the appropriate assessment of the Breckland Council Core Strategy DPD.
- 22 The SPA, SAC and Ramsar sites that are within 20km of the Application Site with their interest features are set out below.

Breckland SAC

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

- i. Inland dunes with open *Corynephorus* and *Agrostis* grasslands
- ii. Natural eutrophic lakes with *Magnopotamion* or *Hydrocharition*-type vegetation
- iii. European dry heaths
- iv. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*)

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

- i. Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

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

- i. Great Crested Newt *Triturus cristatus*

Norfolk Valley Fens SAC

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

- i. Alkaline fens

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

- i. Northern Atlantic wet heaths with *Erica tetralix*

- ii. European dry heaths
- iii. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*)
- iv. Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)
- v. Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*
- vi. Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*)

Annex II species present that are a primary reason for site selection:

- i. Narrow-mouthed whorl snail *Vertigo angustior*
- ii. Desmoulin`s whorl snail *Vertigo moulinsiana*

Rex Graham Reserve SAC

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

- i. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (*Festuco-Brometalia*) (important orchid sites) supporting Military Orchid *Orchis militaris*.

Waveney and Little Ouse Valley Fens SAC

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

- i. Molinia meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)
- ii. Calcareous fens with *Cladium mariscus* and species of the *Caricion davallianae*

Annex II species present that are a primary reason for site selection:

- i. Desmoulin`s whorl snail *Vertigo moulinsiana*

Breckland SPA

23 This site qualifies under Article 4.1 of the Birds Directive by supporting populations of European importance of the following species listed on Annex I of the Directive:

- i. Stone Curlew *Burhinus oedichnemus* 142 pairs representing up to 74.7% of the breeding population in Great Britain (Count as at 1998)
- ii. Nightjar *Caprimulgus europaeus* 415 pairs representing up to 12.2% of the breeding population in Great Britain (Count as at 1998)
- iii. Woodlark *Lullula arborea* 430 pairs representing up to 28.7% of the breeding population in Great Britain (Count as at 1997)

Redgrave and South Lopham Fens Ramsar site

24 This site is designated under the following Ramsar criteria:

Ramsar criterion 1:

The site is an extensive example of spring-fed lowland base-rich valley, remarkable for its lack of fragmentation.

Ramsar criterion 2:

The site supports many rare and scarce invertebrates, including a population of the fen raft spider *Dolomedes plantarius*.

Ramsar criterion 3:

The site supports many rare and scarce invertebrates, including a population of the fen raft spider *Dolomedes plantarius*. The diversity of the site is due to the lateral and longitudinal zonation of the vegetation types characteristic of valley mires.

Scoping Out of Particular Effects and Sites

25 A number of potential effects have been considered and scoped out from more detailed consideration in this report to inform the appropriate assessment.

26 These potential effects and why they have been scoped out from more detailed consideration are given below.

Direct Land Take of a European or Ramsar Site

27 The Application Site is not within the boundary of any European or Ramsar site. It is adjacent to the Breckland SPA. The SPA is situated immediately to the north of the Application Site boundary and on its western side it is separated by the A134 Mundford Road.

Land Take of Land Used by an Interest Feature When Outside the Protected Site

28 The loss of land used by an interest feature of a European or Ramsar site when outside the protected site can only occur in the case of mobile features. The relevant features are the three Annex 1 bird species of the Breckland SPA and Great Crested Newt, an interest feature of the Breckland SAC.

29 It has been determined that there will be no loss of land used by any of these interest features. This is based on the following studies, evaluation and assessment.

Stone Curlew

30 The data supplied in confidence by the RSPB on Stone Curlew nest site locations identified two nest locations within 4km of the Application Site but none on the Application Site itself. None of these nest sites were within 1,500m of the Application

Site. As a result there is no possibility that there will be permanent loss of nesting habitat for this species when using farmland outside the Breckland SPA.

31 There is no evidence from the baseline surveys, including those carried out in the hours of darkness prior to dawn, that Stone Curlew use the arable land of the Application Site for feeding. As a result there is no possibility that there will be permanent loss of feeding habitat for this species when using farmland outside the Breckland SPA.

32 Permanent loss of Stone Curlew feeding or nesting habitat will not occur as a result of the Proposed Development. As a result it can be concluded that this particular effect can be screened out from more detailed assessment.

Nightjar

33 The baseline surveys, including those carried out in the hours of darkness prior to dawn and after dusk, identified that the nearest Nightjar territory was more than 300m away. Arable farmland, the habitat of the Application Site, is not a habitat used by nesting Nightjar. There is no possibility that there will be permanent loss of nesting habitat for this species.

34 There is no evidence from the baseline surveys, including those carried out in the hours of darkness prior to dawn or after dusk, that Nightjar use the arable land of the Application Site for feeding. Arable farmland is not a high value habitat for foraging Nightjar and the permanent loss of this habitat to the development will not result in any significant loss of food supply. As a result there is no possibility that there will be permanent loss of feeding habitat for this species when using farmland outside the Breckland SPA.

35 Permanent loss of Nightjar feeding or nesting habitat will not occur as a result of the Proposed Development. As a result it can be concluded that this particular effect can be screened out from more detailed assessment.

Woodlark

36 The baseline surveys, including those carried out over four visits at dawn in February to May when Woodlark are most likely to be singing, identified that the nearest Woodlark territory was more than 300m away. Arable farmland is a habitat used by a proportion of the nesting Woodlark in the Brecks but they have only used such habitat in the year(s) that fields are taken out of arable cropping through the, now closed, set-aside scheme (Wright *et al.* 2007). The arable farmland was not set-aside over the period of the baseline surveys. The development of the Application Site will not lead to the permanent loss of nesting habitat for this species.

37 There is no evidence from the baseline surveys, including those carried out at dawn over seven visits from February to June when Woodlark are most likely to be feeding, that Woodlark use the arable land of the Application Site for feeding. Arable farmland is not a high value habitat for foraging Woodlark and the permanent loss of this habitat to development of the Application Site will not result in any significant loss of food supply. As a result there is no possibility that there will be permanent loss of feeding habitat for this species when using farmland outside the Breckland SPA.

38 Permanent loss of Woodlark feeding or nesting habitat will not occur as a result of the Proposed Development. As a result it can be concluded that this particular effect can be screened out from more detailed assessment.

Great Crested Newt

39 The Application Site is not within 500m of the Breckland SAC and there is no waterbody of value to Great Crested Newt within 500m.

40 Permanent loss of Great Crested Newt terrestrial habitat or a breeding pond will not occur as a result of the Proposed Development. As a result it can be concluded that this particular effect can be screened out from more detailed assessment.

Domestic Pets as Predators

41 The Proposed Development contains no domestic or residential elements and as a result there will be no people permanently living on site who might seek to keep a pet such as a cat that would hunt off-site and predate Nightjar or Woodlark that nest on the adjacent Breckland SPA.

42 Domestic cats would not be kept on site as part of any rodent control measures and the encouragement of feral cats, for instance by providing food, would not be permitted by staff working on site.

43 Domestic pets that might act as predators will not be permitted or encouraged on site. As a result it can be concluded that this particular effect can be screened out from more detailed assessment.

Predators and Scavengers

44 There is the possibility that attracting predators and scavengers to the Application Site might create a localised elevated population of a species such as Fox or crows that then move off site and predate the eggs, young or adult Stone Curlew, Nightjar or Woodlark.

45 The Proposed Development will receive recycled wood and biomass as fuel sources. The quality control procedures, fuel specifications and the contracts with suppliers will ensure that the fuel sources do not contain waste food or similar matter that will

attract predators and scavengers. In addition fuel will be processed within buildings, providing further assurance that any food sources will not be available to predators and scavengers.

- 46 The fuel source will not attract predators and scavengers. As a result it can be concluded that this particular effect can be screened out from more detailed assessment.

Potentially Polluting Emissions to Water

- 47 All water used and arising on site, with the exception of clean water draining from roofs, will be stored and treated on site and pumped off site to the south to Thetford where it will be connected into the existing waste water sewerage infrastructure. This avoids the construction of a pipeline to the west, passing through the Breckland Forest SSSI/Breckland SPA, and discharging after treatment and subject to Environment Agency consent in to the Little Ouse River. Any water escaping or falling on to the developed part of the site (with the exception of roof drainage and water falling onto the landscaped areas) will be prevented from soaking to the ground water by an impervious concrete base. Pollution prevention will also be applied to the areas where chemicals, fuels and process products are stored on the site. This includes fuel being stored under cover and in an area without drains and sufficient effluent storage for the firewater run-off resulting from a major fire. A closed and lined attenuation pond is present in the lowest part of the site. These processes and measures ensures that no potentially polluting water is discharged into the adjacent Breckland SPA or those SACs at a greater distance from the Application Site.

- 48 There will be no discharges of potentially polluting water into any European Site. As a result it can be concluded that this particular effect can be screened out from more detailed assessment.

Hydrogeology

- 49 The installation of piles to support the Proposed Development will not be so deep as to intercept the water table and as a result will not interfere with ground water flows beneath the Application Site.

- 50 The adjacent Breckland SPA does not contain features of interest that are themselves water related, water dependent or sensitive to hydrological changes. The nearest European Site that contains such water related interests is the Breckland SAC with its nearest point at 2.6km. European or Ramsar Sites with water related interest features at greater distances are the Norfolk Valley Fens SAC, the Waveney and Little Ouse Valley Fens SAC and the Redgrave and South Lopham Fens Ramsar site. All of these designated sites are at such a distance that any effect arising in the ground water and hydrogeological system at the proposed development site would

not be transmitted to the ground water and hydrogeological systems that underlie the designated sites.

- 51 There will be no activity or development at the Application Site that will alter or interfere with ground water flows or levels. As a result it can be concluded that this particular effect can be screened out from more detailed assessment.

Designated Sites Scoped Out

- 52 Two of the European or Ramsar sites identified above are also scoped out of the assessment based on their distance from the Application Site. Two of the designated sites are greater than 15km away, beyond the distance advised by the Environment Agency for consideration of air pollution from large combustion processes. These sites are:

- i. Rex Graham Reserve SAC at 16.7km away.
- ii. Redgrave and South Lopham Fens Ramsar site at 18.8km away.

- 53 The Redgrave and South Lopham Fens Ramsar site overlaps in part with the Waveney and Little Ouse Valley Fens SAC. This latter designated site has not been scoped out because there are components of this SAC that are sited closer than the Ramsar site. The closest part of the SAC is 13.2km away (the Weston Fen SSSI component) and it remains within the study to be assessed particularly for potential long range air pollution effects.

Effects and Sites Scoped In for more Detailed Consideration in this Report

- 54 The potential effects of the Proposed Development that were considered most likely to give rise to significant effects on the interest features of the European site, and hence would be considered in detail for potential adverse impacts on the integrity of the European sites, are set out below. In each case both the European Site and those interest features that might be affected by the potential effect are listed.

- i. Dust pollution affecting the adjacent Breckland SPA and its interest features Stone Curlew, Nightjar and Woodlark.
- ii. Air pollution from the combustion process and vehicles affecting the Breckland SPA and its interest features Stone Curlew, Nightjar and Woodlark, the Breckland SAC and its interest features inland dunes, natural eutrophic lakes, dry heaths, dry grasslands, the Norfolk Valley Fens SAC and its interest feature alkaline fens and the Waveney and Little Ouse Valley Fens SAC and its interest features Molinia meadows and calcareous fen.

- iii. Disturbance to species from noise affecting the adjacent Breckland SPA and its interest features Stone Curlew, Nightjar and Woodlark
 - iv. Disturbance to species from light pollution affecting the adjacent Breckland SPA and its interest features Stone Curlew, Nightjar and Woodlark.
 - v. Disturbance to species from human activity and vehicle movements affecting the adjacent Breckland SPA and its interest features Stone Curlew, Nightjar and Woodlark
- 55 Potential effects and European or Ramsar Sites not listed here have been scoped out from detailed assessment and the reasoning behind this is given in the relevant section above.

Methods for Considering Potential Effects and Adverse Impact

Assessment of the Potential Impact of Air Pollution

- 56 The air quality and atmospheric dispersion modelling methodology is detailed in Chapter 11 of the Environmental Statement. This section provides information on the method used to assess the significance of impacts on ecological receptors.
- 57 The operation of the facility will result in emissions to air, the most significant of which in the context of ecological effects, are:
- i. Nitrogen containing compounds (oxides of nitrogen NO_x and ammonia NH_3) that can lead through their fertilising effect (the process of eutrophication) to changes in plant species dominance, particularly coarse grasses dominating over fine grasses and lichens.
 - ii. A range of compounds (NO_x , sulphur dioxide SO_2 , NH_3 and to a lesser extent hydrogen chloride HCl) that can lead through their acidifying effect to changes in plant communities.
- 58 Habitats may be affected through changes in:
- i. Ambient atmospheric pollutant concentrations; and
 - ii. Deposition of certain compounds.
- 59 The potential effects on habitats within protected sites are quantified by comparing the maximum Process Contributions (PC) and Predicted Environmental Concentrations (PEC) (incorporating a maximum background concentration) to empirically derived thresholds above which damage to vegetation is known to occur (Environmental Quality Standards: EQS).

60 Two EQSs are used to assess the potential effect of emissions on sensitive ecological receptors. These are:

- i. Critical levels; and
- ii. Critical loads (or critical load functions).

61 Critical load and critical level are quantitative estimates of exposure to one or more pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur according to present knowledge. The critical load relates to the quantity of pollutant deposited from air to the ground, whereas the critical level is the gaseous concentration of a pollutant in the air.

Assessment of critical levels

62 Critical levels for the protection of vegetation and ecosystems are specified within relevant European Air Quality Directives and corresponding UK air quality regulations as outlined in the National Air Quality Strategy (NAQS). For this study Process Contributions (PC) and Predicted Environmental Concentrations (PEC) of NO_x, SO₂ and NH₃ at each site have been calculated and compared with the relevant critical level:

- i. 30 µg.m⁻³ in the case of NO_x
- ii. 20 µg.m⁻³ in the case of SO₂
- iii. 3 µg m⁻³ in the case of NH₃

63 HCl contributes to acidifying deposition in the UK, but there is little information on the direct effects of HCl on plants and no critical level is available for the evaluation of direct HCl impacts on vegetation.

64 In addition APIS (www.apis.ac.uk) recommends the use of some additional, lower critical levels when lichens that are known to be particularly sensitive to some pollutants, are present. The Breck heathlands and grasslands are noted for their lichen communities and these are specifically listed as interest features in some designated sites. As a result the following critical levels are use for the assessment of impacts on lichen communities:

- i. 10 µg.m⁻³ in the case of SO₂
- ii. 1 µg m⁻³ in the case of NH₃

65 Background NO_x, SO₂ and NH₃ concentrations at each designated site have been derived from the APIS website (www.apis.ac.uk). They can vary across a site, particularly when sites are large. In order to make the assessment precautionary in its approach, the nearest point of each large site to the proposed development has

been chosen for assessment since it is here that the process contribution is predicted to be greatest.

Assessment of critical loads

66 Critical loads for acid deposition and nitrogen deposition established for the protection of habitats have been taken from the APIS website. These critical loads are in some cases available for an encompassing habitat type (e.g. planted coniferous woodland) and in other cases for specific sub-categories of habitats (e.g. for acid grassland APIS lists a series of separate critical loads ranging from that for non-Mediterranean dry acid grassland to that for tundra). Where a critical load is available for a specific habitat type that is present in the Brecks then that has been used rather than the more generalised habitat classification. Table 1 below lists those specific critical loads for nitrogen deposition relevant to the area being assessed.

Table 1: Nitrogen deposition critical loads by habitat used in the assessment

Habitat - as referred to by APIS	Critical load (Minimum – maximum) (kg N/ha/year)
Sub-Atlantic semi-dry calcareous grassland	15 - 25
Dry heaths	10 - 20
Non-Mediterranean dry acid and neutral closed grassland	10 - 20
Poor Fen and Rich Fen combined	10 - 35

67 Predicted contributions to acid deposition and nitrogen deposition have been calculated and compared with the relevant critical load range for the habitat types associated with each designated site as derived from the APIS website (www.apis.ac.uk).

68 Background levels of acid deposition at each designated site have been derived from the APIS website (www.apis.ac.uk). They can vary across a site, particularly when sites are large. In order to make the assessment precautionary in its approach, the nearest point of each large site to the proposed development has been chosen for assessment since it is here that the process contribution is predicted to be greatest.

Ecological Evaluation Criteria

69 The significance of the predicted emissions of oxides of nitrogen (NOx), sulphur dioxide (SO₂) and ammonia (NH₃) is assessed in two ways. If the background emissions combined with the predicted emissions from the plant (i.e. the PEC) do not exceed the critical load for a given habitat at a particular site, the impact is not considered to be significant.

- 70 If the background concentrations are already above the relevant critical level/load, the impact arising from predicted emissions due to the plant is not considered significant if the maximum process contribution (PC) is less than 1% of the relevant critical level/load for that site. The Environment Agency's guidance (EU Habitats and Birds Directives Handbook) states that: "*Where the concentration within the emission footprint in any part of the European site(s) is less than 1% of the relevant long-term benchmark (EAL, Critical Level or Critical Load), the emission is not likely to have a significant effect alone or in combination, irrespective of the background levels*".
- 71 When comparing the maximum PC within a site against the EQS, it has been assumed that the maximum PC level affects the whole site. This is a precautionary approach to the assessment and ensures that the predicted effects represent a worst-case scenario.
- 72 Cumulative ('in combination') impacts with adjacent industrial sources already operational have been accounted for through the use of the background levels in APIS that contain the cumulative of figures from point sources in the area at a 5 km² level.

Assessment of the Potential Impact of Noise

- 73 The noise survey and modelling methodology is detailed in Chapter 13 of the Environmental Statement. This section provides information on the method used to assess the significance of impacts on birds, the ecological receptors considered to be most sensitive to noise effects that operate over such distances that they will occur outside the boundary of the proposed development.
- 74 The effect from the construction, operation and decommissioning of the facility that may have impacts on breeding birds results from any continuous noise that might 'mask' the communication between birds. Evidence available on this effect and the derivation of a threshold for a significant impact are described below.
- 75 An effect, which has been identified in some circumstances, produced by continuous noises e.g. road traffic, some construction machinery and mechanical processes, is that the territorial songs or calls of birds may be masked by noise of similar frequencies. This can reduce the distance over which the song or call can be heard. For a song, alarm call or another sound to give rise to a response from a bird, the sound must be detectable against the background noise. The detectability of a sound is determined by the signal-to-noise ratio (SNR) and the detection ability of the bird. Within a given frequency band, signals with a SNR below the detection threshold of the listening bird are 'masked'.
- 76 The songs or calls of a breeding bird could potentially be masked if during construction works, operation or decommissioning the noise level were to increase

above the threshold at which masking had been identified to occur. There are no established guidelines for the assessment of noise on bird populations and no publicly approved thresholds (i.e. by a statutory conservation agency) above which birds, and particularly the species that are the interest feature of the SPA, have been found to be affected.

77 Recent research on the effect of road noise has identified that, generally speaking, where noise levels exceed 55dB LAeq this may have adverse effects on the breeding behaviour of some bird species (Habib *et al.* 2007; Hirvonen 2001; Reijnen *et al.* 1995; Reijnen *et al.* 1996; Rheindt 2003; West *et al.* 2007) and similar effects have also been identified in urban areas subject to a more diverse range of sound sources (Young 2008). Adverse impacts from continuous noise are not universal and instances of adaptation by some species to background noise have been identified (Brumm 2004; Fuller *et al.* 2007; Patricelli and Blickley 2006; Slabbekoorn and Peet 2003; Wood and Yezerinac 2006) although these adaptations may come at a cost (Brumm 2004). The many, and possibly majority of, cases where no effect is observed is unlikely to be reported in the academic literature.

78 There is an absence of information on the effects of noise on the bird species that are the interest feature of the SPA. From the limited studies that have been carried out there is not a predictable pattern of which bird species will be adversely affected and which will not be affected (Hirvonen 2001; Peris and Pescador 2004) although ear morphology has been suggested as a reason for differences (Ryals *et al.* 1999). Taking account of the requirement under the Habitats Regulations to take a precautionary approach to potential effects when they might occur to interest features of the SPA, a threshold is applied of 55dB LAeq for the impact of continuous background noise to become significant through causing a masking effect on bird song or calls.

The Assessment of Potential Impacts

Introduction

79 The potential effects that could be caused by the development of the Application Site and the activities and processes that will take place have been described above. This section presents a detailed assessment of each of the potential effects against the European Sites and their interest features that have been screened in.

Dust Pollution

80 Information on the activities on the proposed development site that might generate dust during the construction phase and the measures taken to reduce this are described in detail in Chapter 11 Air Quality. Mitigation actions will be implemented through good working practices described within a Code of Construction Practice or a

Construction Environmental Management Plan. The dust generating activities and measures taken to manage dust during the decommissioning phase are predicted to be similar to the construction phase.

- 81 Information on the activities on the proposed development site that might generate dust during the operational phase and the measures taken to reduce this are described in detail in Chapter 11 Air Quality. The main mitigation actions designed in to the operation of the facility to reduce dust emissions are for many of the materials handling activities to take place within buildings and for the flue gases to be subject to treatments that will remove particulates.

Breckland SPA interest feature Stone Curlew

- 82 Stone Curlew nest on arable land and semi-natural heathland in the Breckland SPA.
- 83 The desk study and bird surveys identified no nesting Stone Curlew within 1,500m and no feeding Stone Curlew within 500m of the Application Site.
- 84 As the evidence indicates that Stone Curlew do not nest or feed on the application site or its surrounding area then dust generation and deposition does not have an adverse impact on this interest feature of the Breckland SPA.

Breckland SPA interest feature Nightjar.

- 85 Nightjar nest in clear felled areas within conifer forestry plantations in the Breckland SPA. Nightjar will nest on semi-natural heathland in the SPA but there is none of this habitat nearby. Radio tracking studies in Thetford Forest have shown that Nightjar will forage up to 2km from their nesting area, with most flights being less than 1 km (Bowden and Green 1991).
- 86 The bird surveys identified the nearest Nightjar territory at more than 300m away. The land that is closer, but still within the SPA, is not currently suitable for breeding Nightjar as it is in the middle growth stage of plantation forestry. None of the plantation forest that is closest to the proposed development will be felled within 20 years (Forestry Commission 2009a). Construction will have been completed by then. It is not planned that any of these clear fell areas will become permanent open space (eg heathland) but will be replanted with conifers (Forestry Commission 2009b). This will result in habitat becoming available temporarily for breeding Nightjar that is close to the proposed development during the operational phase. The designed in dust reduction and management measures will mean that these areas will not be subject to significant dust deposition. The habitats present close to the proposed development site, conifer plantation and arable fields, are not high value habitats for foraging Nightjar and any limited dust deposition on to these habitats will not result in any significant loss of food supply.

87 Dust generation and deposition does not have an adverse impact on Nightjar, an interest feature of the Breckland SPA.

Breckland SPA interest feature Woodlark.

88 Woodlark in the Brecks nest in clear fell areas within conifer plantations (deserting these areas as the grass and other ground vegetation grows up in advance of the young trees reaching the thicket stage) (Bowden 1990), semi-natural heathland and since the 1990's on set-aside farmland (Wright *et al.* 2007). There is no semi-natural heathland habitat nearby that would provide nesting habitat.

89 The bird surveys identified the nearest Woodlark territory at more than 300m away. The land that is closer, but still within the SPA, is not currently suitable for breeding Woodlark as it is in the middle growth stage of plantation forestry. None of the plantation forest that is closest to the proposed development will be felled within 20 years (Forestry Commission 2009a). Construction will have been completed by then. It is not planned that any of these clear fell areas will become permanent open space (eg heathland) but will be replanted with conifers (Forestry Commission 2009b). This will result in habitat becoming available temporarily for breeding Woodlark that is close to the proposed development during the operational phase. The designed in dust reduction and management measures will mean that these areas will not be subject to significant dust deposition. The habitats present close to the proposed development site, conifer plantation and arable fields, are not high value habitats for foraging Woodlark and any limited dust deposition on to these habitats will not result in any significant loss of food supply.

90 Dust generation and deposition does not have an adverse impact on Nightjar, an interest feature of the Breckland SPA.

Air Pollution from the Combustion Process and Vehicles

91 Information on the activities on the Application Site that might generate emissions of pollutants to the air during the construction phase and the measures taken to reduce this are described in detail in Chapter 11 Air Quality.

92 Information on the activities on the Application Site that might generate emissions of pollutants to the air during the operational phase and the measures taken to reduce this are described in detail in Chapter 11 Air Quality. The main mitigation actions designed in to the operation of the facility to reduce pollutant emissions are the flue gas cleaning system and the operation of the facility to the pollutant emission limits of the Waste Incineration Directive and statutory air quality limits.

93 These paragraphs consider gaseous emissions, that of emissions of dust having been considered in the specific 'dust' assessment paragraphs above.

Assessment of the construction phase

94 In the absence of an operational combustion process the emissions to air are produced by vehicles and other plant working on site. These are qualitatively assessed in Chapter 11. This qualitative assessment came to the conclusion that since there were greater emissions during the operational phase, due to the combustion processes, the conclusions of that operational phase assessment should be taken as the worst case and applied to the construction phase. The operational phase assessment presented below concludes that there are no significant adverse effects on the European Sites and their interest features. As a consequence it can be concluded that the construction phase will have no adverse impact on the interest features of the European Sites.

Assessment of the operational phase

95 The pollutants assessed are:

- i. Nitrogen oxides (NO_x)
- ii. Sulphur dioxide (SO₂)
- iii. Ammonia (NH₃)
- iv. Acid deposition
- v. Nitrogen deposition

96 Those elements of Chapter 11 that are relevant to assessing effects on wildlife are summarised below.

97 The assessment made in the operational phase considers emissions from the exhaust stack, emissions from operational vehicles and the combined effects with the existing Thetford Power Station to the north west since that source of emissions is already included in the background pollutant levels. Modelling to predict ground level concentrations and deposition of pollutants was carried out using the dispersion model ADMS 4.1. A grid of receptors (fine, close to the source and coarse, at a greater distance) has been modelled to illustrate the effects at a wide range of locations.

98 The critical levels and loads that are used in the assessment of effects on designated sites are described in the air quality assessment methodology above.

Results of air pollution modelling in relation to the European Sites

99 The detailed outputs of the modelling for the SACs and the SPA within 15km of the Application Site are included in a series of tables in Appendix 8.9. There are no Ramsar sites within 15km. The findings of the modelling, examining existing

background concentrations, the contribution made by the Proposed Development and how this relates to the relevant EQS or critical load are summarised below.

- 100 Many of the designated sites being considered in this assessment are large in size and to account for this the nearest point is considered for assessment. This provides an assessment made on the worst case and hence is made on a precautionary basis.

Nitrogen oxide (NO_x) concentrations

- 101 The background concentration of nitrogen oxides at the designated sites within 15km of the Application Site range from 22.10 µg.m⁻³ (in the Breckland SPA and the Breckland SAC at Barnhamcross Common SSSI) to 12.30 µg.m⁻³ in the Breckland SPA. The background concentration adjacent to the Application Site is 20.20 µg.m⁻³, within the Breckland SPA. The background concentration in the nearest part of the Breckland SAC (at Thetford Golf Course and Marsh SSSI) is 13.00 µg.m⁻³.

- 102 The maximum contribution that the Proposed Development makes to nitrogen oxides concentrations is 0.68 µg.m⁻³ adjacent to the Application Site in the Breckland SPA. The maximum contribution that the Proposed Development makes to nitrogen oxides concentrations in the Breckland SAC is 0.19 µg.m⁻³ within East Wretham Heath SSSI.

- 103 All predicted environmental concentrations of nitrogen oxides at the designated sites within 15km of the Application Site, that is the combination of the existing background levels plus the process contributions, are below the EQS of 30 µg.m⁻³. As a result it can be concluded that the Proposed Development does not lead to a significant impact from nitrogen oxide emissions. Emissions of nitrogen oxide have no adverse impact on those habitats that support the interest features of the Breckland SPA and no adverse impact on the interest features of the SACs assessed.

Sulphur dioxide (SO₂) concentrations

- 104 The background concentration of sulphur dioxide at the designated sites within 15km of the Application Site range from 3.50 µg.m⁻³ (in the Breckland SPA and the Breckland SAC at Barnhamcross Common SSSI and Thetford Heath SSSI) to 1.40 µg.m⁻³ at Croxton Heath, part of the Breckland Forest SSSI and Stanford Training Area SSSI. These sites are within the Breckland SPA and Breckland SAC respectively. The background concentration adjacent to the Application Site is 1.90 µg.m⁻³, within the Breckland SPA. The background concentration in the nearest part of the Breckland SAC (at Thetford Golf Course and Marsh SSSI) is 1.70 µg.m⁻³.

- 105 The maximum contribution that the Proposed Development makes to sulphur dioxide concentrations is 0.27 µg.m⁻³ adjacent to the Application Site in the Breckland SPA. The maximum contribution that the Proposed Development makes to sulphur dioxide concentrations in the Breckland SAC is 0.08 µg.m⁻³ within East Wretham Heath SSSI.

106 All predicted environmental concentrations of sulphur dioxide at the designated sites within 15km of the Application Site, that is the combination of the existing background levels plus the process contributions, are below the EQS of $20 \mu\text{g.m}^{-3}$. As a result it can be concluded that the Proposed Development does not lead to a significant impact from sulphur dioxide emissions. Emissions of sulphur dioxide have no adverse impact on those habitats that support the interest features of the Breckland SPA and no adverse impact on the interest features of the SACs assessed.

Ammonia (NH₃) Concentrations

107 The background concentration of ammonia at the designated sites within 15km of the Application Site range from $3.00 \mu\text{g.m}^{-3}$ (in the Breckland SPA and the Breckland SAC at Barnhamcross Common SSSI and Thetford Heath SSSI) to $0.80 \mu\text{g.m}^{-3}$ at Lakenheath Warren SSSI, RAF Lakenheath SSSI and Wangford Warren and Carr SSSI. Lakenheath Warren SSSI and Wangford Warren and Carr SSSI are both in the Breckland SPA and Breckland SAC and RAF Lakenheath SSSI is in the Breckland SAC. The background concentration adjacent to the Application Site is $1.50 \mu\text{g.m}^{-3}$, within the Breckland SPA. The background concentration in the nearest part of the Breckland SAC (at Thetford Golf Course and Marsh SSSI) is $1.10 \mu\text{g.m}^{-3}$.

108 The maximum contribution that the Proposed Development makes to ammonia concentrations is $0.0107 \mu\text{g.m}^{-3}$ adjacent to the Application Site in the Breckland SPA. The maximum contribution that the Proposed Development makes to ammonia concentrations in the Breckland SAC is $0.0031 \mu\text{g.m}^{-3}$ within East Wretham Heath SSSI.

109 All but two of the predicted environmental concentrations of ammonia at the designated sites within 15km of the Application Site, that is the combination of the existing background levels plus the process contributions, are below the EQS of $3.0 \mu\text{g.m}^{-3}$. The two sites where the ammonia concentration is not below the EQS are in the Breckland SPA and the Breckland SAC at Barnhamcross Common SSSI and Thetford Heath SSSI. These sites are already at the EQS as a result of the background ammonia concentrations.

110 In such circumstances consideration is given to the proportion of the EQS that is represented by the process contribution. At two sites that are not below the EQS due to background levels, in each case the process contribution is considerably less than 1%. It is 0.06% at Barnhamcross Common SSSI and 0.05% at Thetford Heath SSSI, both these sites being in the Breckland SPA and the Breckland SAC.

111 This assessment has considered impacts judged against the EQS of $3.0 \mu\text{g.m}^{-3}$, a concentration that is appropriate for the protection of higher plants. On this basis it can be concluded that emissions of ammonia have no adverse impact on those

habitats that support the interest features of the Breckland SPA and no adverse impact on the interest features of the SACs assessed.

Specific consideration of sites with lichen communities

- 112 The Breck heathlands and grasslands are noted for their lichen communities. APIS recommends the use of a lower critical level (EQS) for ammonia of $1 \mu\text{g.m}^{-3}$ when lichens are present. This because lichens are known to be particularly sensitive to some forms of air pollution. The significance of predicted ammonia levels has been reassessed against this lower critical level for those European Sites where lichen communities form part of the habitat that is an interest feature. This reassessment excludes those European or Ramsar sites that are designated for their wetlands, conifer plantations and arable farmland.
- 113 This reassessment identified that the Breckland SAC is subject to a background concentration of ammonia that exceeds the lower EQS of $1 \mu\text{g.m}^{-3}$ for the protection of lichens. The list of component SSSIs that form part of the Breckland SAC and the relevant ammonia concentrations is given in Table 5 of Appendix 8.9.
- 114 In such circumstances consideration is given to the proportion of the EQS (in this case the lower level set for the protection of lichen communities) that is represented by the process contribution. At the Breckland SAC where ammonia concentrations are not below the EQS due to background levels, in each case the process contribution is less than 1% and in some cases considerably less than 1%. The designated site where the process contribution is the highest proportion of the EQS for lichens is East Wretham Heath SSSI, a component of the Breckland SAC and falls to 0.05% at Foxhole Heath Eriswell SSSI, the component of the Breckland SAC with the lowest percentage.
- 115 This assessment has considered impacts judged against the ammonia EQS of $1.0 \mu\text{g.m}^{-3}$, a concentration that is appropriate for the protection of lichens. On this basis it can be concluded that emissions of ammonia have no adverse impact on the interest features of the Breckland SAC.
- 116 Taking both the conclusions from the assessment of impacts on higher plants and on lichen communities it can be concluded that the Proposed Development does not lead to a significant impact from ammonia emissions. Emissions of ammonia have no adverse impact on the interest features of the European Sites assessed.

Acid deposition

- 117 The background acid deposition rates at the designated sites within 15km of the Application Site have been assessed. The background acid deposition rate adjacent to the Application Site is $3.19 \text{ kg eq.ha}^{-1}.\text{yr}^{-1}$, within the Breckland SPA. This background acid deposition rate is not exceeded anywhere else in the Breckland

SPA. The background acid deposition rate in the nearest part of the Breckland SAC (at Thetford Golf Course and Marsh SSSI) is $1.63 \text{ kg eq.ha}^{-1}.\text{yr}^{-1}$. The lowest levels recorded in the Breckland SAC are $1.40 \text{ kg eq.ha}^{-1}.\text{yr}^{-1}$ at Lakenheath Warren SSSI, Wangford Warren Carr SSSI and Lakenheath SSSI components of the Breckland SAC. The background acid deposition rate at the Norfolk Valley Fens SAC is $1.95 \text{ kg eq.ha}^{-1}.\text{yr}^{-1}$ and at the Waveney and Little Ouse Valley Fens SAC is $1.86 \text{ kg eq.ha}^{-1}.\text{yr}^{-1}$. There is widespread exceedance of the critical load across the Breckland SPA, the Breckland SAC and their component SSSIs.

118 In such circumstances consideration is given to the proportion of the background acid deposition that is represented by the process contribution. If the proportion exceeds 1%, consideration has to be given to the potential for significant adverse effects. At the Breckland SAC and the Norfolk Valley Fens SAC the process contribution represents less than 1% of the background acid deposition rate.

119 There is one location where the process contribution is 1.92% of the background acid deposition rate. This is within the Breckland SPA adjacent to the Application Site. The acid deposition critical load taken from the APIS website is that for 'planted coniferous woodland' since that is the habitat type present at this location. This critical load has been determined on the basis of the acid deposition rate that adversely affects the growth rate of conifer trees planted as a forestry crop. The interest features of the Breckland SPA that use this habitat type are Nightjar and Woodlark. The population levels and productivity of these two bird species does not depend on the health of the planted conifer trees. The population levels and productivity of these two bird species depends on the clear felling of the trees and the time period on replanting before the regrowth of the ground vegetation and the growth of the conifer trees makes conditions unsuitable for nesting and feeding. As a consequence although the background acid deposition rate exceeds the critical load and the process contribution is more than 1% of that background deposition, this is not an adverse impact on Nightjar and Woodlark. It can be concluded that acid deposition has no adverse impact on those habitats that support the interest features of the Breckland SPA and no adverse impact on the interest features of the SACs assessed.

Nitrogen Deposition

120 The background nitrogen deposition rates at the designated sites within 15km of the Application Site have been assessed. The background nitrogen deposition rate adjacent to the Application Site is $41.20 \text{ kg eq.ha}^{-1}.\text{yr}^{-1}$, within the Breckland SPA. This background nitrogen deposition rate is not exceeded anywhere else in the Breckland SPA. The background nitrogen deposition rate in the nearest part of the Breckland SAC (at Thetford Golf Course and Marsh SSSI) is $19.60 \text{ kg eq.ha}^{-1}.\text{yr}^{-1}$. The lowest levels recorded in the Breckland SAC is $16.50 \text{ kg eq.ha}^{-1}.\text{yr}^{-1}$ at

Lakenheath Warren SSSI, Wangford Warren Carr SSSI and Lakenheath SSSI components of the Breckland SAC. The background nitrogen deposition rate at the Norfolk Valley Fens SAC is 23.90 kg eq.ha⁻¹.yr⁻¹ and at the Waveney and Little Ouse Valley Fens SAC is 22.70 kg eq.ha⁻¹.yr⁻¹. The background nitrogen deposition rate exceeds the habitat relevant critical load at all European Sites assessed within 15km of the Application Site.

- 121 In such circumstances consideration is given to the proportion of the background nitrogen deposition that is represented by the process contribution. If the proportion exceeds 1%, consideration has to be given to the potential for significant adverse effects. At all the designated sites assessed within 15km of the application site the process contribution represents less than 1% of the background nitrogen deposition rate. It can be concluded that nitrogen deposition has no adverse impact on those habitats that support the interest features of the Breckland SPA and no adverse impact on the interest features of the SACs assessed.

Breckland SPA interest feature Stone Curlew

- 122 Stone Curlew nest on arable land and semi-natural heathland in the Breckland SPA.
- 123 The desk study and bird surveys identified no nesting Stone Curlew within 1,500m and no feeding Stone Curlew within 500m of the Application Site.
- 124 The air pollution assessment has identified that the Proposed Development causes no adverse impacts on habitats that support Stone Curlew and as a result it can be concluded that there are no adverse impacts on this interest feature of the Breckland SPA.

Breckland SPA interest feature Nightjar.

- 125 Nightjar nest in clearfell areas of conifer plantations and semi-natural heathland in the Breckland SPA.
- 126 The surveys identified no nesting Nightjar within 300m of the Application Site and that the Application Site is not used by feeding Nightjar.
- 127 The air pollution assessment has identified that the Proposed Development causes no adverse impacts on habitats that support Nightjar and as a result it can be concluded that there are no adverse impacts on this interest feature of the Breckland SPA.

Breckland SPA interest feature Woodlark.

- 128 Woodlark nest in clearfell areas of conifer plantations and semi-natural heathland in the Breckland SPA and a proportion use arable farmland when set-aside outside of the SPA.

129 The surveys identified no nesting Woodlark within 300m of the Application Site and that the Application Site is not used by feeding Woodlark.

130 The air pollution assessment has identified that the Proposed Development causes no adverse impacts on habitats that support Woodlark and as a result it can be concluded that there are no adverse impacts on this interest feature of the Breckland SPA.

Breckland SAC interest features inland dunes, natural eutrophic lakes, dry heaths and dry grasslands

131 The air pollution assessment identified that emissions from the Proposed Development cause no adverse impact on these habitats that are interest features of the Breckland SAC.

Norfolk Valley Fens SAC interest feature alkaline fens

132 The air pollution assessment identified that emissions from the Proposed Development cause no adverse impact on this habitat that is the interest feature of the Norfolk Valley Fens SAC.

Waveney and Little Ouse Valley Fens SAC interest features Molinia meadows and calcareous fen

133 The air pollution assessment identified that emissions from the Proposed Development cause no adverse impact on these habitats that are interest features of the Waveney and Little Ouse Valley Fens SAC.

Disturbance to Species from Noise

134 Details of the existing background noise levels, the noise generated on the site during the construction phase and operational phase and the measures taken to reduce this are described in detail in Chapter 12 Noise.

135 Those elements of the chapter that are relevant to assessing effects on wildlife are summarised below.

136 Existing noise levels were measured at a number of locations. Mean daytime noise levels on the edge of the Breckland SPA (southeast corner of Jubilee Wood) were found to average 51dB LAeq 1hr and have a maximum level of 91 dB LAm_{ax}. Adjacent to the A134 (and hence adjacent to the SPA) the noise levels created by passing vehicles in the daytime were found to have a LAm_{ax} of 71 to 80 dB at 10 m and 64 to 67 dB at 50 m from the road edge.

137 Average noise levels in the village of Croxton in the daytime were similar to the daytime levels at the edge of the SPA (southeast corner of Jubilee Wood) being 50dB

L_{Aeq} 12hr. The measurements made here provide additional information on average night time noise levels. The noise level was 39dB L_{Aeq} 12hr on weekdays.

Construction Phase

138 Modelling was undertaken to predict the noise levels during the construction phase. Three activities were identified that were representative of periods within which there is the greatest potential for significant noise to be generated. These activities are:

- i. day-time ground excavations and piling
- ii. night-time concrete pour of foundations
- iii. day-time building construction

139 Average noise levels generated on site (ie at 10m from the source of the noise, see Appendix 12.4) were predicted to vary from 65dB L_{Aeq} for activities such as compressors, through 76dB L_{Aeq} for construction vehicles to the noisiest component of the construction activity, hydraulic hammer piling at 88dB L_{Aeq}. The use of hydraulic hammer piling in the noise modelling is taking the worst case scenario. Excavation and in-situ casting of steel and concrete piles is the preferred construction method.

140 This on site construction generated noise falls off rapidly, following an inverse square law as sound propagates. Predicted average noise levels fall to 55dB L_{Aeq} on the edge of the SPA and to below the existing background level of 50dB L_{Aeq} within 40m.

141 These predicted levels account for the implementation of mitigation measures in the form of the good working practices described within a Code of Construction Practice or a Construction Environmental Management Plan.

Operational Phase

142 Modelling was undertaken to predict the noise levels during the operational phase, including both operating plant and the noise of the HGVs making deliveries. Average noise levels predicted on the proposed development site by this combination of plant and HGVs averaged up to 70-75dB L_{Aeq} within small parts of the development. At the location of the vehicle entrance the predicted average noise levels fell to no more than 60dB L_{Aeq} and the highest average predicted noise level occurring on the edge of the SPA was 50-55dB L_{Aeq}. Average noise levels then fall rapidly to below the existing background noise, including across those parts of the SPA distant from the existing traffic noise along the Mundford Road.

143 These predicted levels account for the implementation of 'designed in' mitigation measures, principally placing many of the processes that occur at the facility within buildings to provide a level of screening.

Breckland SPA interest feature Stone Curlew

144 Stone Curlew nest on arable land and semi-natural heathland in the Breckland SPA.

145 The desk study and bird surveys identified no nesting Stone Curlew within 1,500m and no feeding Stone Curlew within 500m of the Application Site.

146 As the evidence indicates that Stone Curlew do not nest or feed on the application site or its surrounding area then noise does not have an adverse impact on this interest feature of the Breckland SPA.

Breckland SPA interest feature Nightjar.

147 The identified threshold for continuous noise to 'mask' communication by birds, based on the evidence presented above, is 55dB LAeq. Such a noise level has been predicted to occur on the edge of the Breckland SPA but fall rapidly to below the background level 40m in to the SPA.

148 The bird surveys identified the nearest Nightjar territory at more than 300m away. The land that is closer, but still within the SPA, is not currently suitable for breeding Nightjar as it is in the middle growth stage of plantation forestry. None of the plantation forest that is closest to the proposed development will be felled within 20 years (Forestry Commission 2009a). Construction will have been completed by then. It is not planned that any of these clear fell areas will become permanent open space (eg heathland) but will be replanted with conifers (Forestry Commission 2009b). This will result in habitat becoming available temporarily for breeding Nightjar that is close to the proposed development during the operational phase. The designed in noise reduction and management measures will mean that these areas will not be subject to significant noise levels.

149 It is concluded that noise generated on the Application Site does not have an adverse impact on Nightjar, an interest feature of the Breckland SPA.

Breckland SPA interest feature Woodlark.

150 The identified threshold for continuous noise to 'mask' communication by birds, based on the evidence presented above, is 55dB LAeq. Such a noise level has been predicted to occur on the edge of the Breckland SPA but fall rapidly to below the background level 40m in to the SPA.

151 The bird surveys identified the nearest Woodlark territory at more than 300m away. The land that is closer, but still within the SPA, is not currently suitable for breeding

Woodlark as it is in the middle growth stage of plantation forestry. None of the plantation forest that is closest to the proposed development will be felled within 20 years (Forestry Commission 2009a). Construction will have been completed by then. It is not planned that any of these clear fell areas will become permanent open space (eg heathland) but will be replanted with conifers (Forestry Commission 2009b). This will result in habitat becoming available temporarily for breeding Woodlark that is close to the proposed development during the operational phase. The designed in noise reduction and management measures will mean that these areas will not be subject to significant noise levels.

- 152 It is concluded that noise generated on the Application Site does not have an adverse impact on Woodlark, an interest feature of the Breckland SPA.

Disturbance to Species from Light Pollution

- 153 During the construction and decommissioning phases lighting will principally be needed when works takes place in the winter and lighting is required to permit working to normal hours during the short winter days. This period is outside the bird breeding season. Details of the design of the on-site lighting, predictions of light levels around the proposed development site during operation and the measures taken to reduce light spill off the site are described in detail in Chapter 15 Lighting.

Construction Phase

- 154 Mitigation of any potential effects of lighting during the construction phase will be achieved through measures in the form of the good working practices described within a Code of Construction Practice or a Construction Environmental Management Plan.

Operational Phase

- 155 Lights around the proposed development site for safe working during darkness and security are mounted at no more than 10m high with the large majority at 5m high. The higher lighting columns are at the south end of the proposed development site where the HGVs arrive. The design layout and luminaire type used seek to minimise light spill off the site by using directional and low level lighting. Sodium lights are used as these have a reduced UV content. This represents significant designed-in mitigation.
- 156 The highest level light is that for aircraft warning mounted on the stack. This is coloured red and is assessed as having no potential to attract insects or deter birds.
- 157 Modelling has been undertaken to predict the light levels across the proposed development site and to predict the amount of light spill beyond the boundary of the site. The modelling has shown that light levels at the boundary of the site average 0

lux around the northern two thirds of the site (1 lux is the light level of a moonlit night) and averaging 0-1 lux around the southern end. The exception is where the access to the site joins the Mundford Road. Here light levels are in the range 4-20 lux.

Breckland SPA interest feature Stone Curlew

- 158 Stone Curlew nest on arable land and semi-natural heathland in the Breckland SPA.
- 159 The desk study and bird surveys identified no nesting Stone Curlew within 1,500m and no feeding Stone Curlew within 500m of the Application Site.
- 160 The modelling shows that light levels more than 500m from the Application Site would be significantly less than 1 lux since it falls to below this level at the Application Site boundary.
- 161 As the evidence indicates that Stone Curlew do not nest or feed on the application site or its surrounding area then light pollution does not have an adverse impact on this interest feature of the Breckland SPA.

Breckland SPA interest feature Nightjar.

- 162 Light spill on to the Breckland SPA to the north and to the west is predicted to be less than 1 lux. Sodium lighting is to be used that has a low UV content and as a result will have minimal potential to attract flying insects, the food supply for Nightjar, from outside of the proposed development site.
- 163 The bird surveys identified the nearest Nightjar territory at more than 300m away. The land that is closer, but still within the SPA, is not currently suitable for breeding Nightjar as it is in the middle growth stage of plantation forestry. None of the plantation forest that is closest to the proposed development will be felled within 20 years (Forestry Commission 2009a). Construction will have been completed by then. It is not planned that any of these clear fell areas will become permanent open space (eg heathland) but will be replanted with conifers (Forestry Commission 2009b). This will result in habitat becoming available temporarily for breeding Nightjar that is close to the proposed development during the operational phase. The designed in light reduction and management measures will mean that these areas will not be subject to significant light levels.
- 164 It is concluded that light generated on the Application Site does not have an adverse impact on Nightjar, an interest feature of the Breckland SPA.

Breckland SPA interest feature Woodlark.

- 165 Light spill on to the Breckland SPA to the north and to the west is predicted to be less than 1 lux. Sodium lighting is to be used that has a low UV content and as a result will have minimal potential to attract flying insects, one component of the food supply

for Woodlark, from outside of the proposed development site. Woodlark take their food from the ground and their diet contains a high proportion of invertebrates that cannot fly such as spiders or larvae such as caterpillars (Snow and Perrins 2004).

- 166 The bird surveys identified the nearest Woodlark territory at more than 300m away. The land that is closer, but still within the SPA, is not currently suitable for breeding Woodlark as it is in the middle growth stage of plantation forestry. None of the plantation forest that is closest to the proposed development will be felled within 20 years (Forestry Commission 2009a). Construction will have been completed by then. It is not planned that any of these clear fell areas will become permanent open space (eg heathland) but will be replanted with conifers (Forestry Commission 2009b). This will result in habitat becoming available temporarily for breeding Woodlark that is close to the proposed development during the operational phase. The designed in light reduction and management measures will mean that these areas will not be subject to significant light levels.
- 167 It is concluded that light generated on the Application Site does not have an adverse impact on Woodlark, an interest feature of the Breckland SPA.

Disturbance to Species from Human Activity and Vehicle Movements

- 168 Vehicles and other plant and machinery used in the construction and operational phases are described in Chapter 3 The Proposed Development and the movement of vehicles to and from the site during construction in Chapter 7 Transport.

Construction Phase

- 169 The peak number of vehicle movements to and from the site during the construction period is predicted to be less than 500 per day and construction will take place over two years. The assessment is made on the basis that a similar number and type of vehicle movements will occur during the decommissioning phase. Associated with the construction and decommissioning will be human activity within the site. That activity which produces noise or light is assessed separately; these paragraphs consider the potential disturbing effect of the movements of vehicles and the presence of people.
- 170 The current daily (weekday) two way traffic flow along the A134 was measured at 10,123 movements. Vehicles involved in the construction phase (HGVs and vans/cars) will temporarily increase this by no more than 500 movements to around 10,600 movements, an increase of less than 5%. Vehicle movements in the decommissioning phase are predicted to be similar to those during construction phase.
- 171 A security fence (3m high welded mesh 'Paladin' fencing) will be installed at the beginning of the construction phase. This will prevent people working on the

construction from walking off site and on to the adjacent habitats where they might cause disturbance. People moving within the site, either on foot or in vehicles, during the construction phase will be visible to adjacent habitats other than after the completion of the landscaping bund on the western side. People in vehicles has been found to be less disturbing to some birds than people on foot or with dogs e.g. Stone Curlew (Taylor *et al.* 2007).

172 Decommissioning will take place within the screening that will have been put in place in the construction phase. This screening includes the bund along the western boundary, the tree belts along the western, southern and eastern boundary and the hedgerows along the northern and eastern boundaries. This planted screening will have had 25 years to establish, grow and, in the case of the hedgerow, have been managed specifically to create a thick, screening structure to a height greater than that of people.

173 Mitigation of any potential effects of people and vehicles moving within the proposed development site during the construction phase will be achieved through measures in the form of the good working practices described within a Traffic Management Plan that will form part of a Code of Construction Practice or a Construction Environmental Management Plan.

Operational Phase

174 The number of vehicle movements (HGVs making fuel deliveries and cars/vans carrying staff) to is predicted to be less than 200 per day. That activity which produces noise or light is assessed separately; these paragraphs consider the potential disturbing effect of the movements of vehicles and the presence of people.

175 Vehicle movements to and from the site will consist of HGV deliveries of the wood and biomass fuel sources, HGV movements to remove ash and staff coming to and from work. Fuel deliveries will be along those routes already agreed for deliveries to the existing Thetford Power Station. The worst case prediction for HGV movements is 170 per day (85 deliveries). The HGV movements will be restricted to 06:00 – 21:00 and spread though the working day. It is expected that two thirds of the HGV movements generated by proposal will use A11, based on them following the pattern of the existing Thetford Power Station. Staff shift patterns will be based on 12 hour shifts that change at 07.00 and 19.00 and as a worst case this will generate 32 vehicle movements per day.

176 A security fence (3m high welded mesh 'Paladin' fencing) will be present throughout the operational phase. This will prevent people working on the Application Site from walking off site and on to the adjacent habitats where they might cause disturbance.

177 People moving within the site, either on foot or in vehicles, during the operational phase will be screened from adjacent habitats by the landscaping bund on the western side and, once it has matured, by the tree screen landscape planting and the hedgerow on the northern boundary.

Breckland SPA interest feature Stone Curlew

178 Stone Curlew nest on arable land and semi-natural heathland in the Breckland SPA.

179 The desk study and bird surveys identified no nesting Stone Curlew within 1,500m and no feeding Stone Curlew within 500m of the Application Site.

180 As the evidence indicates that Stone Curlew do not nest or feed on the application site or its surrounding area then disturbance from human activity and vehicle movements on the Application Site does not have an adverse impact on this interest feature of the Breckland SPA.

181 An assessment of vehicle movements in relation to potential Stone Curlew disturbance is made in relation to vehicle movements will occur across the highway network. Whilst the precise source and long distance route of construction vehicles is not known, on a precautionary basis it has to be assumed that they might pass along trunk roads, and possibly non-trunk roads, that have Stone Curlew nesting nearby.

182 Studies have shown that the presence of regularly used roads, especially trunk roads, has a deterrence effect on Stone Curlew (Green *et al.* 2000), reducing the density of birds nesting close to the route of the road (Sharp *et al.* 2008). It is possible that the effect of roads on Stone Curlew is due to the headlights of vehicles observed at night (Green *et al.* 2000) rather than a noise effect or the sight of vehicles during the day.

Disturbance by Construction Traffic Using the Highway Network

183 Construction will take place between 07.00hrs and 19.00hrs with construction traffic moving to the site in the minutes before or after these times. As a result during the Stone Curlew nesting season the construction traffic will not be moving to and from the site in the hours of darkness and will not contribute to a disturbance effect caused by vehicle lights. It has not been established that there is a cause and effect relationship between vehicle lights and Stone Curlew deterrence and as a result a precautionary approach has been taken and the additional traffic is assumed to contribute to the deterrence effect even if the additional traffic occurs during daylight hours.

184 The recent study and modelling of the relationship between roads and Stone Curlew distribution on the Brecks (Sharp *et al.* 2008) found that the disturbance effect of non-trunk roads (ie the A134), as measured by effects on nesting density in arable land, was considerably less than that along the trunk roads studied (the A11 and A14) with

the reduction in nesting density limited to a zone 500m from the non-trunk road. The effect of trunk roads on nesting density was identified as being to 1,000m and maybe up to 1,500m from the trunk road. The application of the model to predicted increases in traffic has found that a 35% increase in trunk road traffic results in the deterrence of 4.5 pairs of Stone Curlew (Sharp *et al.* 2008) and a 64% increase trunk road in traffic results in the deterrence of 10.6 pairs of Stone Curlew (Jacobs 2009).

185 Vehicle movements along the A11 (Jacobs 2009) have been measured as an average daily traffic flow of 25,840 in 2006 and following the A11 dualling they are predicted to rise to 42,444 movements in 2028, an increase of 16,604 daily vehicle movements (a 64% increase). The modelling undertaken predicted that this number of additional movements would lead, through disturbance, to the loss of 10.6 pairs of Stone Curlew. The additional vehicle movements during the construction phase is an increase of no more than 500 movements and this is a temporary increase that will take place for no more than two breeding seasons. These additional movements, would in proportion to that modelled for the A11, lead to the temporary loss of 0.3 pairs of Stone Curlew for two breeding seasons before construction ceases and the additional traffic levels fall back to that of the operational phase.

186 The temporary displacement, through disturbance by additional construction traffic, of 0.3 pairs of Stone Curlew from the SPA population of 206 pairs (population recorded in 2007) is evaluated as being at a scale that is not sufficient to cause an adverse impact on this interest feature or on the integrity of the Breckland SPA. This is because it is very low in magnitude and occurs at most only over two breeding seasons.

187 Mitigation could be delivered for this temporary disturbance of nesting stone curlew, if it is considered significant enough at the level of 0.3 pairs from a total of 206 pairs (less than 0.15%), by planning the construction such that the peak number of vehicle movements occurs outside of the Stone Curlew breeding season.

Operational Phase

188 Deliveries to the power station will take place between 06:00 – 21:00 hrs and as a result a high proportion of the vehicle movements during the Stone Curlew nesting season will take place in daylight hours and will not contribute to the disturbance effect caused by vehicle lights. It has not been established that there is a cause and effect relationship between vehicle lights and Stone Curlew deterrence and as a result a precautionary approach has been taken and the additional traffic is assumed to contribute to the deterrence effect even if the additional traffic is moving during daylight hours.

189 The additional vehicle movements during the operation phase results an increase of no more than 200 movements. These additional movements, would in proportion to

that modelled for the A11 (detailed above), lead to the loss of 0.1 pairs of Stone Curlew over the lifetime of the facility.

- 190 The displacement, through disturbance by additional traffic, of 0.1 pairs of Stone Curlew from the SPA population of 206 pairs (population recorded in 2007) is a negligible effect and is not evaluated as having an adverse effect on this interest feature of the Breckland SPA.

Breckland SPA interest feature Nightjar.

- 191 Nightjar have been shown to be sensitive to disturbance by people walking across their nesting grounds, especially when accompanied by dogs that are not under close control or on a lead, and this leads to reduced nest density and breeding success (Murison 2002).

- 192 The security fence installed around the Application Site will prevent people working on site accessing the adjacent habitats and as a result disturbance cannot arise from this source.

- 193 Disturbance of Nightjar by people working on the site will not occur and no adverse impact on this interest feature of the Breckland SPA will occur.

Breckland SPA interest feature Woodlark.

- 194 Woodlark have been shown to be sensitive to disturbance by people walking across their nesting grounds, especially when accompanied by dogs that are not under close control or on a lead. This disturbance deters male birds from establishing territories and reduces the density of breeding Woodlark (Mallord *et al.* 2007a and 2007b).

- 195 The security fence installed around the construction site will prevent people working on site accessing the adjacent habitats and as a result disturbance cannot arise from this source.

- 196 Disturbance of woodlark by people working on the site will not occur and no adverse impact on this interest feature of the Breckland SPA will occur.

Summary of the Detailed Assessment of the Proposal Alone

- 197 The result of the detailed assessment that has been carried out is summarised in Table 2 below.

Table 2: The summary of the detailed assessment

Receptor	Potential effect	Interest feature	Adverse effect on integrity?
Breckland SPA	Dust pollution	Stone Curlew Nightjar Woodlark	No No No
Breckland SPA	Air pollution	Stone Curlew Nightjar Woodlark	No No No
Breckland SPA	Disturbance to species from noise	Stone Curlew Nightjar Woodlark	No No No
Breckland SPA	Disturbance to species from light pollution	Stone Curlew Nightjar Woodlark	No No No
Breckland SPA	Disturbance to species from human activity and vehicle movements	Stone Curlew Nightjar Woodlark	No No No
Breckland SAC	Air pollution	Inland dunes Natural eutrophic lakes Dry heaths Dry grasslands	No No No No
Norfolk Valley Fens SAC	Air pollution	Alkaline fens	No
Little Ouse Valley Fens SAC	Air pollution	Molinia meadows Calcareous fen	No No

198 It can be concluded that as there are no adverse effects on the interest features of the European sites then the Proposed Development alone will have no adverse impact on the integrity of the Breckland SPA, Breckland SAC, Norfolk Valley Fens SAC or Little Ouse Valley Fens SAC.

Consideration of the Development Proposal with other Plans and projects

- 199 Three proposed developments are considered for cumulative effects:
- i. A11 Fiveways to Thetford dualling
 - ii. Thetford Growth
 - iii. Feltwell Quarry

A11 Fiveways to Thetford dualling

- 200 The Highways Agency proposal to dual the A11 from the Fiveways Roundabout to Thetford is, at November 2009, being heard at a public inquiry.
- 201 The Highways Agency is proposing to dual the A11 from the Fiveways Roundabout to Thetford, largely on the existing alignment but including a bypass around Elveden village. It is predicted that the dualling of the A11 will result in a 64% increase in traffic flow by 2028 (Jacobs 2009). This prediction includes accounting for the increase in traffic flows expected to arise from developments at Thetford (i.e. it is itself a cumulative assessment).
- 202 The route of the A11 runs through the Breckland SPA and SAC and the widening of the carriage way will result in the direct loss of 35.28ha of the SPA. The increased traffic flows are also predicted to lead, though disturbance, to the displacement of 10.6 nesting territories of Stone Curlew. Natural England and the RSPB have withdrawn their objection to the proposal on the basis that 182 ha of land already within the SPA would have appropriate habitat created/managed on it (described as 'mitigation through habitat creation'). Natural England and the RSPB have agreed that this level of mitigation is sufficient to avoid an adverse effect arising from the scheme.
- 203 The predicted displacement of the Stone Curlew by the dualling of the A11 has to be considered for possible in-combination effects with the short term displacement of Stone Curlew by the construction traffic from the proposed power station. The degree of displacement of Stone Curlew by the A11 is predicted to rise in line with increased traffic flows and as such it will not start to occur until the dualling is complete. It is also proposed and agreed with Natural England and the RSPB that it will be satisfactorily mitigated for by the habitat creation proposals.
- 204 For the reasons that:
- i. The power station construction traffic and the significant increase in traffic on the dualled A11 do not coincide in time, and
 - ii. The effects of the increased traffic flows on the A11 will be removed by mitigation
- 205 It is concluded that there will be no cumulative effect between the two proposals.

Thetford Growth

- 206 The East of England Plan requires that 6,000 new homes be provided at Thetford over the period 2001 – 2021. This is reflected in the emerging Breckland Council Core Strategy and Development Control Policies DPD.

- 207 The East of England Plan requires the facilitation of 30-40ha (74-99 acres) of strategic employment land and provision for development that will deliver 5,000 net additional jobs by 2021. This is also reflected in the Breckland Council adopted Core Strategy and Development Control Policies DPD. It is assumed that a significant proportion of this will be delivered by the Thetford Enterprise Park that has already been granted permission.
- 208 The increase in traffic flows that this level of development will create along the A11 have already been accounted for in the assessment of effects the A11 dualling on Stone Curlew and mitigation already agreed.
- 209 The emerging Breckland Council Core Strategy and Development Control Policies DPD has undergone the Habitats Regulations Assessment process and as a result modifications were made prior to adoption to ensure that the proposals it contained did not result in an adverse effect on the integrity of the Breckland SPA or SAC.
- 210 For the reasons that:
- vi. The Thetford Growth proposals have been subject to assessment and no adverse effect on the integrity of the Breckland SPA or SAC identified, and
 - vii. The effects of the increased traffic flows on the A11 resulting from this growth will be removed by mitigation
- 211 It is concluded that there will be no cumulative effect between the two proposals.

Feltwell Quarry

- 212 An application has been submitted for an extension to Feltwell Quarry, Methwold Warren, accompanied by an Environmental Statement. It is currently understood that Natural England consider that it has an adverse effect on the Breckland SPA (Woodlark were identified holding territory close by) particularly due to noise and that mitigation measures are currently being discussed.
- 213 The proposed power station is not close to Feltwell Quarry (the quarry is located approximately 13 km to the north west of the proposed development) and as a result any noise impacts that are produced by quarrying will not act in-combination with the construction, operation or decommissioning of the proposed power station.
- 214 The assessment of the proposed power station has not identified any impacts on Woodlark and as a result it does not produce any effect that could act cumulatively with the proposed quarry extension.
- 215 For the reasons that:
- i. The distance between the proposals excludes the possibility of any noise from the sites acting in-combination, and

ii. The proposed power station has no impact on Woodlark

216 It is concluded that there will be no cumulative effect between the two proposals.

Stage 3: Consideration of Further Mitigation Measures

217 No adverse effects on the integrity of any of the interest features of the European sites have been identified. As a result there is no need to consider further mitigation measures.

218 Considerable efforts have already been made to avoid adverse impacts during the planning and design of this proposed development and considerable efforts have also been made to 'design in' mitigation wherever possible.

219 This designed in mitigation includes choosing a site that was in intensive agricultural use and hence of low ecological value, having many processes conducted within buildings to minimise dust and noise impacts, a lighting design to minimise light spill off-site, no discharges to groundwater or local watercourses and screening of the site with a bund, tree and hedge planting.

220 Further provision for ensuring mitigation is delivered will be through measures included in the good working practices described within a Code of Construction Practice or a Construction Environmental Management Plan.

221 An adverse impact has been identified that was not evaluated as sufficiently large to be an adverse impact that would affect the integrity of a European site. This was the temporary impact during the construction phase on Stone Curlew, an interest feature of the Breckland SPA. It has been predicted that there will temporary disturbance of nesting Stone Curlew that results from the peak of construction traffic movements. The predicted level of disturbance, using an established model, is at the level of 0.3 pairs from a total of 206 pairs (less than 0.15% of the population). It is considered that this level of disturbance, that will be for no more than parts of two breeding seasons, is below the level that will cause an adverse effect on the integrity of the Breckland SPA but that it does merit discussion with Natural England. This is to agree whether or not it is significant enough to warrant further mitigation as a non-significant impact. Further mitigation would be by planning the construction such that the peak number of vehicle movements would take place outside of the Stone Curlew breeding season.

Conclusion

222 This assessment has been carried out in line with guidance published by the UK Government and the European Commission and in accordance with relevant legislation. It also takes account of the response from Norfolk County Council and

Natural England to a scoping request on the Report to Inform the Appropriate Assessment.

- 223 This Report to Inform the Appropriate Assessment has assessed and identified the potential effects of the Proposed Development during the construction, operational and decommissioning phases. This assessment has been against the project proposal that incorporates a range of mitigation measures that have already been 'designed in' and result from experience of similar developments and the evidence base gathered on the potential impact on ecological interests.
- 224 Baseline data have been collated through desk study and specific surveys. The European Sites that were identified for detailed assessment were the Breckland SAC, the Norfolk Valley Fens SAC, the Waveney and Little Ouse Valley Fens SAC and the Breckland SPA.
- 225 The assessment identified no significant adverse effects on the interest features of the relevant European Sites during the construction, operational or decommissioning phases. This conclusion was made based on the inclusion of the 'designed in' mitigation measures and actions taken to ensure compliance with protected species legislation.
- 226 The Proposed Development of a combined heat and power station north of Thetford, considered alone and in-combination with other plans and projects will have no adverse impact on the integrity of the Breckland SAC, the Norfolk Valley Fens SAC, the Waveney and Little Ouse Valley Fens SAC and the Breckland SPA.

References

- Bowden, C.G.R. (1990). Selection of Foraging Habitats by Woodlarks (*Lullula arborea*) Nesting in Pine Plantations. *Journal of Applied Ecology* 27: 410-419.
- Bowden, C.G.R. and Green, R.E. (1991). *The ecology of nightjars on pine plantations in Thetford Forest*. Unpublished RSPB report. RSPB, Sandy.
- Brumm, H. (2004). The impact of environmental noise on song amplitude in a territorial bird. *Journal of Animal Ecology* 73: 434-440.
- English Nature. (1997). *Habitats Regulations Guidance Note (HRGN1): The Appropriate Assessment (Regulation 48), the Conservation (Natural Habitats &c) Regulations, 1994*. English Nature, Peterborough.
- Environment Agency (2003) *Integrated Pollution Prevention and Control (IPPC) - Environmental Assessment and Appraisal of BAT. Horizontal Guidance Note IPPC H1*. Environment Agency, Bristol.

- European Commission (2000). *Managing Natura 2000 Sites. The provisions of Article 6 of the 'Habitats' Directive 92/43/EEC*. Office for Official Publications of the European Communities, Luxembourg.
- European Commission (2002). *Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites. Methodological Guidance on the Provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC*. Office for Official Publications of the European Communities, Luxembourg.
- Forestry Commission (2009a). *East Anglia Forestry District Management Map*. Forestry Commission, Santon Downham.
- Forestry Commission (2009b). *East Anglia Forestry District Habitat and Species Map*. Forestry Commission, Santon Downham.
- Fuller, R.A., Warren, P.H. and Gaston K.J. (2007). Daytime noise predicts nocturnal singing in urban robins. *Biol. Lett.* 3: 368–370.
- Green, R.E., Tyler, G.A., and Bowden, C.G.R. (2000). Habitat selection, ranging behaviour and diet of the stone curlew (*Burhinus oedicephalus*) in southern England. *Journal of Zoology* 250: 161-183.
- Habib, L., Bayne, E.M. and Boutin, S. (2007). Chronic industrial noise affects pairing success and age structure of ovenbirds *Seiurus aurocapilla*. *Journal of Applied Ecology* 44: 176-184.
- Hirvonen, H. (2001). Impacts of highway construction and traffic on wetland bird community. IN: Proceedings of the 2001 International Conference on Ecology and Transportation, Eds. Irwin, C.L., Garrett, P., McDermott, K.P. Center for Transportation and the Environment, North Carolina State University, Raleigh, NC 369-372.
- Jacobs (2009). *A11 Fiveways to Thetford: Statement to inform the appropriate assessment for Breckland Special Protection Area*. Jacobs Engineering UK Ltd, Reading.
- Mallord, J.W., Dolman, P.M., Brown, A. and Sutherland, W.J. (2007a). Quantifying density dependence in a bird population using human disturbance. *Oecologia* 153: 49–56.
- Mallord, J.W., Dolman, P.M., Brown, A.F. and Sutherland, W.J. (2007b). Linking recreational disturbance to population size in a ground-nesting passerine. *Journal of Applied Ecology* 44: 185–195.
- Murison, G. (2002). *The impact of human disturbance on the breeding success of nightjar *Caprimulgus europaeus* on heathlands in south Dorset, England*. English Nature Research Report 483. English Nature, Peterborough.
- ODPM. (2005a). *Planning Policy Statement 9: Biodiversity and Geological Conservation*. ODPM, London.
- ODPM. (2005b). *Biodiversity and Geological Conservation - Statutory Obligations and their Impact within the Planning System*. ODPM, London.

- Patricelli, G.L. and Blickley J.L. (2006). Avian communication in urban noise: causes and consequences of vocal adjustment. *The Auk* 123: 639-649.
- Peris, S.J. and Pescador, M. (2004). Effects of traffic noise on passerine populations in Mediterranean wooded pastures. *Applied Acoustics* 4: 357-366.
- Reijnen, R., Foppen, R., Ter Braak, C. and Thissen, J. (1995). The effects of car traffic on breeding bird populations in woodland. III. Reduction of density in relation to proximity of main roads. *Journal of Applied Ecology* 32: 187-202.
- Reijnen, R., Foppen, R. and Meeuwsen, H. (1996). The effects of traffic on the density of breeding birds in Dutch agricultural grasslands. *Biological Conservation* 75: 255-260.
- Rheindt, F.E. 2003. The impact of roads on birds: Does song frequency play a role in determining susceptibility to noise pollution? *Journal of Ornithology* 144: 295-306.
- Ryals, B.M., Dooling, R.J., Westbrook, E., Dent, M.L., MacKenzie, A. and Larsen, O.N. (1999). Avian species differences in susceptibility to noise exposure. *Hearing Research* 131: 71-88.
- Sharp, J., Clarke, R.T., Liley, D. and Green, R.E. (2008). *The effect of housing development and roads on the distribution of stone curlews in the Brecks*. Footprint Ecology, Wareham, Dorset.
- Slabbekoorn, H and Peet, M. 2003. Birds sing at a higher pitch in urban noise: Great Tits hit the high notes to ensure that their mating calls are heard above the city's din. *Nature* 424: 267.
- Snow, D. and Perrins, C. (Eds.) (2004). *Birds of the Western Palearctic interactive*. BirdGuides Ltd and Oxford University Press.
- Taylor, E.C., Green, R.E. and Perrins, J. (2007). Stone-curlews *Burhinus oedicnemus* and recreational disturbance: developing a management tool for access. In Proceedings of the BOU Conference 2006: Birds and Recreational Disturbance. *Ibis* 149(s1): 37-44.
- Wood, W.E. and Yezerinac, S.M. (2006). Song Sparrow (*Melospiza melodia*) song varies with urban noise. *The Auk* 123: 650-659.
- Wright, L.J., Hoblyn, R.A., Sutherland, W.J and Dolman, P.M. (2007) Reproductive success of Woodlarks *Lullula arborea* in traditional and recently colonized habitats. *Bird Study* 54: 315-323.
- Young, E. (2008). Wing tones. *New Scientist* 29th March 2008.