British Energy Group PLC

Sizewell

First Interim Bird Report

February 2008

Entec UK Limited

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Report for

Christine Blythe,
British Energy Group Plc
Barnett Way
Barnwood
Gloucester
GL4 3RS

Main Contributors

Owain Gabb

Issued by

[redacted]

Owain Gabb

Approved by

[redacted]

Hugh Watson

Entec UK Limited

Pacific House
Imperial Way
Reading RG2 0TD
England
Tel: +44 (0) 1183 775600
Fax: +44 (0) 1183 775610

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1. Introduction

1.1 Purpose of this Report

British Energy (BE) is at the early stages of investigating the feasibility of building new nuclear power stations at a range of sites within their UK land holding. Sizewell has been identified as one potential site for investigation and likely progression to EIA. Entec UK Ltd have been appointed as BE's ecological consultants to lead and co-ordinate the baseline ornithological and terrestrial ecological work and assessment for Sizewell. An Ecological Scoping Report (Entec doc ref 19801cr050), detailing the desk study exercise and survey work to be undertaken at Sizewell between April 2007 and March 2008 has previously been produced and circulated to consultees.

This report summarises the first phase of ornithological work at Sizewell, the breeding bird surveys undertaken on the BE Estate between April and July 2007 inclusive. The results of intertidal and inshore marine surveys covering the late spring passage, summer and early return passage period have also been included. It is intended to issue this report to consultees for comment, and as such, any observations on the adequacy of work undertaken to date, and any recommendations with regard to further work required in 2008 to form the baseline for an EIA would be welcomed. BE is keen to develop appropriate ornithological mitigation and compensation measures through discussion with consultees, and while these will be easier to define once more information about the design of the proposed build becomes available, any initial recommendations based on the findings of this report would be very useful.

It should be noted that this report contains information relating to the nest locations of highly protected species. As such, it should be treated as **confidential** and should not enter the public domain.

1.2 Scheme Description

An area of land directly north of the Sizewell 'A' and 'B' Power Stations has been identified as having the potential to accommodate nuclear new build. This area, which covers 0.32km^2/32ha and has an approximate central grid reference of TM473640, is referred to in this document as 'the preliminary works area.' A boundary, including an indicative access road and construction compound (accounting for a potential further 0.35km^2/35ha of land take) is shown in **Figure 1.1**. It should be noted that this initial development footprint is purely indicative, as environmental, landscape and visual, hydrological and other constraints have not yet been considered and taken into account. These would all be addressed as a matter of course as part of an EIA.

No detailed information on the exact nature of the proposed nuclear power station can be provided at this stage, but it is assumed for the present that the power station would be water-cooled and that there would be a requirement for additional works associated with this in the sub-tidal zone. The range of development activities that could potentially affect biodiversity interests are typical of those associated with the construction, operation and decommissioning of

any large industrial structure, albeit one that it is likely to remain in place for an extended period of time.

1.3 Preliminary Works Area Description and Context

The preliminary works area comprises open sheep grazed pasture, fringed by reinstated coastal dune vegetation parts of which have been planted with trees and scrub. The hydrology and pedology of the preliminary works area were irreversibly altered as a result of works associated with the building of the Sizewell 'A' and 'B' Stations (adjacent to its southern boundary), and as a result it has lost much of its botanical merit. Habitats adjoining or in close proximity to the preliminary works area are of considerable ecological interest however. These include wet meadows (and associated wetland habitats and ditch systems), dune systems, shingle plant communities and wet semi-natural woodland. The quality of the shingle, grazing marsh and associated wetland habitats have led to substantial areas of these in close proximity to the preliminary works area being designated for their ecological interest.

The entire BE land holding at Sizewell, including the preliminary works area and the Sizewell 'B' Station (which occupies 0.36km^2/36ha) extends to approximately 6.69km^2/669ha. The dominant habitats are arable farmland and woodland/scrub, with each accounting for approximately 30% of the land area. A considerable area of coniferous and mixed woodland is present around Goose and Kenton Hills, and there are scattered blocks and linear belts of semi-natural deciduous woodland throughout. Grazing marsh and heathland/acid grassland are also well represented, with both habitats covering approximately 10% of the land holding, while fen/reedbed, foreshore and pasture each cover approximately 3% of the land within the estate. Two working farms and eight domestic properties are also present.

1.4 Background and Scope

The key potential ornithological issues relating to the development are:

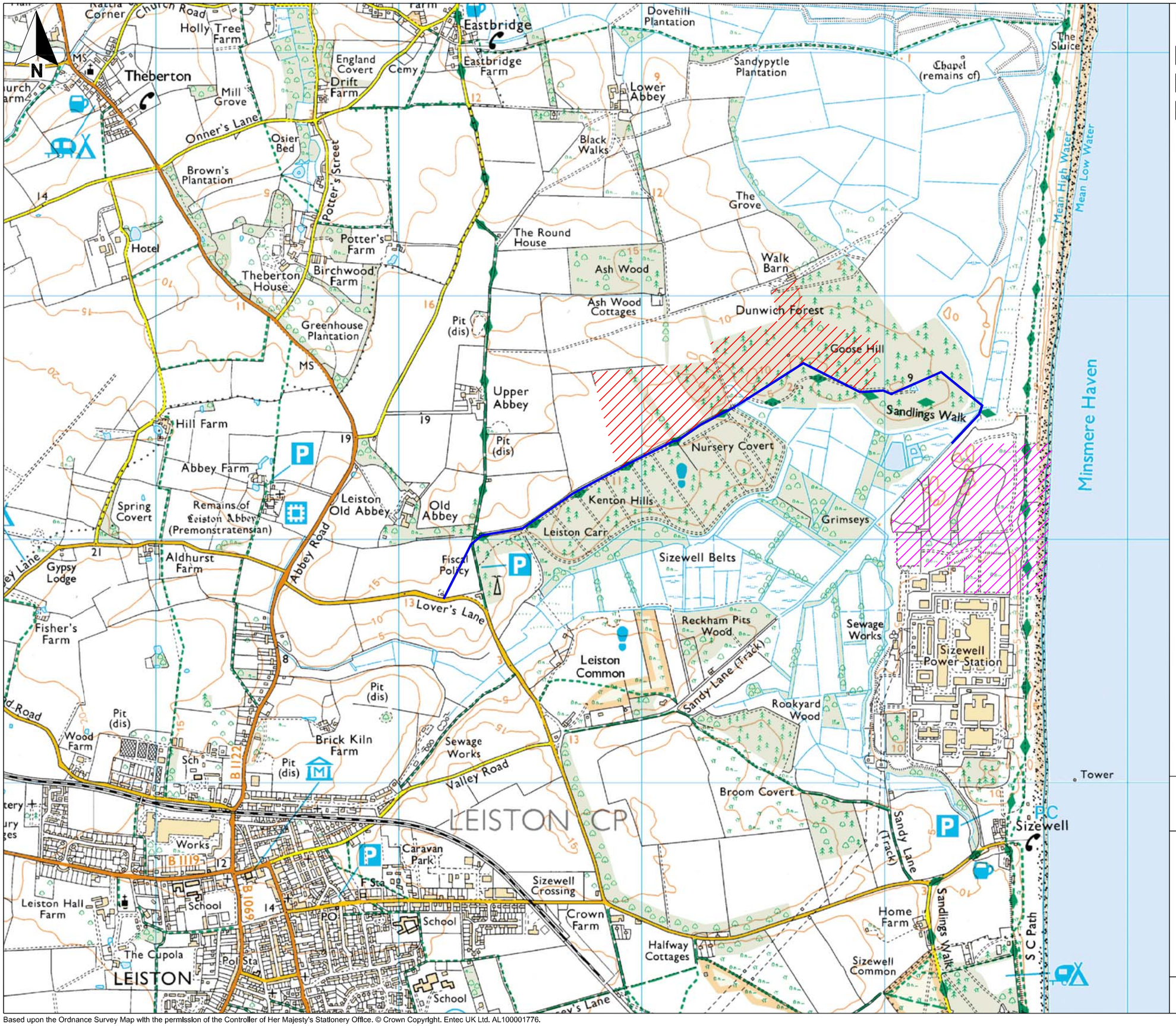
- The effects of direct habitat loss due to land take by the proposed power station, the access road and construction compounds;
- The effects of indirect habitat loss, i.e. the displacement of birds from the proximity of the proposed power and associated infrastructure as a result of disturbance. Such disturbance may occur as a consequence of construction work, or due to the presence of the power station or associated infrastructure close to nesting or feeding sites or on habitual flight routes;
- The fragmentation of habitat and the potential barrier to movement that would occur, particularly as a result of the construction of a new access road;
- Related to the three points above, the potential for effects on species that form the cited interest of European and nationally designated sites as a result of the proposed development.

There is no guidance available that details or discusses appropriate ornithological survey work for new nuclear power station proposals. Therefore, the bird survey programme for Sizewell

was developed following a considerable desk study exercise. The potential for species protected under Schedule 1 of the Wildlife & Countryside Act 1981 (as amended)[1] and / or listed under Annex 1 of the EC Directive on the Conservation of Wild Birds (79/409/EEC), commonly referred to as the Birds Directive[2] to occur within the survey area was the subject of specific investigation. As a result of the desk study, a survey programme incorporating a range of generic and species specific surveys was instigated.

[1] All species of wild birds are afforded some degree of protection under the Wildlife and Countryside Act 1981, though some species that are considered to be rare or vulnerable, which are listed on Schedule 1 of the Act, are afforded additional protection.

[2] Certain endangered, rare, or vulnerable bird species, which warrant special protection, are included on Annex 1 of the European Communities Council Directive on the Conservation of Wild Birds (79/409/EEC).



Key

- Preliminary works area
- Indicative construction compounds
- Indicative access road

0 m — 750 m

Scale 1:15,000 @ A3

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Figure 1.1
Preliminary Works Area (including indicative construction compounds and access road)

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2. Methodology

2.1 Desk Study

To understand the ornithological context of the preliminary works area, the locations and qualifying features of Special Protection Areas (SPAs) and Sites of Special Scientific Interest (SSSIs) within 5km of the preliminary works area were determined through the use of the website www.magic.gov.uk and other published sources. There are no established criteria with regard to the distance from a development site that a search should cover, and 2km has been suggested as a sufficient distance in the past (IEA, 1995). Due to the known ornithological interest of the Sizewell area, however, this search area was extended to 5km for European and nationally important sites. The ornithological interest of non-statutory designated sites within 3km of the proposed new build and associated infrastructure were also considered. The positions of these designations in relation to the preliminary works area are shown on **Figures 2.1a&b**. The English Nature Report on the Suffolk Coast and Heaths Natural Area (English Nature, 1997) was also referenced to gain insight into the ecological context of the site and adjoining habitats from a wider perspective.

A considerable amount of baseline ecological survey work has been conducted on the BE Estate at Sizewell during the past twenty-five years. This has been undertaken by a range of organisations including Suffolk Wildlife Trust (SWT) ecological consultants (commissioned by Nuclear Electric and latterly by BE), the Environment Agency, universities and colleges, special interest groups and individuals. This information was made available to Entec by British Energy to assist the design of the ornithological survey programme. Additional data from survey work commissioned by Magnox in association with the decommissioning of Sizewell 'A,' and species records held by the Suffolk Biological Records Centre (SBRC) were also used to inform the work. Data requests to the British Trust for Ornithology (BTO) and Suffolk Ornithologists Group (SOG) will follow the release of this document as the initial ecological scoping phase has now been completed[3].

In addition to this information, a number of further primary sources of data were identified and used to inform the work. These include:

- The results of annual breeding and wintering bird surveys conducted by the Suffolk Wildlife Trust on parts of the BE Estate (summarised in the annual land management review);
- Birds of Suffolk (Piotrowski, 2003);
- Suffolk Birds 2005 – the county bird report (Wright, M [Ed], 2006);
- Birds in England (Brown, A. & Grice, P, 2005);

[3] The initial scoping phase concluded with a meeting with RSPB on 24 September 2007. Prior to this there were meetings with Natural England, Suffolk County Council (attended by the County Ecologist), and the Suffolk Wildlife Trust.

- The New Atlas of Breeding Birds of Britain and Ireland (Gibbons *et al*., 1993).

2.2 Breeding Bird Surveys

The key objective of the bird surveys undertaken at Sizewell during the 2007 breeding season was to establish a suitable baseline for the evaluation of the potential effects of a new nuclear power station and associated infrastructure on the bird community present. Breeding, feeding and commuting birds were considered during the work. With regard to species of high nature conservation importance, where contemporary data indicating population size or distribution was not available, their occurrence was investigated (where this could not be established through generic survey) through species specific work. The numbers and diversity of bird species using the intertidal zone and inshore waters adjacent to the proposed new build and the existing power stations was also investigated through surveys conducted twice a month from two locations. The methods used are outlined below.

2.2.1 Territory Mapping

Territory mapping surveys based on the BTO's Common Bird Census (CBC) methodology were carried out in all areas within 1km of the proposed new build area and associated infrastructure (excluding the built nuclear plant, the gardens and driveways of domestic properties and associated farm buildings, and the edge of the village of Leiston). Surveys therefore covered approximately 9km^2. Much of this land (6.72km^2) is under British Energy ownership[4], and unrestricted access was therefore possible. Within the BE Estate, transects no further than 50m apart were walked across all open habitats, while all field boundaries, the edge of the small reedbed and the edge of the small belts of semi-natural woodland were also walked. In the coniferous plantation, all rides / firebreaks and tracks were walked, and all birds visible / audible from them were recorded. In those areas within 1km of the preliminary works area, but outside BE's land ownership and where access could not be secured, footpaths, roads and tracks were walked and all birds that were apparent were recorded. While these peripheral areas are relatively well served by footpaths, it is clear that breeding densities cannot be reliably derived from them. To ensure that disturbance was kept to a minimum on RSPB land (in the north-eastern part of the survey area), it was agreed that data would be provided by RSPB staff undertaking their usual annual surveys, on the understanding that BE and RSPB would exchange data following the survey season (Adam Rowlands, pers comm.). The survey area for the territory mapping work, and the BE Estate boundary are shown on **Figure 2.2**.

While eight to ten visits are the norm for CBC sites being monitored over the long-term, where territory mapping is being used for the purpose of assessing potential environmental impacts it is generally accepted that three to four visits are sufficient to determine the numbers and densities of breeding birds with reasonable accuracy. Four survey visits were therefore undertaken at Sizewell, with two surveyors working together to complete each visit. Due to the size of the area surveyed it took a minimum of ten survey days to complete each survey visit. The dates on which surveys were conducted were as follows:

- 10 – 15 April

[4] BE is responsible for the management of the Estate, which is undertaken in partnership with SWT.

- 2, 3, 6, 8 & 12 May
- 5 & 15 – 18 June
- 6 – 8 & 21 – 22 July

Supplementary records of birds recorded outside timed surveys and during species-specific work were also used when compiling the final territory maps, along with information supplied by the Suffolk Wildlife Trust (who are responsible for the management of the BE Estate for conservation and conduct annual bird surveys).

2.2.2 Dabbling Duck Survey

In addition to the territory mapping survey, which covered all areas of wet meadow, ditch and reedbed (and recorded some waterfowl as a result); specific surveys focussed on locating breeding dabbling ducks[5] were undertaken in accordance with the guidelines outlined in Gilbert *et al* (1998). The edges of all ditches and the reedbed within the Sizewell Belts were walked by two surveyors between dawn and 10am. Surveys were undertaken on three dates:

- 16 April
- 6 May
- 14 June

The age and sex of all wildfowl (where apparent) was recorded, and appropriate notes were made with regard to activity. Reedbed passerines and other breeding species were also noted, and the results used to inform the territory mapping survey. The survey area for the dabbling duck surveys is shown on **Figure 2.3**.

2.2.3 Hobby Survey

Hobby is thought to nest annually within the mature plantation in Dunwich Forest, as early season territorial behaviour and fledged young have been frequently recorded by SWT in this area. The precise location of the nest site may vary, as birds appropriate the nests of Corvids or the dreys of squirrels rather than building their own, and the afforested area is managed for a mix of purposes including landscape and commercial aims[6], meaning that some potential nest sites will be occasionally lost due to forestry works. Hobby does not require extensive areas of mature woodland for nesting (e.g. Hardey *et al.*, 2006) and on this basis there was potential for nesting to occur elsewhere in the BE Estate, although there were no previous records to support this. Specific survey work was therefore instigated in an attempt to establish breeding locations. Particular emphasis was placed on Dunwich Forest during the survey work both due to the likelihood that hobby nests in this area and as it is likely, due to the intention to avoid designated sites of nature conservation importance, that the preferred route of any access road

[5] The breeding bird assemblage was considered to be of national significance at the time of designation. Duck species present included shoveler, gadwall and teal. In addition, the areas of wet grassland supported breeding snipe and lapwing.

[6] The main objective of management of the plantations is to meet the Sizewell B planning conditions and undertakings. It is also managed for timber production, biodiversity, access and amenity. Therefore there is an integrated approach to the management of the plantation, taking into account this range of objectives.

will be through this area, and that some parts of the plantation may also be lost to construction compounds (which would adjoin the proposed access). Currently the design of the power station and associated infrastructure is at the preliminary stage.

A range of survey work was undertaken to establish territory locations. During the initial territory mapping survey, conducted between 10 and 15 April, the upper branches of trees were scanned to establish the positions of existing nests that could be used by hobbies. Subsequent to this, a number of suitable vantage-points were selected overlooking the plantation at Dunwich Forest to watch for early season flight activity that would indicate territory occupancy. During these initial surveys, any hobby flights observed were mapped and behaviour noted. Two surveyors conducted the work. Each watch lasted for a minimum of thirty minutes, at which point, if no hobby activity had been recorded, or if hobby activity was reported elsewhere by the other surveyor, a new location was chosen. Two surveyors working independently, but communicating their sightings to each other, enabled appropriate vantage-points to be chosen in response to observed activity.

Surveys were repeated in early-mid August, concentrating on areas where hobby activity had been observed during the previous three months and during the initial hobby surveys: i.e. Dunwich Forest, Broom Covert and Ash Wood. Hobby young become increasingly active and vocal in the 10 days before they leave the nest (Hardey *et al*., 2006), which occurs around mid August (Brown & Grice, 2005). Local vantage-points providing good views of these areas were again used to map flight lines, and all behavioural activity was noted.

Surveys were therefore conducted on eight 'man days': 5 May, 14 May (two surveyors on both days), 4, 5, 8 & 9 August (one surveyor on each day), with a minimum of six hours of survey per day. The interpretation of results was aided by observations made during the territory mapping surveys and made incidentally, outside formal survey work.

2.2.4 Nightjar Survey

There is no recorded history of nightjar occurring, as a breeding species, within the BE Estate at Sizewell. There is a limited extent of habitat potentially capable of supporting the species, however, particularly areas of young plantation within Dunwich Forest and (possibly) some discrete areas of lowland heath around Broom Covert and Retsoms[7]. To investigate whether nightjars were present at Sizewell, two nocturnal surveys were undertaken following methodology outlined in Gilbert (1998). Surveys took place on 8 and 10 July, with two surveyors working in tandem. Transects were walked across Broom Covert, through Walk Barns, along the northern and north-eastern edge of Dunwich Forest (along the edge of Retsoms), within the area of young plantation within Dunwich Forest and around the entire perimeter of Kenton Hills. Frequent stops were made to listen for 'churring' and other vocalisations. All bird species seen or heard were recorded on field maps. Areas covered during the surveys are indicated on **Figure 2.4**.

[7] Retsoms is the field adjacent to the north-eastern boundary of Dunwich Forest / Goose Hills. This area is currently under reversion from arable farmland to heathland. Experimental plots in the western part of the field that have been treated with sulphur and spread with heather litter are slowly developing towards a heather dominated community, while in other parts of the field (where sulphur has not been applied) a dry maritime grassland has developed.

2.2.5 Intertidal and Inshore Marine Survey

In order that any potential disturbance effects resulting from the new build on birds using the intertidal areas and inshore marine waters adjacent to the proposed new build area could be evaluated, surveys were undertaken on a bi-monthly basis between April and July inclusive. Two locations were used: TM47633 64587 (Location 1) and TM47612 63379 (Location 2). These locations, and the areas surveyed from them are shown on **Figure 2.5**. The former location enabled observation of activity in the grid square adjacent to the proposed new build area, while the latter enabled observation of activity in the grid square adjacent to the existing power stations and took in the warm water outfall and associated towers. All waders, wildfowl and seabirds flying over the intertidal area and the inshore waters up to 300m offshore were recorded[8]. Numbers and apparent behaviour of all species was noted.

The aim of the surveys was to record the diversity, activity of species and differences in use of the intertidal and inshore marine waters by birds between the two grid squares (TM4764 and TM4763) in order that the importance of the existing power station outfall as a foraging resource could be quantified. The surveys also allowed investigation of whether birds commuting parallel to the shore or over the intertidal showed any reaction to the built power station and enabled an assessment of the likely value of the southern grid square to terns and black-headed gulls breeding at Minsmere to be made.

During each survey day, survey work commenced close to high or low water and was conducted over six full hours, so that any changes or patterns in bird distribution across the tidal cycle could be identified[9]. During each hour of survey the intertidal area and inshore waters within each grid square was scanned using binoculars for 45 minutes and all species present or commuting through were recorded[10]. There was then a fifteen minute break in survey, to allow the surveyors to rest their eyes and to regain focus before the next timed survey commenced. Six 45 minute surveys were completed during each survey day, resulting in a total of 18 hours of survey per month and 72 hours of survey (36 per point) over the season. Times, dates and weather conditions during surveys are shown in **Table 2.1** below.

[8] 300m offshore was selected as the maximum threshold for recording on the basis that all relevant bird species within 300m were generally identifiable at this distance in normal sea states and weather conditions, and accurate counts could be made. It is also apparent that any disturbance effects are most likely to affect birds occurring in relatively close proximity to the proposed power station. Taking into account the width of the shoreline, it is likely that a bird flying at 300m offshore would be more than 450m from the proposed new build footprint (assuming the distance above mean high water of the proposed new build is ultimately similar to the built plant).

[9] It is recognised that at Sizewell there is relatively little tidal range, so it was not assumed that there would necessarily be detectable patterns in bird distribution in the inshore waters as a result of changes in the state of tide.

[10] Surveyors used telescopes to confirm identity and activity of birds as necessary. High quality rangefinders were used by both surveyors throughout the season to improve their distance estimation, although these were not generally of use in estimating the distance of individual birds on the sea (due to the more reflective nature of the water than the bird often preventing a confident estimate of distance).

Table 2.1 Dates and Times of Intertidal and Inshore Marine Surveys

Location	Date	Survey Commenced	Wind Direction	Wind Speed
1	12/04/07	11:30	NE	2-3
2	12/04/07	11:25	NE	2-3
1	15/04/07	12:25	N-NE	1
2	15/04/07	12:25	N-NE	2
1	04/05/07	07:30	N-NNE	3
2	04/05/07	07:30	N-NNE	3
1	13/05/07	08:30	SE	2
2	13/05/07	08:30	SE	2
1	04/06/07	08:40	N	2
2	04/06/07	08:45	N	2
1	17/06/07	10:35	W-SW	2-3
2	17/06/07	10:10	W-SW	2
1	09/07/07	12:10	SW	1
2	09/07/07	12:10	SW	2-3
1	17/07/07	11:30	SE	4-5
2	23/07/07	09:55	ESE	3

Key

- 5km perimeter area around preliminary works area
- Preliminary works area
- Sites of Special Scientific Interest
  1. Minsmere to Walberswick Heaths and Marshes
  2. Sizewell Marshes
  3. Leiston Aldeburgh
- Special Areas of Conservation
  1. Minsmere to Walberswick Heaths and Marshes
- Special Protection Areas
  1. Minsmere to Walberswick Heaths and Marshes
  3. Sandlings
- Ramsar
  1. Minsmere to Walberswick Heaths and Marshes

0 km — 2 km

Scale 1:35,000 @ A3

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Figure 2.1a
Statutory Designated Sites within 5km of the preliminary works area

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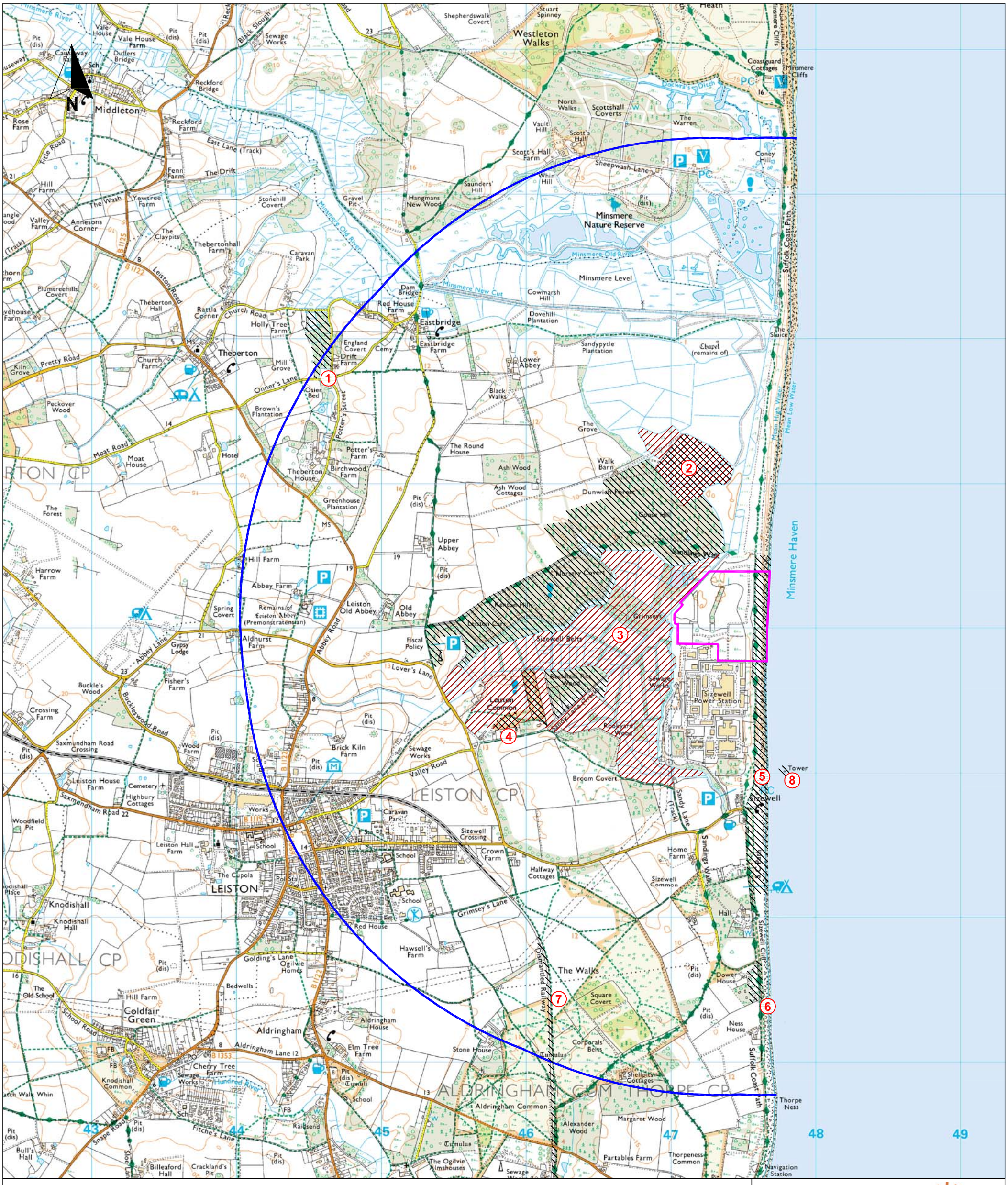

Key

- Preliminary works area
- 3km perimeter area around preliminary works area
- County Wildlife Site
- Suffolk Wildlife Trust Reserve
- (2) Sites

1. Minsmere Valley
2. Southern Minsmere Levels
3. Sizewell Levels and associated areas
4. Leiston Common
5. Suffolk shingle beaches
6. Dower House
7. Disused railway line (Aldringham - Aldeburgh)
8. Sizewell Rigs

0 km — 1.5 km

Scale 1:25,000 @ A3

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Figure 2.1b
Non-statutory designated sites within 3km of the preliminary works area

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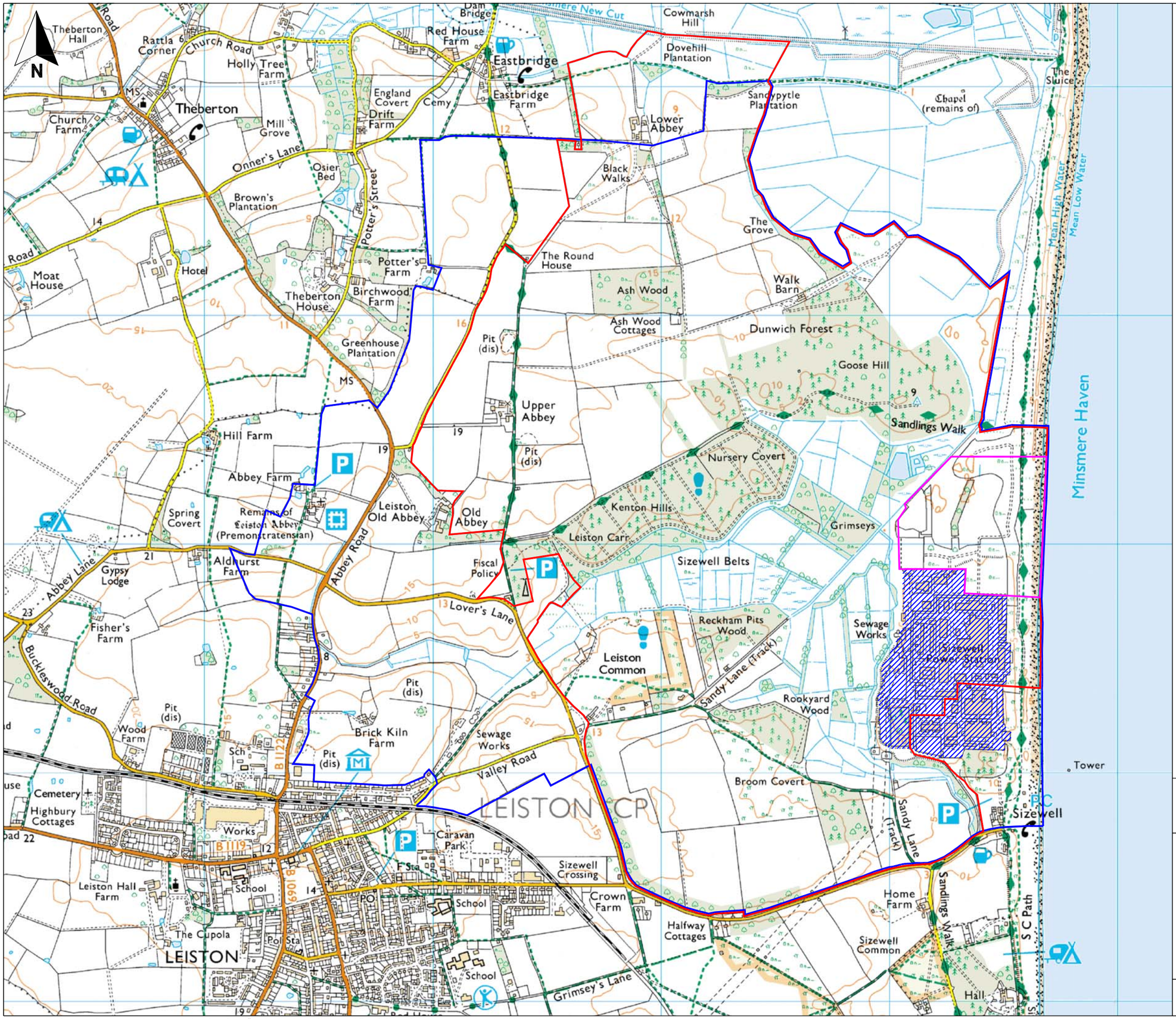

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Figure 2.2
Territory Mapping Survey Area and BE Estate Boundary

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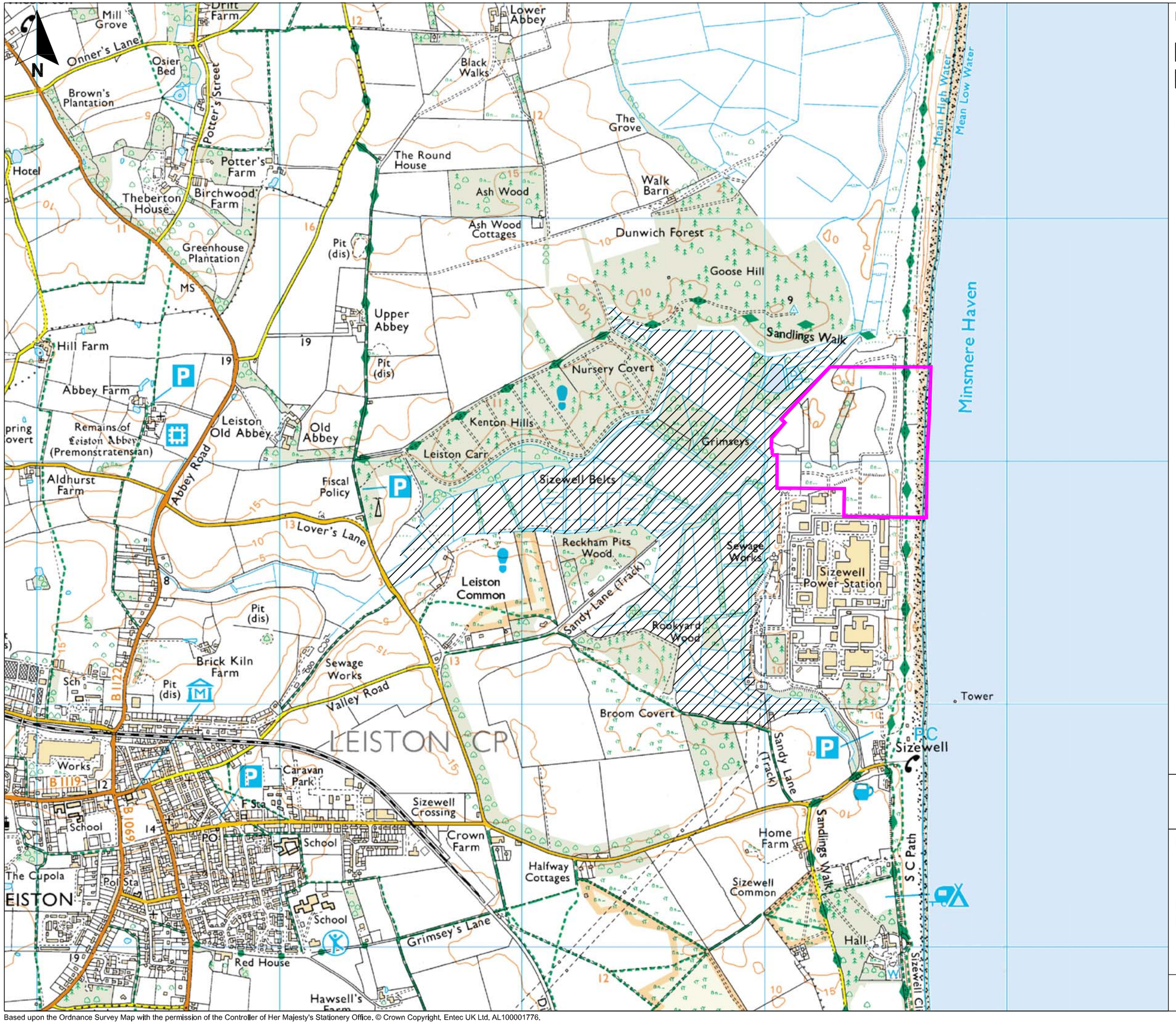

Key

- Preliminary works area
- Area surveyed for dabbling ducks

0 m — 750 m

Scale 1:15,000 @ A3

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Figure 2.3
Dabbling Duck Survey Area

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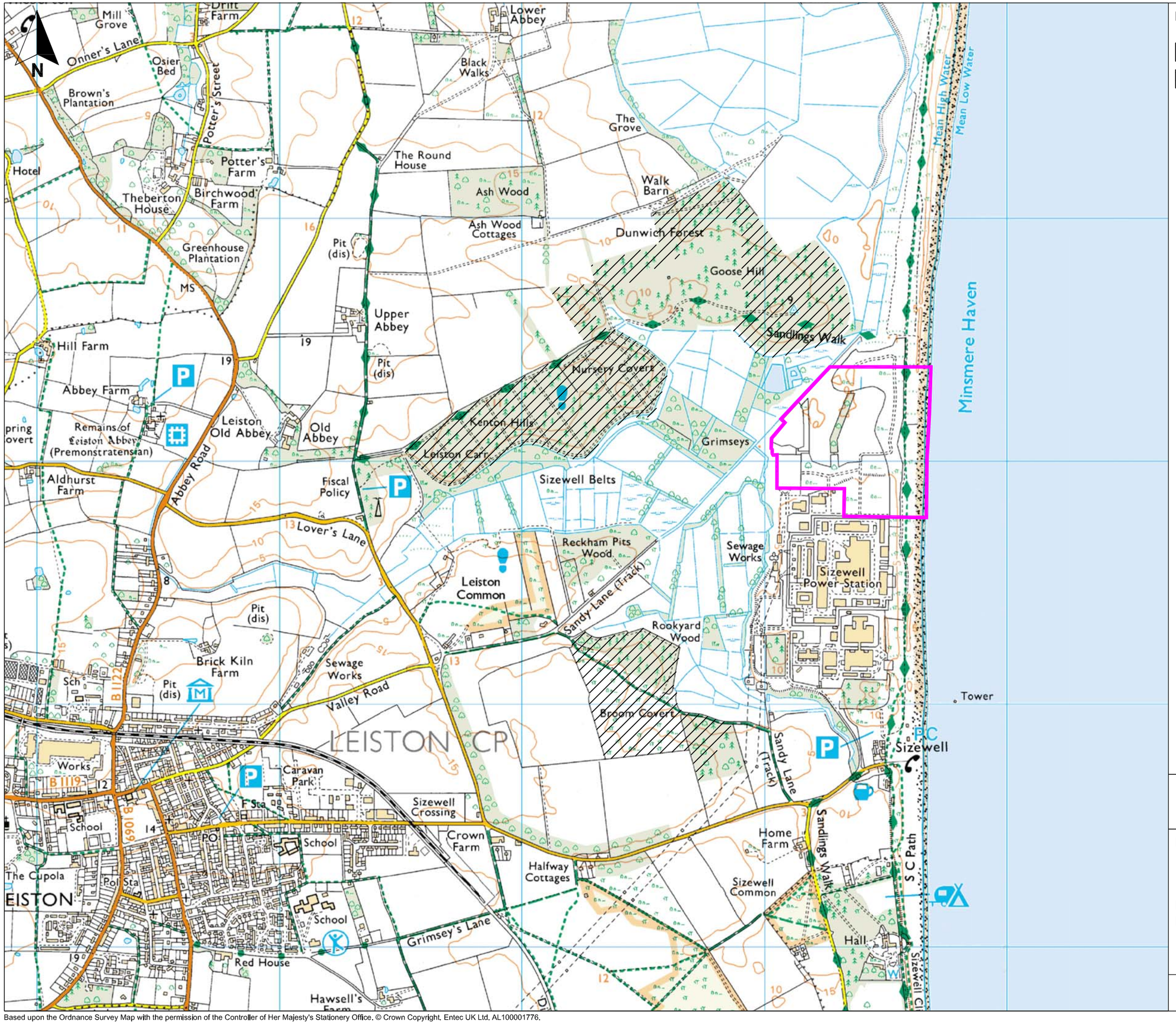

Key

- Preliminary works area
- Nightjar survey area

0 m — 750 m

Scale 1:15,000 @ A3

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Figure 2.4
Nightjar Survey Area

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N

Ash Wood

Ash Wood Cottages

Walk Barn

Dunwich Forest

Goose Hill

Sandlings Walk

Nursery Covert

Kenton Hills

Leiston Carr

Grimseys

Sizewell Belts

Reckham Pits Wood

Leiston Common

Sandy Lane (Track)

Rookyard Wood

Broom Covert

Sewage Works

Sizewell Power Station

Tower

PC Sizewell

Sandy Lane (Track)

Minsmere Haven

1

2

Key

- Preliminary works area
- Survey locations
  1. TM47633 64587
  2. TM47612 63379
- 300m area surveyed from location 1
- 300m area surveyed from location 2

0 m 500 m

Scale 1:10,000 @ A3

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Figure 2.5
Intertidal and Inshore Marine Survey Locations and Survey Area

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3. Results

3.1 Designated Sites of Ornithological Importance

3.1.1 European Designated Sites

The closest site of European Importance for its habitats and bird populations is the Minsmere to Walberswick SPA approximately 200m to the north of the proposed new build power station (and adjacent to the proposed new access road at its closest point). The SPA was classified on the basis of its breeding and wintering bird interest:

Minsmere to Walberswick SPA qualifies under Article 4.1 of the EC Birds Directive 974/409/EEC) by supporting populations of the following species listed on Annex 1 of the Directive:

During the breeding season:

- Bittern (*Botaurus stellaris*), 35% of the GB breeding population (5 year mean, 1993-1997);
- Avocet *(Recurvirostra avosetta)* 10.4% of the GB breeding population. Count (early 1990s);
- Marsh harrier *(Circus aeruginosus)* 10.2% of the GB breeding population (5 year mean, 1993-1997);
- Little Tern (*Sterna albifrons*) 1.2% of the GB breeding population (5 year mean, 1992-1996);
- Nightjar *(Caprimulgus europaeus)* 0.7% of the GB breeding population count (1990).

Over winter:

- Hen harrier (*Circus cyaneus*) 2% of the GB population (5 year peak mean, 1985/6-1989/90).

The site also qualifies under Article 4.2 of the Directive by supporting populations of European importance of the following migratory species.

During the breeding season:

- Teal *(Anas crecca)* 4.9% of the population in Great Britain (Count, 1990);
- Gadwall *(Anas strepera)*, 3.1% of the population in Great Britain (Count, 1990);
- Shoveler (*Anas clypeata)*, 2.3% of the population in Great Britain (Count, 1990).

Over winter:

- Shoveler *(Anas clypeata)* 1% of the population in Great Britain (5 year peak mean 1991/92-1995/96);
- Gadwall *(Anas strepera)* 1.1% of the population in Great Britain (5 year peak mean 1991/92-1995/96);
- (Russian) White-fronted goose *Anser albifrons albifrons* 1.1% of the population in Great Britain 5 year peak mean.

A further site of European importance for its bird populations, Sandlings SPA, is approximately 900m to the south of the proposed new build footprint. This site qualifies under Article 4.1 of the EC Birds Directive 974/409/EEC) by supporting populations of the following species listed on Annex 1 of the Directive;

- Nightjar (*Caprimulgus europaeus*) 3.2% of the population in Great Britain (Count, 1992);
- Woodlark (10.3% of the population in Great Britain (Count, 1997).

3.1.2 Nationally Designated Sites

Sizewell Marshes SSSI, which was designated in 1987 (and subject to a revision increasing its size in 1992) covers an area of 104 hectares, entirely within the BE Estate. The SSSI is adjacent to the western boundary of the proposed new build area and is of national importance for the considerable area of lowland unimproved wet meadow it contains. Associated with the wet meadows are outstanding assemblages of invertebrates and breeding birds and several nationally scarce plant species.

The SSSI citation states that the breeding bird assemblage is of national significance with many species that are typical of wet grassland and associated habitats, including shoveler, gadwall, teal, snipe (*Gallinago gallinago*) and lapwing (*Vanellus vanellus*). Prior to the survey programme being initiated, the desk study revealed that this level of interest was likely to have significantly declined (Alan Miller, SWT, pers. comm.). This decline is not linked to changes in estate management; snipe, lapwing and teal numbers are in long term decline in the county, while numbers and productivity of breeding shoveler are prone to considerable fluctuation at nearby RSPB Minsmere[11] (Piotrowski, 2003). A review of the results of the annual breeding bird surveys that are conducted by BE/SWT suggested that gadwall and shoveler were the only species mentioned in the SSSI description that were likely to continue to breed with regularity (and in regionally rather than nationally important numbers) within the BE Estate.

Minsmere to Walberswick Heaths and Marshes SSSI, parts of which have been classified as SPA and designated SAC, is approximately 200m to the north of the proposed new build power station (and adjacent to the proposed new access road) at its closest point. The SSSI covers over 2,325 hectares and is managed by a variety of conservation organisations including Natural England, RSPB, SWT and The National Trust. The SSSI contains a complex series of habitats, notably mudflats, shingle beach, reedbeds, heathland and grazing marsh, which combine to create an area of exceptional scientific interest. Species mentioned in the site description are:

[11] At Minsmere 45 pairs of shoveler bred in 1960, but this had fallen to 6 pairs in 1992 – apparently due to nest predation (Piotrowski, 2003). A total of 13 pairs were present in 2003, with 32 pairs in 2004 and 36 pairs in both 2006 and 2007 (Robin Harvey [RSPB], pers. comm.)

wigeon, shelduck, redshank and dunlin (associated with the tidal mudflats of the River Blythe Estuary); breeding marsh harrier, bittern, Cetti's warbler, garganey, water rail and large populations of reed warbler and bearded tit in the Minsmere and Walberswick reedbeds; breeding avocets, shoveler, gadwall, teal and shelduck at the RSPB Minsmere Reserve; and high numbers of waterfowl including breeding snipe, redshank, gadwall, shoveler and black-tailed godwit at Eastbridge and Southwold.

Leiston to Aldeburgh SSSI, which includes Sandlings SPA, is approximately 900m to the south of the proposed new build at its nearest point. The designation contains a rich mosaic of habitats including acid grassland, heath, scrub, woodland, fen, open water and vegetated shingle. This mix of habitats in close juxtaposition and the associated transition communities between habitats is unusual in the Suffolk Coast and Heaths. Many species of bird are present including tree pipit, turtle dove, bullfinch and nightingale in the scrub; breeding water rail, marsh harrier, gadwall and grasshopper warbler in the marshes; and wintering waterfowl including Bewick's swan, bittern, white-fronted goose, gadwall and teal in a range of appropriate wetland and farmed habitats.

3.1.3 Non-Statutory Designated Sites

Eight non-statutory designated sites are present within 3km of the proposed new build and associated infrastructure. These include areas adjoining statutory designations which, while valued, do not meet the criteria for SAC, SPA or SSSI status, and include County Wildlife Sites and Suffolk Wildlife Trust Reserves. Although all of these sites will have some breeding bird interest, only two specifically mention birds as a key feature and reason for designation. The South Minsmere Levels SWT Reserve and Wildlife Site is of importance as it is directly adjacent to the Minsmere SPA, SAC and SSSI and is of interest for its breeding waders and wildfowl and its over-wintering bird community. Sizewell Rigs County Wildlife Site, which takes in the two offshore maintenance structures associated with the cooling water intake and outfall, is of interest as it supports a colony of over 200 breeding kittiwakes. This is one of two sites in Suffolk where kittiwake colonies have become established (the other being at Lowestoft[12]). The total numbers at these sites represent a very small proportion of the UK population, which has no other natural nesting sites on the UK east coast between Kent and Yorkshire.

3.2 Desk Study Data

Breeding bird surveys are conducted annually[13] by SWT and transects are taken through all areas of marsh, Leiston Common, Reckham Pits Wood, Black Walks, Ash Wood and some agricultural field margins. The areas covered during annual surveys undertaken by SWT are shown on **Figure 3.1**.

Seventy species were reported to have bred within the BE Estate in 2004 (ADAS, 2006) reflecting its diversity, the quality of habitats within it and its size. Features of the breeding bird

[12] On a purpose built wall constructed by Associated British Ports to compensate for the loss of the Lowestoft South Pier Pavilion (which was demolished in 1988).

[13] Regular recording of bird species present has been undertaken since at least 1971. The formality of recording has varied, with annual structured surveys becoming the norm from the late 1980s.

population are hobby which is known to breed in the Goose Hill area, grey heron (which has recently started to breed in Sizewell Wents), barn owl, kingfisher and Cetti's warbler. During the survey period[14] increases in the numbers of reed bed passerines including reed warbler, sedge warbler and reed bunting have been recorded, skylark numbers have increased, and Cetti's warbler has become established as a breeding species.

Other species are known to have declined, have ceased to breed with regularity, or have disappeared completely from the Estate during this time. These include grasshopper warbler, which no longer breeds; teal and spotted flycatcher (which breed intermittently or persist in very low numbers) and grey partridge, the status of which is unclear. Breeding numbers of waders such as snipe and redshank are in long term decline in Suffolk (Piotrowski, 2003) despite there being no lack of apparently suitable breeding habitat. Snipe does not now breed within the estate[15], while redshank numbers are low, with 1-2 pairs generally present on the grazing marsh bordering RSPB land to the north (8-10 pairs were present in the late 1980s and early 1990s (Henderson Consultants 1989, 1993)).

In addition to breeding snipe, redshank and teal, wetland and associated marshy habitats within the BE Estate have been known to support breeding populations of ducks and waders including shoveler, gadwall and lapwing. Breeding duck numbers vary between years, but all remain in single figures. Garganey may have bred on the BE Estate in 1998, as five birds including three juveniles were recorded in the reedbed in that year by SWT staff.

Fourteen red-listed species of particular conservation concern[16] (Gregory *et al*, 2000) are known to have bred on the BE Estate since 2000, although some have been sporadic in their occurrence. Grey partridge has been present in very low numbers (the last record was of two birds in October 2005), with breeding not recorded in recent years. Farmland conservation initiatives within the estate, such as the creation of field margins and planting of hedgerows combined with the planting of winter bird cover, may encourage this species. One to six pairs of turtle dove have been present within the BE Estate in recent years and a lesser spotted woodpecker bred in Reckham Pits Wood in 2000[17]. Suffolk holds more than a third of the

[14] Annual surveys have been conducted since 1996-97. Increasingly detailed lists of the number of each species breeding within the Estate have been provided in the Annual Land Management Reviews issued by ADAS and SWT during this period.

[15] The rate of decline has been marked. In 1989 13 territories were recorded but by 1993, only 1 territorial bird was present (Henderson Consultants, 1989), and in recent years no snipe have been recorded breeding within the estate (Alan Miller, pers comm.). The availability of breeding habitat, habitat condition and management practices have not obviously changed to the detriment of the species and it is likely that the decline in snipe numbers reflects a wider decline in the population across Suffolk (including at Minsmere and Walberswick), the specific reasons for which are not completely clear.

[16] The background to the establishment of a 'traffic light system' of conservation concern for UK birds is discussed in Gregory et al (2002). 'Red-listed' species include those that are globally threatened, have suffered an historical population decline (between 1800 and 1995) or which have experienced rapid declines in their UK breeding population or contractions in their UK range of more than 50% over the past twenty-five years. Amber listed species have suffered moderate (25-49%) declines in their UK breeding population or range over the past 25 years, have an unfavourable conservation status in Europe (and are therefore of European concern), breed in very low numbers (five year mean of 1-300 pairs), breed at 10 or fewer UK sites, or occur in relatively high numbers in the UK (exceeding 20% of the European breeding, migratory or non-breeding populations). Other species have 'green' status, as they do not fulfil these criteria. This implies that the population of a species is either stable or increasing or that too little is known about the population to allow the species to be included on the red or amber list.

[17] Two birds were recorded holding territory in 1989 (Henderson Consultants, 1989).

British woodlark population, and up to five pairs have been recorded holding territory within the estate, although inter-annual fluctuations do occur and between 2004 and 2006 five, three and three pairs were considered to have bred respectively[18]. Targeted management to maintain and increase the woodlark population on the BE Estate has been carried out by SWT at Retsoms and Leiston Common.

The other red-listed species on the BE Estate comprise farmland passerines that have declined at regional and national level while remaining nationally common. These are skylark, song thrush, house sparrow, linnet, bullfinch, yellowhammer and reed bunting. All appear to have stable or increasing populations within the estate[19], and this may be linked to sympathetic land management including the planting of winter cover crops that act as food sources. Grasshopper warbler was last recorded breeding is Sizewell Belts in 2000, while spotted flycatcher breeding has been sporadic in recent years. Marsh tit numbers within the BE Estate appear to fluctuate (from a high of 7 pairs in 2002 to just one in 2004, no recorded breeding in 2005 and two pairs in 2006).

A pair of barn owl is known to have bred in one of the nest boxes that have been erected at Goose Hills. A range of buildings within the estate are used for roosting on a seasonal basis. Estate management, including the creation of field margins, may have increased the attractiveness of the Estate to the species. Black redstart breeds within the operational power station where 2-3 pairs are normally present. Nightingale occurs in low numbers (typically 1-2 pairs), and in some years is not recorded breeding on the Estate.

Species that have been recorded breeding historically within the Sizewell Estate include crossbill and goshawk, both of which bred in the Kenton / Goose Hills area. Goshawk is considered to have bred in 1992 and 1998, while crossbill has been recorded on a more regular basis, and three pairs were thought to have bred in 1998. The number of crossbills breeding in Suffolk varies considerably from year to year and the breeding population appears to be sustained by periodic continental immigration (Piotrowski, 2003). Species that are long extinct from the Estate are stone-curlew which was last recorded breeding on the BE Estate in the 1950s, and corn bunting which last bred in the Sizewell / Minsmere area in 1970 (Hall, 1984).

3.3 Breeding Bird Surveys

3.3.1 Summary of Results

The survey programme resulted in 69[20] species of breeding bird being recorded across an area almost exactly 9km^2 in extent. The dabbling duck survey did not result in any unexpected

[18] An initial estimate from SWT is that two pairs bred in 2007.

[19] Bullfinch, yellowhammer and linnet numbers may in fact be lower than in the late 1980s and early 1990s (Henderson Consultants 1989, 1993), but recent population trends suggest stability or slight increases in annually monitored areas.

[20] It is possible that 80 species bred. Figures for swallow and house martin, which clearly breed within the estate, are not included in Table 3.1, as domestic properties and farm buildings were not generally entered or walked around, so no accurate census was possible. Feral pigeon and swift may also breed within these buildings, but were not recorded doing so. Single pairs of greylag goose, Canada goose, shoveler, tufted duck, teal and lapwing and bearded tit are included in SWT draft breeding bird territory figures for 2007, and it is assumed that these species are therefore likely to have bred. All except bearded tit were recorded using the site by Entec surveyors. SWT conducted more intensive

findings, with mallard being by far the commonest breeding species and lower numbers of gadwall and mute swan and a range of other common waterfowl. The focussed hobby survey resulted in the mapping of two territories, while nightjar was not recorded during the dedicated nocturnal work.

The location of breeding territories is shown on **Figure 3.2A-E** (this figure has been split into four 'sub-figures' to allow ease of reference). Highly protected species (i.e. Schedule 1 and Annex 1 species) are indicated by red two-letter BTO Codes, with dabbling duck registrations indicated in orange, and registrations of all other species in blue. A key indicating the species that each code refers to is also provided. It should be remembered when considering the figures that the two letter registrations refer to the apparent centre of territorial activity rather than nest sites. It should also be noted that the aim of this survey was to characterise the bird community rather than derive exact densities, something which would require a considerably more involved survey programme. It is inevitable that the densities of some mobile, vocal species have therefore been overestimated due to the precautionary approach that has been taken in interpreting the data. Where potential overestimation is considered likely this is acknowledged in the text.

Given the mosaic of habitats that is present within the area surveyed (which include reedbed, marshes, coniferous plantation, deciduous woodland, open farmland and heath), calculating densities of birds across the survey area as an entirety was not considered worthwhile or legitimate, although this can be easily undertaken with reference to the information provided in **Table 3.1**. Indicative densities of birds within the proposed nuclear power station footprint have been derived, however, as habitat is fairly homogeneous, and the figures thus derived can be used to evaluate the importance of the loss of the area should land take for new build occur. For simplicity, and due to potential changes in the likely land take required and the position of the indicative site compounds, however, numbers and densities of breeding species have not been presented for this area, or for areas in proximity to the indicative access road. This can be done once a final scheme design has been determined.

The results of the surveys are presented in **Table 3.1.**

surveys of the marshes in 2007 than were conducted by Entec, and were therefore able to confirm breeding in these species. Entec surveyors recorded lapwing breeding on RSPB land close to the border of the Sizewell Estate.

Table 3.1 Numbers of Breeding Bird Territories Recorded in the Survey Area and the Proposed Nuclear Power Station Footprint

Species	Estimated Number of Territories within survey area	Estimated Number of Territories within proposed power station footprint	Density of Territories within proposed power station footprint	Wildlife and Countryside Act Schedule 1 / Annex 1 of EU birds Directive	UK BAP Priority Species	Suffolk BAP Species	Birds of Conservation Concern Red List	Birds of Conservation Concern Amber List
Little grebe	1							
Grey heron	1*							
Mute swan	5							
Mallard	27	1						
Gadwall	6							4
Sparrowhawk	1							
Kestrel	1							4
Hobby	2 (3)[21]			4				
Red-legged partridge	33							
Pheasant	3**							
Water rail	2**							4
Moorhen	50							
Coot	1							
Lapwing	3***				4			4
Redshank	2***							4
Woodpigeon	27**							
Stock dove	3							4
Collared dove	6							
Turtle dove	2				4	4	4	
Cuckoo	3****	1			4			4
Barn owl	1*			4				4
Tawny owl	2**							
Little owl	1							
Kingfisher	1			4				4

[21] Two pairs are thought to have bred, with a third pair possibly breeding. Results are presented in 3.3.3 Hobby Surveys.

Table 3.1 (continued) Numbers of Breeding Bird Territories Recorded in the Survey Area and the Proposed Nuclear Power Station Footprint

Species	Estimated Number of Territories within survey area	Estimated Number of Territories within proposed power station footprint	Density of Territories within proposed power station footprint	Wildlife and Countryside Act Schedule 1 / Annex 1 of EU birds Directive	UK BAP Priority Species	Suffolk BAP Species	Birds of Conservation Concern Red List	Birds of Conservation Concern Amber List
Green woodpecker	34****							4
Great spotted woodpecker	34							
Skylark	71	3			4	4	4	
Woodlark	2			4	4	4	4	
Meadow pipit	1							4
Pied wagtail	13							
Wren	290	6						
Dunnock	165	5			4			4
Robin	246	2						
Nightingale	5							4
Stonechat	3							4
Blackbird	116	1						
Song thrush	40	1			4		4	
Mistle thrush	13	1						4
Cetti's warbler	13	1		4				
Sedge warbler	27							
Reed warbler	10							
Garden warbler	29							
Lesser whitethroat	9							
Whitethroat	120	5						
Blackcap	122							
Willow warbler	16	3						4
Chiffchaff	77							
Goldcrest	97	1						4
Spotted flycatcher	2				4	4	4	
Marsh tit	5				4		4	

Table 3.1 (continued) Numbers of Breeding Bird Territories Recorded in the Survey Area and the Proposed Nuclear Power Station Footprint

Species	Estimated Number of Territories within survey area	Estimated Number of Territories within proposed power station footprint	Density of Territories within proposed power station footprint	Wildlife and Countryside Act Schedule 1 / Annex 1 of EU birds Directive	UK BAP Priority Species	Suffolk BAP Species	Birds of Conservation Concern Red List	Birds of Conservation Concern Amber List
Blue tit	180	1						
Great tit	142	1						
Coal tit	84	1						
Long-tailed tit	67****	2						
Treecreeper	26							
Starling	2				4		4	
Jay	18							
Magpie	20	1						
Jackdaw	2							
Carrion crow	6							
Rook	30							
House Sparrow	89				4		4	
Chaffinch	396	16						
Greenfinch	84							
Goldfinch	34	1						
Bullfinch	10				4	4	4	
Linnet	27	6			4	4	4	
Yellowhammer	46				4		4	
Reed bunting	17				4	4	4	

* Grey heron and barn owl are known to breed within the Estate, although the nest site of the heron (in Sizewell Wents) and the barn owl (Lower Abbey Farm) were not recorded during the work. Barn owl has been recorded nesting in a pole-mounted nest box at Goose Hills (2006), but in 2007 this site was occupied by a kestrel (SWT, pers comm.).

** These species are considered to have been under recorded during the survey work. Pheasant is of commercial rather than conservation interest and not all registrations were mapped. Woodpigeon often flushes on approach but does not vocally alarm and sings relatively infrequently, hence is difficult to record accurately without intensive work. Surveys were not appropriate for recording tawny owl which exhibits greatest territorial activity between October and December and courtship behaviour between December and mid April (e.g. Hardey et al, 2006) and was not therefore adequately covered during the nightjar work (which also only covered discrete areas), or water rail, for which more accurate numbers can be estimated through tape luring techniques. Tape luring carried out by SWT in 2004 resulted in eight water rail territories being located. There is no reason to believe that the number of water rail territories on site will

have changed considerably as conditions have remained similar within the Sizewell Marshes during this time. Annual monitoring suggests that numbers of water rail at RSPB Minsmere appear stable (Robin Harvey [RSPB}, pers comm.).

*** These registrations came from the north-eastern part of the survey area. This is under RSPB ownership, and following the first survey, it was agreed that RSPB should collect data as part of ongoing bird survey work. It is therefore unclear whether lapwing and redshank bred at this stage (registration from the initial survey have been included here for completeness but are not included on Figure 3.2).

**** These species can be difficult to accurately census as they are high mobile, vocal and / or have complex breeding ecology. Therefore, it is probable that the number of pairs of each has been overestimated to some extent.

Territory mapping showed that the commonest species in the survey area were those with wide ranging habitat preferences. Of these, chaffinch was the most numerous, with almost 400 territories, while wren with 290 territories and robin with 246 territories respectively were also well represented. Other common generalist species were great tit, blue tit and dunnock, while the amount of deciduous woodland and woodland edge, hedgerow and scrub habitats within the survey area resulted in relatively high numbers of blackcap and whitethroat being recorded. Areas of coniferous plantation held considerable numbers of goldcrest and coal tit.

Highly protected species that bred within the survey area were hobby, barn owl, kingfisher, woodlark and Cetti's warbler. Fifteen breeding UK Biodiversity Action Plan (BAP) Priority Species were recorded, of which seven also feature on the Suffolk BAP, while twelve breeding species that feature on the Birds of Conservation Concern red list[22] and a further sixteen species that appear on the amber list[23] were present. These amber listed species included nightingale, which has a restricted distribution in the UK, with Suffolk being one of its core areas of distribution.

The diversity of breeding species within the proposed power station footprint was very limited in comparison with the wider survey area. Twenty-one species, including one pair of song thrush, three pairs of skylark and six pairs of linnet (all of which are red-listed) were considered to have held territory. Otherwise, the bird community comprised a range of species some of which feature on the amber list of birds of conservation concern, but all of which remain common at regional and national level. This lack of diversity was not unexpected, as the habitats present comprise semi-improved grassland, ornamental planting and (modified) dune vegetation, while well-developed scrub cover is confined to two discrete fenced areas, and there are no wetland habitats or tall ruderal vegetation. A number of the bird registrations included under Column 3 in Table 3.1 (which indicates the number of each species that occurred within the preliminary works area), including the Cetti's warbler, actually came from areas in close proximity to the works area rather than within it. They are included in this column as they were plotted as being so close to the works area that their core territory locations would potentially

[22] The criteria for assigning species to the red list include: if they are globally threatened; if they have declined by 50% or more over the past 25 years; if they have experienced severe declines historically or if their range in the UK has contracted by over 50% in the past 25 years. Both wintering and breeding species are considered. All red-listed species recorded in the survey area at Sizewell appear on the list due to considerable range contractions or rapid declines in their breeding populations.

[23] Amber-listed species are those which have experienced moderate recent declines or range reductions (between 25 and 49%) over the past 25 years, that are rare breeders (with a population of 1-300 pairs in the UK), that have 50% or more of the breeding population occurring at 10 or fewer sites, or for which 20% or more of the European population breed (or winter in the case of wildfowl) within the UK.

overlap it. This suggests that they could be potentially displaced or disturbed by the works, resulting in nest failure and loss of the pair/pairs to the local population.

A more detailed discussion of the importance of the preliminary works area, and the wider survey area at Sizewell to breeding birds is presented in **Section 4**.

3.4 Intertidal Bird Surveys

3.4.1 Summary of Results

Four tern species - common, arctic, little and sandwich tern - were recorded during the intertidal and inshore marine surveys. Common tern was the most regularly recorded of the four, reflecting the proximity of the established breeding population at Minsmere, where 55-93 pairs have been present over the past three years (Robin Harvey, [RSPB] pers comm., Wright, M [Ed], 2006). There were no records during the April surveys, but between May and July there were regular records of 10-75 common terns associated with the outfall[24]. The highest numbers recorded during the surveys were 55 on 13 May, 50 on 9 July and 75 on 23 July, and it was clear from the overall results that common terns feed at the outfall throughout the breeding season. In contrast, the maximum count of feeding common terns in the northern grid square adjacent to the proposed new build area was eight birds on 17 June, and it was apparent from the data that while birds do dip feed on occasion in the inshore waters in this area, most birds commute to and from the warm water outfalls off the existing nuclear power stations, passing through this square en route. Counts of common terns commuting through the northern grid square towards the warm water outfall included 69 south and 138 north on 4 June, and 239 south and 252 north on 9 July[25].

The only arctic tern records were on 4 May and involved small numbers (1-4) of dip-feeding birds moving north through the inshore waters. These birds showed no association with the warm water outfalls. There were 28 records of sandwich tern using or commuting over waters within 300m of the shore during the surveys. Single foraging birds were present around the warm water outfalls and associated towers on 4 May and 4 June, with the remaining birds commuting directly through. Little terns were recorded on 13 occasions, mainly in the northern grid square, and therefore in closer proximity to the coastal breeding colony at Minsmere (the colony is approximately 2km to the north of the northern survey location). There were only 2 records of feeding little terns, both in the southern grid square, 1 of which was associated with the outfall.

Gull species showed a marked association with the outfall. Black-headed gull was recorded throughout the period, with a peak count of 71 foraging around the outfall on 13 May and 14 other counts of 10-43 feeding birds recorded in this area during the survey period. In contrast, the peak count of black-headed gulls foraging in the waters surveyed from Location 1 during the

[24] As counts were conducted each hour, a considerable proportion of these records would have been conducted on the same day (i.e. during each 45 minute period there would have been an initial count of birds around the outfall, a peak count (if numbers increased) and a final count).

[25] These are counts of birds commuting over the intertidal and inshore marine waters (up to 300m offshore) only – additional birds may have commuted to the outfall via a more circuitous route or further offshore. The totals represent overall numbers in 270 minutes (4.5 hours) of survey.

survey period was 3 on 17 June. Some commuting to and from the Minsmere area was noted, although there was less of a clear pattern than for common tern. Little gull, was only recorded with regularity in July, with a peak count of 8 around the outfall on July 23 and most records involving feeding birds in this area.

Herring, lesser black-backed and great black-backed gulls which were recorded throughout the survey period, also occurred in greatest numbers around the warm water outfall, although frequently birds were recorded loafing rather than actively feeding. There was a peak herring gull count of 130 birds at the outfall on 15 April, with 5 additional counts of 50 or more loafing and feeding birds. The peak count of herring gull in the northern grid square was 20 loafing birds on 13 May. There were 40 lesser black-backed gulls feeding around the outfall on 23 July, with 11 further counts of 10-30 birds from this area recorded during the survey period. Very low numbers of lesser black-backed gulls were recorded using the waters surveyed from Location 1, with a peak count of 5 loafing birds on 15 April. Great back-backed gulls generally occurred in low numbers (1-7 birds), and were strongly associated with the outfall. There was a peak count of 35 loafing birds around the outfall on 15 April. No use of the inshore waters viewed from Location 1 by great black-backed gull was recorded other than occasional commuting birds.

Mediterranean gull was only recorded on an occasional basis, with a peak count of 2 birds on 17 June. All records involved birds commuting through the inshore waters, and the majority were recorded from Location 1, probably reflecting the proximity of breeding birds at Minsmere. Common gull was only recorded in April and May. Most records involved single birds passing through the inshore waters, and there was only one observation of foraging in the vicinity of the outfall, with no foraging recorded elsewhere. Kittiwakes nesting on the Sizewell Rigs were not generally counted. Loafing birds were recorded in close proximity to the Rigs, but there was no association with the outfall recorded, and feeding was not noted in the inshore waters from either survey location. Cormorant was regularly recorded loafing on the Rigs, with 11 birds on 9 July being the peak count. There was little recorded use of the inshore waters by this species.

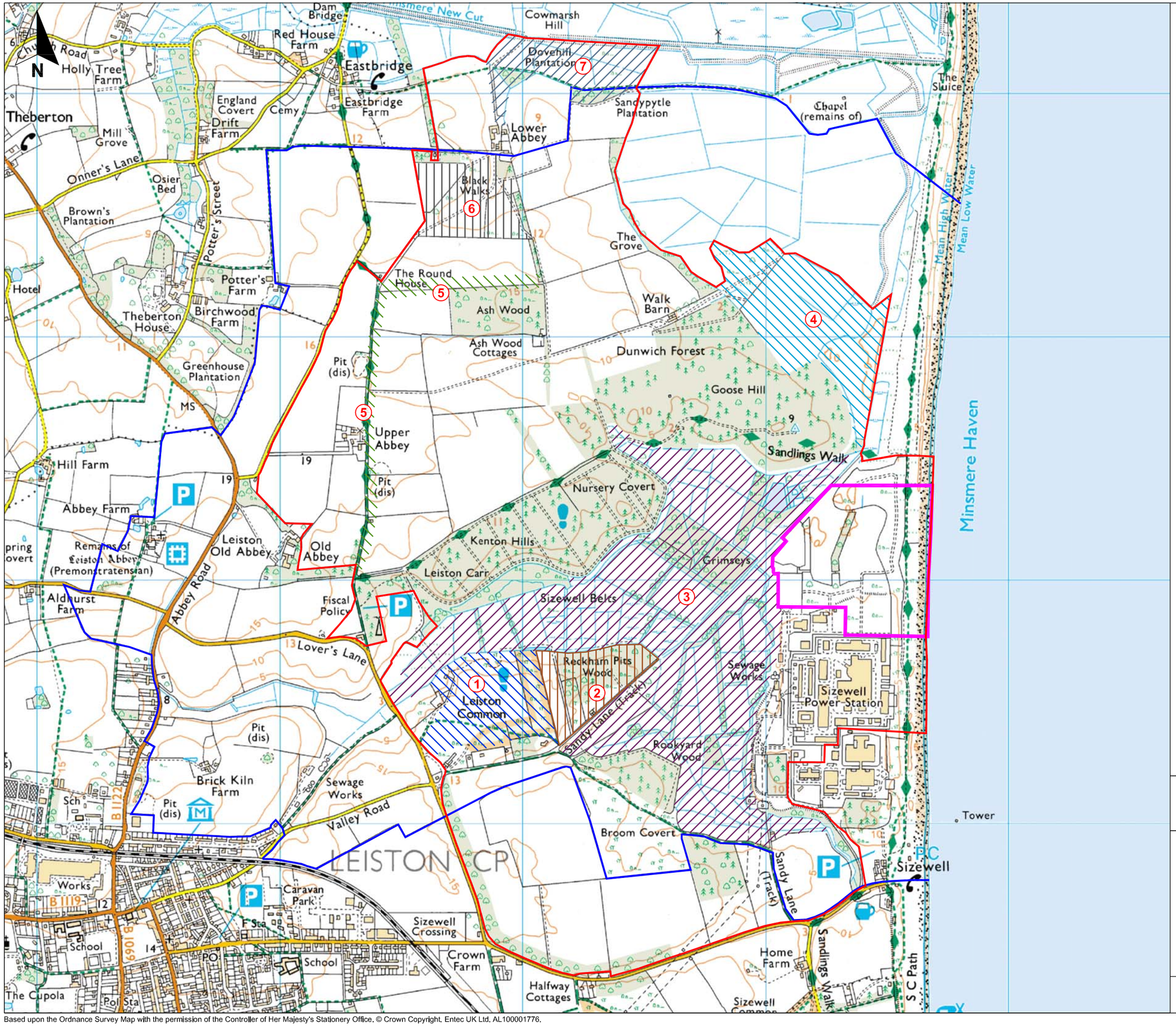
Eleven species of wader were recorded commuting over the littoral zone and the inshore waters. There were no records of waders feeding in either of the grid squares, although 2 ringed plover were noted loafing in the northern grid square on 17 July. There was a casual observation of displaying ringed plovers at TM4763 6453 on 10 April and birds may have bred in the vicinity of this sighting.

The commonest wader species recording during the surveys was oystercatcher, with 48 records (involving 1-8 birds) over the season. The spread of records over the season was relatively even, probably indicating regular movements of non-breeding birds or failed breeders back and fore between the Alde-Ore complex to the south of Sizewell, and the Minsmere area. A similar pattern of movement, albeit on a smaller scale, was noted in avocets with 1-2 birds recorded on five dates. Flight lines of all waders were over the inshore waters and followed the line of the coast. Oystercatchers were occasionally recorded commuting over the intertidal zone, but most oystercatcher and all avocet movements occurred across a relatively broad front between 0 and 300m below the tide line. There were 4 records of ringed plover, 2 in May and 2 in July (including the record of the loafing birds above).

Other well represented species were curlew and whimbrel, with most records occurring in July and indicating return passage south from their breeding grounds. There were 13 records of 1-2 curlew and 8 records of 1-5 whimbrel during the season. Other wader species recorded were greenshank (1 on 17 July), dunlin (2 records of 4 birds on 23 July), redshank (2 on 12 April),

sanderling (2 on 12 April), bar-tailed godwit (2 on 17 July) and turnstone (1 on 17 July). All of these species were recorded commuting or migrating parallel to the line of the coast, with all species except the sanderling flying over the sea (at varying distances from the shore). There were occasional additional records of waders beyond 300m, mostly large or vocal (and hence detectable) species or flocks of birds.

Species recorded on an irregular basis using or commuting through the inshore waters were red-throated diver (1 bird on 12 April), common scoter (peak counts of 5 birds, recorded on two July surveys), gadwall (peak count of 3 birds, recorded on two dates), eider (1 on 4 July), shelduck (a total of 5 birds over 3 dates) and little egret (2 birds on 4 July). Due to the infrequent nature of sightings of these species, no pattern of use has emerged. Fulmar, guillemot and gannet were infrequently recorded from the inshore waters, although they did occur on a more regular basis further offshore.



Key

- Preliminary works area
- Survey area
- British Energy land holding
- ① Leiston Common
- ② Reckham Pits Wood
- ③ Sizewell Belts
- ④ Retsoms/Salt Marsh
- ⑤ Field margins
- ⑥ Black Walks
- ⑦ Lower Abbey Marshes

0 m 750 m

Scale 1:15,000 @ A3

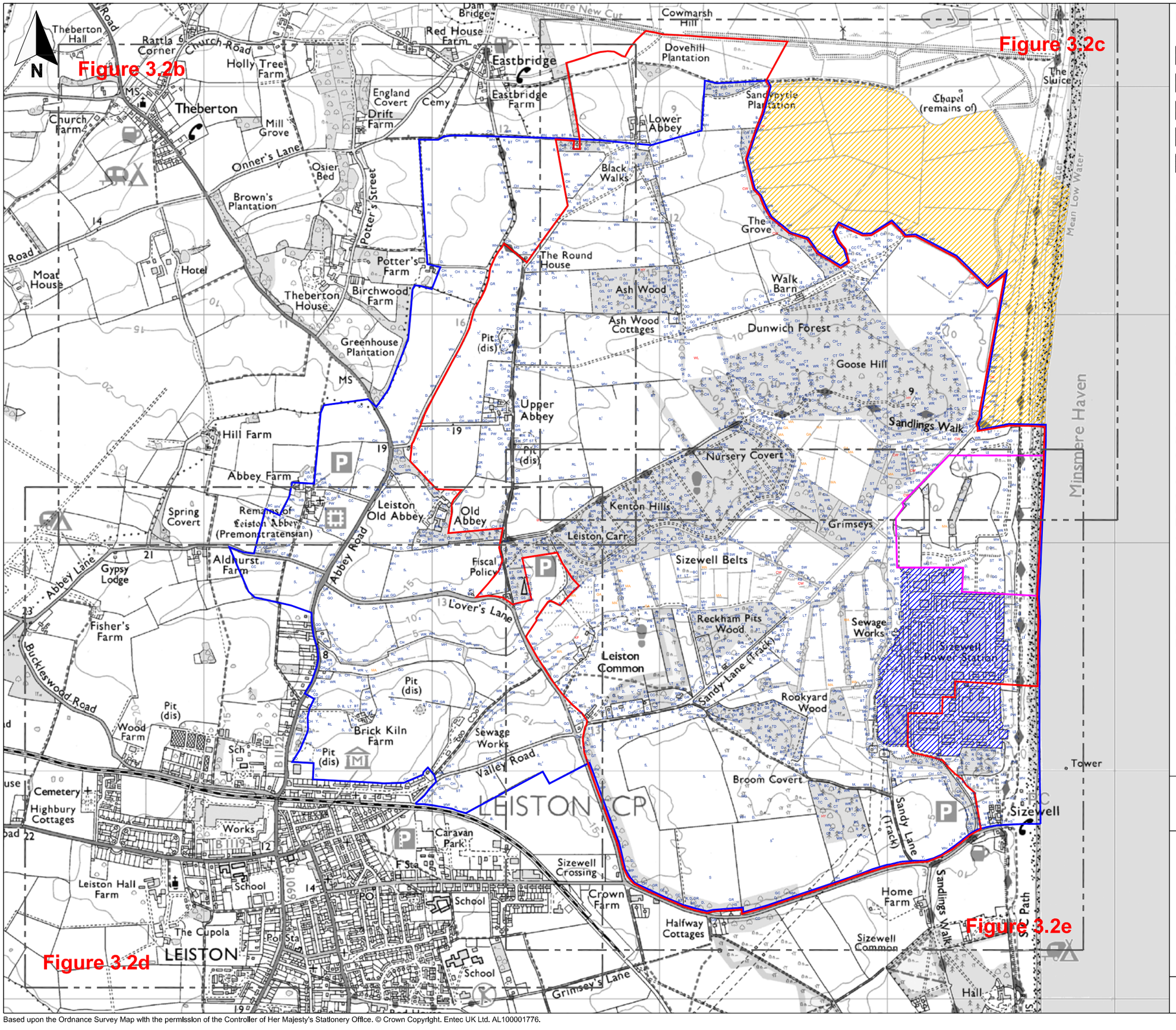
British Energy

British Energy
Sizewell 1st Interim Bird Report

Figure 3.1
SWT Annual Bird Survey Area

November 2007
19801-R73.dwg marsa01

Entec



Key

- British Energy land holding
- Preliminary works area
- Survey area
- Data to be supplied by RSPB
- Excluded from survey

B.	Blackbird	M.	Mistle thrush
BC	Blackcap	MA	Mallard
BF	Bullfinch	MG	Magpie
BT	Blue tit	MH	Moorhen
C.	Carrion crow	MP	Meadow pipit
CC	Chiffchaff	MS	Mute swan
CD	Collared dove	MT	Marsh tit
CH	Chaffinch	N.	Nightingale
CK	Cuckoo	PH	Pheasant
CO	Coot	PW	Pied wagtail
CT	Coal tit	R.	Robin
CW	Cetti's warbler	RB	Reed bunting
D.	Dunnock	RL	Red-legged partridge
G.	Green woodpecker	RO	Rook
GA	Gadwall	RW	Reed warbler
GC	Goldcrest	S.	Skylark
GO	Goldfinch	SC	Stonechat
GR	Greenfinch	SD	Stock dove
GS	Great spotted woodpecker	SF	Spotted flycatcher
GT	Great tit	SG	Starling
GW	Garden warbler	SH	Sparrowhawk
HS	House sparrow	ST	Song thrush
HY	Hobby	SW	Sedge warbler
J.	Jay	TC	Treecreeper
JD	Jackdaw	TD	Turtle dove
K.	Kestrel	TO	Tawny owl
KF	Kingfisher	WA	Water rail
LG	Little grebe	WH	Whitethroat
LI	Linnet	WL	Woodlark
LO	Little owl	WP	Woodpigeon
LT	Long-tailed tit	WR	Wren
LW	Lesser whitethroat	WW	Willow warbler
		Y.	Yellowhammer

0 m — 1km

Scale 1:16,000 @ A3

British Energy

British Energy
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Figure 3.2a
Birdmap overview

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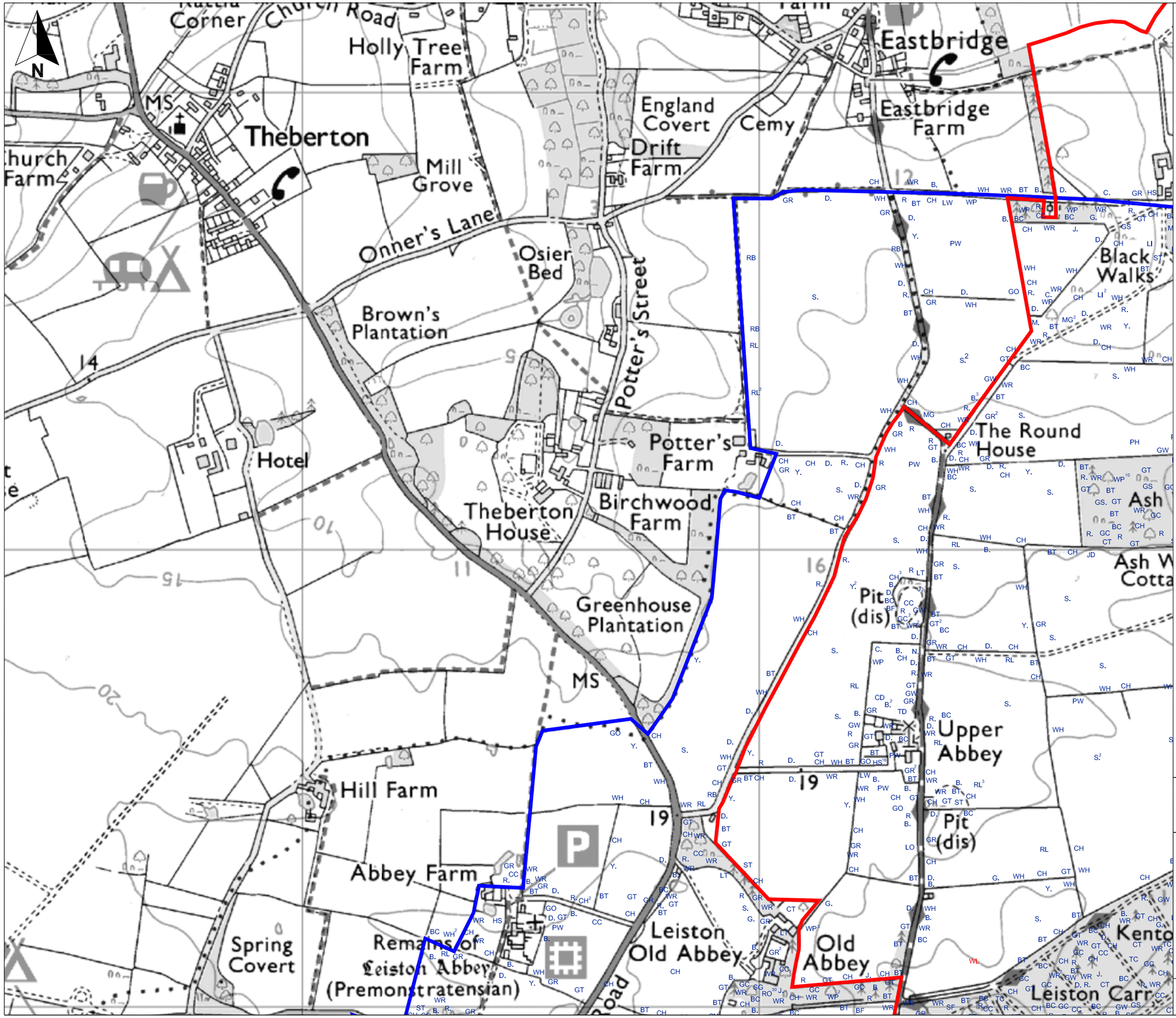
September 2007
19801-R58.dwg marsa01

Entec



Key

- British Energy land holding
- Preliminary works area
- Survey area
- Data to be supplied by RSPB
- Excluded from survey

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GA	Gadwall	RW	Reed warbler
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HS	House sparrow	ST	Song thrush
HY	Hobby	SW	Sedge warbler
J.	Jay	TC	Treecreeper
JD	Jackdaw	TD	Turtle dove
K.	Kestrel	TO	Tawny owl
KF	Kingfisher	WA	Water rail
LG	Little grebe	WH	Whitethroat
LI	Linnet	WL	Woodlark
LO	Little owl	WP	Woodpigeon
LT	Long-tailed tit	WR	Wren
LW	Lesser whitethroat	WW	Willow warbler
		Y.	Yellowhammer

0 m 500m

Scale 1:8,000 @ A3

British Energy

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Sizewell 1st Interim Bird Report

Figure 3.2b

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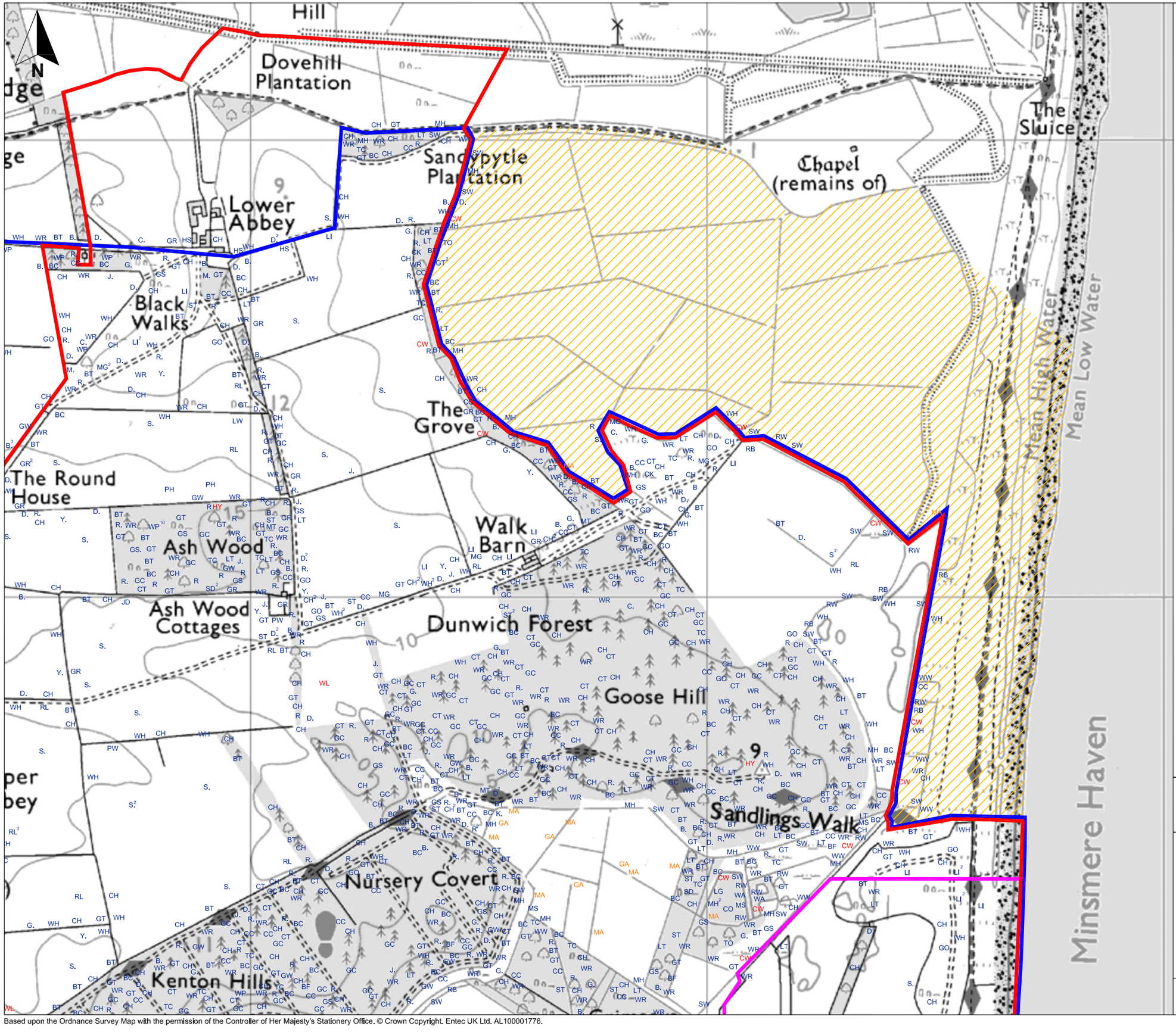
September 2007
19801-R59.dwg marsa01

Entec



Key

- British Energy land holding
- Preliminary works area
- Survey area
- Data to be supplied by RSPB
- Excluded from survey

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GS	Great spotted woodpecker	SF	Spotted flycatcher
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HS	House sparrow	ST	Song thrush
HY	Hobby	SW	Sedge warbler
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K.	Kestrel	TO	Tawny owl
KF	Kingfisher	WA	Water rail
LG	Little grebe	WH	Whitethroat
LI	Linnet	WL	Woodlark
LO	Little owl	WP	Woodpigeon
LT	Long-tailed tit	WR	Wren
LW	Lesser whitethroat	WW	Willow warbler
		Y.	Yellowhammer

0 m 500m

Scale 1:8,000 @ A3

British Energy

British Energy
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Figure 3.2c

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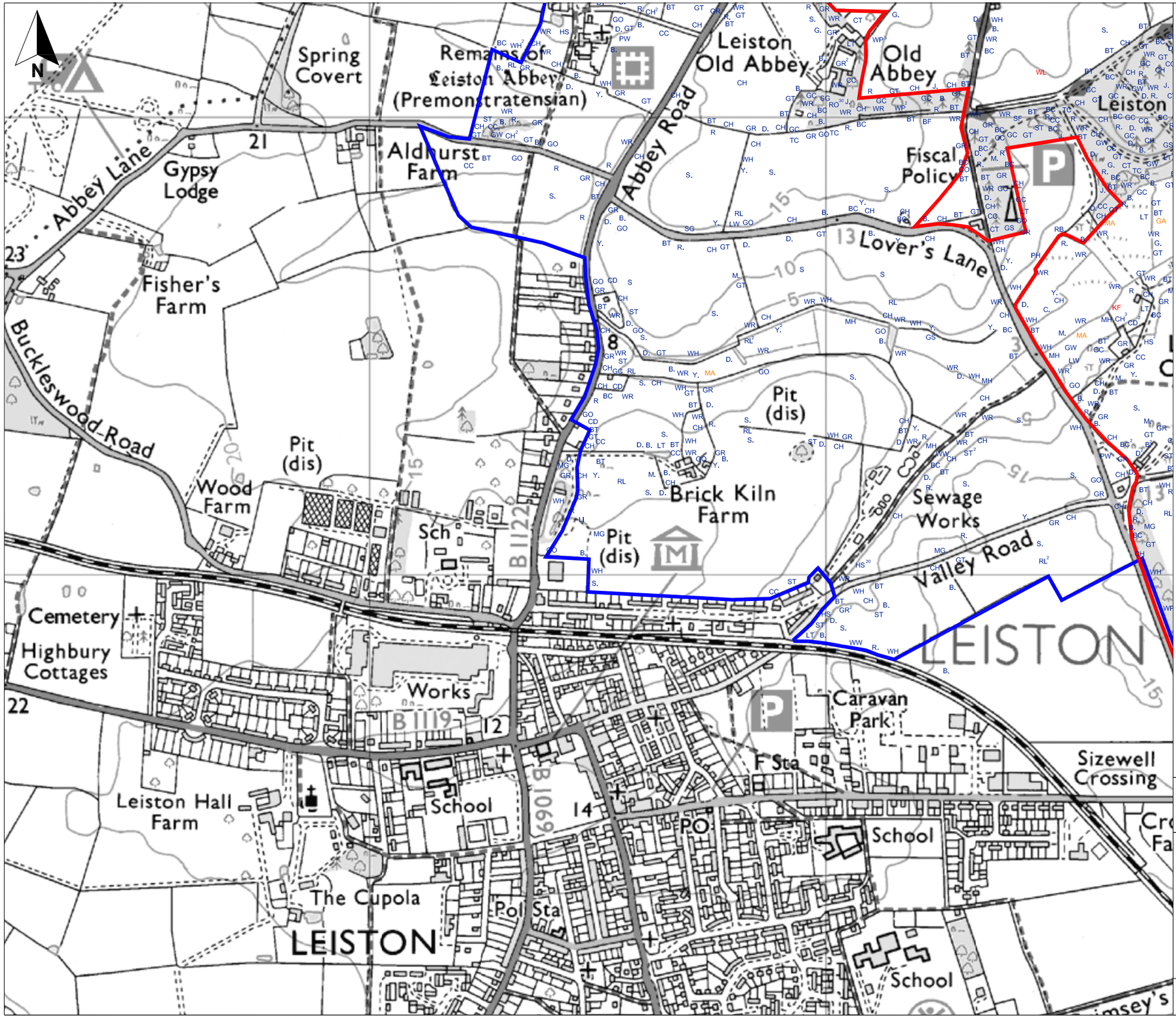
19801-R60.dwg marsa01

Entec



Key

- British Energy land holding
- Preliminary works area
- Survey area
- Data to be supplied by RSPB
- Excluded from survey

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BC	Blackcap	MA	Mallard
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HY	Hobby	SW	Sedge warbler
J.	Jay	TC	Treecreeper
JD	Jackdaw	TD	Turtle dove
K.	Kestrel	TO	Tawny owl
KF	Kingfisher	WA	Water rail
LG	Little grebe	WH	Whitethroat
LI	Linnet	WL	Woodlark
LO	Little owl	WP	Woodpigeon
LT	Long-tailed tit	WR	Wren
LW	Lesser whitethroat	WW	Willow warbler
		Y.	Yellowhammer

0 m — 500m

Scale 1:8,000 @ A3

British Energy

British Energy
Sizewell 1st Interim Bird Report

Figure 3.2d

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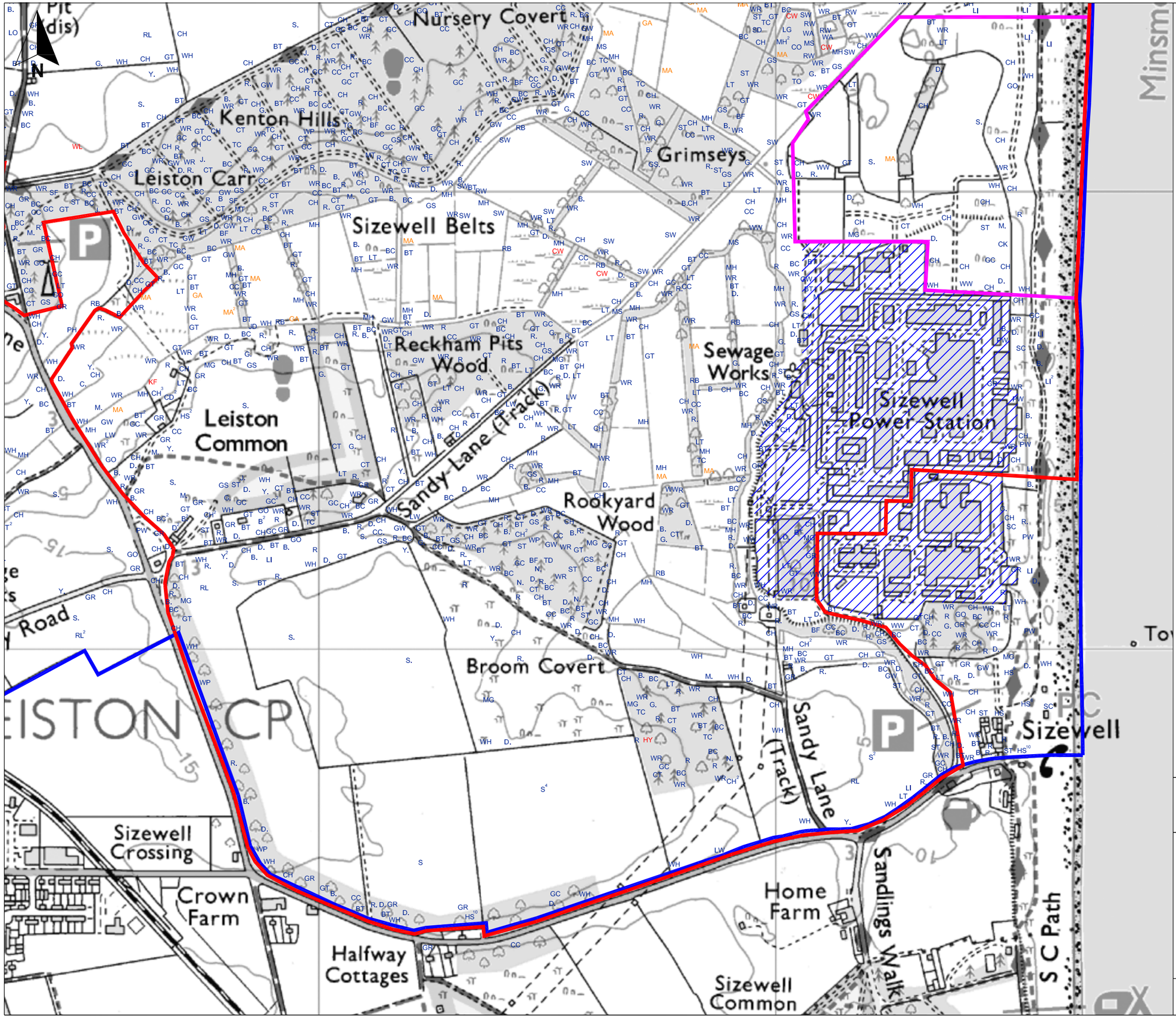
19801-R61.dwg marsa01

Entec



Key

- British Energy land holding
- Preliminary works area
- Survey area
- Data to be supplied by RSPB
- Excluded from survey

B.	Blackbird	M.	Mistle thrush
BC	Blackcap	MA	Mallard
BF	Bullfinch	MG	Magpie
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LG	Little grebe	WH	Whitethroat
LI	Linnet	WL	Woodlark
LO	Little owl	WP	Woodpigeon
LT	Long-tailed tit	WR	Wren
LW	Lesser whitethroat	WW	Willow warbler
		Y.	Yellowhammer

0 m 500m

Scale 1:8,000 @ A3

British Energy

British Energy
Sizewell 1st Interim Bird Report

Figure 3.2e

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September 2007
19801-R62.dwg marsa01

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4. Discussion

The results of the territory mapping survey are discussed in Section 4.1 below. Separate sections on dabbling ducks, hobby and intertidal and inshore marine birds, non-breeding birds and passage migrants are included in Sections 4.2-4.5 inclusive.

When considering bird populations, importance is often taken as meaning that a site supports at least 1% of the population under consideration at county (Suffolk), national (England unless otherwise specified) or international level. This approach has been taken when considering the results of the 2007 bird surveys of the preliminary works area and the wider survey area at Sizewell. To determine likely thresholds of importance, relevant county and national accounts (Piotrowski, 2005., Brown & Grice, 2005) have been used in conjunction with bird reports, scientific papers and information on population trends available from the BTO.

There is no fundamental biological reason to take 1% of a population as the threshold level for establishing the level of importance of a site. Nevertheless, this percentage is widely considered to be of value in developing measures that give an appropriate level of protection to populations, and has gained acceptance on this basis throughout the world. The criterion was, for example, adopted by parties involved in the Ramsar Convention 1971. Thereafter, the 1% level of national species totals has been taken as the basis of assessment in various countries, including Britain (Stroud, Mudge & Pienkowski, 1990).

4.1 Territory Mapping

4.1.1 Highly Protected Breeding Species

Kingfisher was recorded breeding towards the western edge of Sizewell Belts on an area of ditch bank which has been managed by SWT with the aim of providing a nesting location for the species (Carl Powell, SWT, pers comm.). Kingfishers are fairly common in Suffolk, with breeding season reports from 34 sites in 2005 (Wright [Ed], 2006). This suggests that one pair is of county importance. The English population has recently been estimated at 3,000-4,500 breeding pairs (Brown & Grice, 2005).

Woodlark was only regularly recorded, during the territory mapping and incidentally (i.e. outside formal survey work), in two locations - in arable fields adjacent to the northern edge of Leiston Carr, and adjacent to the south side of the recently planted Great Mount Wood. Singing was recorded in both areas, and these have been indicated as territory locations on **Figure 3.2** (although this interpretation should be treated with caution). Surveys for woodlark are best carried out between February and June, and if a three visit strategy is adopted as was undertaken for the national survey in 1997 (Wotton, 1997), only one territory mapping visit would fall within the survey period that this report covers (April to July inclusive). In addition, song perches and foraging areas are often 200-400m from nesting locations (Gilbert *et al*., 1998); therefore there is a greater potential margin for error in the plotting of registrations for this species than for many others.

Despite the reservations expressed above, woodlark numbers recorded during the surveys were consistent with the numbers recorded by SWT in 2007 (SWT draft figures). Between 2005 and

2007, the number of woodlark territories in monitored areas has varied between 2 and 5, with the most consistently occupied areas of the Estate being Leiston Common and Black Walks (although a number of other locations have been used). The developing plantation at Great Mount Wood is certainly a feasible location for nesting woodlark; trends in the county population have been linked to forestry practices, and woodlark numbers often increase in response to the establishment of new plantation and rotational clearance of mature timber stands.

The UK woodlark population was estimated as being between 1,426 and 1,552 occupied territories in 1997. At that time it was estimated that almost 30% of woodlark territories (403-457) were in Suffolk, with 209-245 territories being located in the Suffolk Sandlings. At national level, the species has shown a marked contraction in range in recent decades, and since the census, declines in woodlark numbers in coastal areas of Suffolk have been recorded (Adam Rowlands, RSPB, pers. comm.). This has been linked to the maturation of existing plantations combined with unsuitable forest management practices and a lack of new planting. At present the scale of county decline is unclear. If a consistent county population of 209-245 pairs (and a continued fluctuating population on the BE Estate) is assumed, then in some years the Estate is likely to be of county importance for the species.

A total of 13 Cetti's warbler territories were located in 2007. Six territories were recorded in the Sizewell Belts, with a further four in the marshes around Retsoms and the south-eastern edge of the RSPB landholding and three in scrub in Lower Abbey Marshes. Cetti's warbler was first recorded holding territory within the BE Estate in 2000, when one was in the Sizewell Belts (SWT / ADAS, 2001). Since 2000 there has been a considerable rise in the population breeding within the Estate followed by a possible stabilisation. Four territories were recorded in 2002 and 2003, seven in 2004 rising to a peak (to date) of 19 in 2005. Subsequent to this, numbers have fallen or stabilised, with 11 territories in 2006 (SWT / ADAS, 2001-2007) and 13 territories detected during the 2007 surveys conducted by Entec. Draft figures from SWT suggest that they considered 14 (rather than 13) territories to be present within their survey area in 2007, with the distribution of territories being very similar[26].

Cetti's warbler is still considered a scarce resident in Suffolk despite rapid population growth at national level. During the national survey in 1996 a total of 4 territories were found at three Suffolk sites (Wotton *et al*., 1998), while by 2005 this had risen to a minimum of 79 territorial males at 30 sites (Wright [Ed], 2006). The Entec / SWT survey results indicate that Sizewell is one of the strongholds for the species within the county, and the most recent population estimates for Suffolk clearly suggest that the Estate is of county importance for the species. At national level the number of territorial males was considered to have more than doubled (from 300 to 622) between 1997 and 2000, and was estimated at 851-878 by 2002 (Ogilvie, 2004). Based on these figures, and assuming a constant rate of increase since this time, the current number of territorial males in England would be estimated as being between 1,423 and 1,518 individuals. If this extrapolation is considered reasonable, the BE Estate is likely to currently hold just under 1% of the national population, and the BE Estate would not be considered of national importance for the species.

[26] SWT recorded a further Cetti's warbler territory in Lower Abbey Marshes. Entec surveyors recorded at least one additional bird singing within the nearby RSPB landholding, and this territory may overlap the boundary of the BE Estate.

Barn owl was not recorded during the survey work, but is known to breed on the BE Estate from information provided by SWT. The Suffolk population is virtually restricted to the eastern half of the county, with only sporadic reports elsewhere. Evidence suggests that densities in East Suffolk are relatively high, at approximately five breeding pairs per 10 kilometre square, indicating a county population of 100-125 pairs (Piotrowski, 2003). In this context 1 pair is potentially of county importance.

Crossbill, which has been recorded breeding on the BE Estate, was present in the plantation at Dunwich Forest in April, when small parties were recorded. As crossbills may have completed breeding by this time, it could not be concluded whether the species was likely to have bred within the survey area in 2007. Birds have bred sporadically in the past, and there is no reason to suggest that they will not continue to do so in future.

4.1.2 Red-listed Birds of Conservation Concern

In addition to woodlark, which has been considered above, eleven red-listed species of conservation concern were recorded breeding within the survey area in 2007. An account of the distribution and abundance of these species, and a discussion of the likely importance of the preliminary works area and survey area to them is contained below.

Turtle Dove was considered to have held territory in two locations - in woodland to the north of Broom Covert, and in close proximity to Upper Abbey Farm - as there were multiple records from these locations, including singing birds. Elsewhere within the survey area, there were records of turtle doves from near The Round House; along the track between Ash Wood Cottage and Upper Abbey, and at Old Abbey, but there was insufficient evidence to suggest that these indicated additional territories. Surveys undertaken by SWT have indicated that between one and three pairs of turtle dove have bred within annually monitored areas of the estate over the past three years (SWT / ADAS, 2005-07).

Numbers of turtle dove breeding in England have declined markedly over the past forty years, with BTO Data indicating a 79% decline in numbers in monitored plots since 1968 (www.bto.org). There are various reasons for this decline, which include hunting pressure during migration affecting survival rates, and limited seed availability due to agricultural intensification shortening the breeding season (Browne & Aebischer 2004 & 2005). In the UK, turtle doves occur in greatest numbers in open arable farmland with available woodland cover (for nesting) in the south-east, and the most recent national population estimate was 75,000 pairs in 1991. BTO data from the period 1994-2004 indicates a further 48% decrease in the population, which suggests the national population is now in the region of 30-36,000 pairs. At county level the species is widely distributed, with concentrations along some areas of coast and in the Breckland (Piotrowski, 2003). It is likely, therefore, that despite the declines, the BE Estate is currently of local rather than county importance for the species.

Spotted flycatcher was recorded in two locations - a pair was present in woodland to the north of the car park at Fiscal Policy, and a pair was also noted at Kenton Hills. It is possible that these sightings refer to the same pair, despite the distance between them (c. 300m). Draft SWT breeding bird figures indicate that there was possibly an additional pair in a field margin on the Estate.

Numbers of spotted flycatcher in the UK have declined rapidly and consistently since the 1960s. It is likely that a range of factors have contributed to this decline, including deterioration in the condition of woodland habitats (and linked to this, fewer large flying insects), and conditions on

migration routes and wintering grounds (Fuller *et al*, 2005). As trends have been similar across UK regions and habitats, however, it is most likely that the decline has been driven by factors operating outside the UK. Spotted flycatcher is regarded as a fairly common breeding species in parks and large gardens in Suffolk (Piotrowksi, 2003), although it is reported as being increasingly scarce by Wright (Ed), 2006. At present, it is likely that the BE Estate is of no more than local importance for the species.

Marsh tit was recorded holding territory in five locations, all in deciduous or mixed woodland (including the mixed woodland edge of large tracts of coniferous plantation); there were two territories in woodland edge habitat on the south-eastern side of Kenton Hills; one territory towards the western edge of Goose Hills; one territory in Ash Wood and one territory in the linear strip of woodland to the east of Walk Barn. The coastal strip between the Alde and the Blythe is considered to represent one of the strongholds for the species in the county. (Piotrowski, 2003). Marsh tit is a species that has experienced a sustained decline in the UK Detailed demographic work suggests that the decline may have been driven by low annual survival and that neither increased predation nor interspecific competition is responsible (Siriwardena, 2006). Reductions in the structural and floristic diversity of woodland, resulting partly from increased browsing by deer, are likely to be the causes underpinning the population trends (Perrins 2003, Fuller *et al*. 2005). There is no readily available county estimate for marsh tit numbers, but as the national population is largely confined to southern England and Wales, and was estimated at 56,000 pairs at the time of the last breeding bird atlas (Gibbons *et al*., 1993), even in the face of declines it seems unlikely that the BE Estate is of more than local importance for the species.

A maximum of 10 bullfinch territories were recorded within the survey area. Despite their bold colouration, bullfinches are often unobtrusive. They do not sing loudly or with the regularity of many other passerines, and often advertise their presence with calls rather than song. Within the survey area, territories were considered by the surveyors to have been present in the following locations; the Leiston Carr area of Kenton Hills; the central area of Kenton Hills; the Nursery Covert area of Kenton Hills; a belt of woodland running north-east from Grimseys; mixed woodland south of Old Abbey; woodland to the north of Broom Covert; the eastern fringe of Goose Hills (2); woodland adjoining the south of the built power station and near the disused pit to the north of Upper Abbey Farm.

Bullfinch will regularly forage some distance from the nest, possibly because they can store food for young in sacs in the mouth, and due to the fact that food sources are often patchily distributed (Brown & Grice, 2005). All territories included here are of birds noted on several occasions, however, and as such it would appear unlikely that there has been a significant over-estimation of numbers within the survey area. Both Piotrowski (2003) and Wright ([Ed], 2006) considered bullfinch a common but declining breeding species in Suffolk, hence numbers are unlikely to be of county importance. The density of territories within the survey area appears typical or rather low, as Gibbons *et al* (1993) derived average densities of 8 territories per km^2 in woodland and 1 pair per km^2 in arable farmland habitats respectively.

Other red-listed species recorded breeding within the survey area (skylark, song thrush, starling, house sparrow, linnet, yellowhammer and reed bunting) remain common or very common at county and national level, despite significant population declines. Numbers occurring in the survey area are therefore unlikely to be of more than local importance.

Despite the considerable number of skylarks recorded during the survey work, the species does not breed in the Sizewell Marshes, and was recorded from farmland and heathland habitats in

the northern, western and southern parts of the survey area. Two territories were within the preliminary works area. Yellowhammer was recorded in the same habitats as skylark, although was not present in the preliminary works area. A concentration of territories was noted in the south-western part of the survey area, in the area between the edge of Leiston and Old Abbey.

Song thrush was recorded in a range of woodland and field edge habitats throughout the survey area. One territory was recorded within the preliminary works area, with a further territory within 100m of the western edge of it. The number of territories recorded suggests that the survey area does not support exceptional numbers of song thrush, as densities in woodland and rural garden habitats in Southern England can be as high as 25 per km^2 and 55 per km^2 respectively, while 3-5 pairs per km^2 is more typical of arable farmland (Peach *et al*., 2002).

Starling and house sparrow numbers are likely to have been under-recorded, as likely breeding areas such as around dwellings and farm buildings were generally excluded from the survey. Nevertheless, it is apparent that only low numbers of starling hold territory within the survey area during the breeding season, while house sparrow is relatively common. House sparrow colonies with ten or more males were recorded near the Sewage Works on the edge of Leiston, at Halfway Cottages, Upper Abbey Farm and in bushes on the edge of the built power station car park. Neither species was recorded breeding in the preliminary works area.

Linnet was recorded breeding in the preliminary works area. Three pairs were present in the north-eastern part of this area in close proximity to the coastal path, with another three pairs just to the north of this. Elsewhere in the survey area, linnet were found nesting along the coastal strip, including five pairs in coastal scrub between the built Sizewell Power Stations and the sea, but were sparsely distributed in farmland habitats. Reed bunting showed a predictable association with wetland habitats, with concentrations of breeding territories recorded in the Sizewell Marshes and around ditches to the north-east of Goose Hills. As with linnet, only very low numbers were recorded in farmland habitats.

4.1.3 Other Notable Species

Five nightingale territories were located in 2007, three in scrubby woodland to the north of Broom Covert, one in woodland to the south-east of Broom Covert and a further territory in a thick hedge on the lane between Upper Abbey and The Round House. Occupancy of these areas was recorded on two or more occasions during the territory mapping surveys, and further ad hoc visits were undertaken by the surveyors to confirm their findings. A further singing male in the woodland to the south-east of Broom Covert was not considered to be breeding bird, as it was only recorded on a single occasion, and has not been marked on **Figure 3.1**. Nightingale numbers within the BE Estate have been low in recent years, with a single territory in the Sizewell Belts between 2004 and 2006 inclusive (although Broom Covert is not surveyed during annual SWT survey work and territories in this area may have gone undetected). A national nightingale survey undertaken in 1999 revealed a Suffolk population of 881 singing males, with a concentration of birds in the central coastal zone around Minsmere and Walberswick. Despite considerable range contractions in the UK, overall nightingale numbers only declined by 8% between annual censuses conducted in 1980 and 1999 by the BTO. This was partly due to a 140% increase in Suffolk between the surveys (Piotrowski, 2003). Even allowing for some decline at county level since this date it is unlikely that the population recorded within the BE Estate in 2007 is of county importance.

Heronries within Suffolk are counted on an annual basis, and contemporary information on numbers will need to be secured from SOG / BTO to inform the Environmental Statement for

the development. The indication from readily available data is that numbers of nesting heron in Suffolk vary between 160 and 190 birds each year. Any increase in the number of herons nesting on the Sizewell Estate (from the one pair that currently occurs) would therefore infer county importance upon it.

4.2 Dabbling Duck Survey

The dabbling duck survey work indicated that there were 6 pairs of gadwall and 27 pairs of mallard breeding within the survey area in 2007. Numbers of gadwall appear relatively consistent with surveys undertaken by SWT in 2005 and 2006, when 8 and 5 pairs were recorded respectively. In 2007 gadwall territories were concentrated in two areas, with four pairs in the area of enclosed grazing marsh to the east of Nursery Covert and two further pairs on the 'eastern arm' of the Sizewell Belts, between Leiston Carr and Leiston Common. Gadwall populations continue to grow at national level, and a minimum of 861 pairs were reported from English sites alone in 2000 (Brown & Grice, 2005). This indicated that the ditch systems on the Sizewell Marshes are likely to be of county rather than national importance for the species. Mallard numbers on the Marshes are also likely to be of county importance, as the Suffolk population is estimated to be in the region of 1,000 pairs (Piotrowski, 2003).

As a result of the dabbling duck surveys, population estimates of five pairs of mute swan, one pair of coot and fifty moorhen territories were also derived, while little grebe bred successfully, with at least one chick fledging. A census of mute swans conducted by SOG in 1990 recorded 131 pairs (Wright, 1991), indicating that this population is likely to be of county importance. In addition to the birds recorded above, draft figures from SWT indicate that single pairs of breeding teal, tufted duck and shoveler, all of which are likely to be of county importance, bred in 2007. Water rail numbers within the Estate are also of county importance. BTO Data indicates that 700 to 1400 pairs breed in Britain (BTO Website, 2007). Brown & Grice (2005) suggested that in excess of 1,000 pairs occur in England. Piotrowski (2003) does not provide a county estimate of water rail numbers, but does state that the species is mainly found in coastal wetlands. Given a localised county distribution and the numbers of birds apparently holding territory within the BE Estate, the Sizewell Marshes are therefore of county importance for the species.

4.3 Hobby Survey

Dunwich Forest

Hobbies were initially recorded displaying over farmland to the north-west of Kenton Hills and flying from Sizewell Marshes towards Dunwich Forest on 5 May. Surveys conducted on 14 May concentrated on the Goose Hills area of Dunwich Forest. During these surveys a high display flight, which included circling and stooping, was recorded. A hobby was subsequently seen calling to a second (flying) bird, from a perch in a cluster of five mature pines adjacent to an area of younger plantation towards the eastern end of Goose Hills. A third bird then joined the pair, and the picture became confused, with the apparent territory being temporarily abandoned. By the evening, however, there was no sign of a third bird and a pair had returned to the same location.

Following this early season territorial activity, despite relatively regular records indicating that birds were continuing to use the area, breeding was not confirmed until late August. Records of four birds, including two juveniles were recorded on a number of dates in the Goose Hills area and subsequently in Reckham Pits Wood.

The registration presented on **Figure 3.2** therefore represents an indicative rather than a confirmed central territory location. The area will be investigated further for evidence of pellets, kills and nests during September, as young are now known to have fledged. The location of the lookout perch of the male bird is usually within sight of the nesting tree (Sergio *et al*., 2001) and this may provide further confidence to support the conclusion that this area was close to the centre of the territory.

Broom Covert

The presence of a pair of breeding hobby in Broom Covert was first suspected as a result of calls heard coming from within the plantation during a territory mapping survey.

During early August breeding was confirmed. Adult birds were recorded consistently commuting back and fore to Broom Covert on 5 and 9 August, and a range of other behaviour was noted including repeated sightings of two birds; extended flights over the plantation which included periods when a bird was recorded as 'hanging in the air'; occupancy of perches in the plantation by two birds; calling between adults, and territorial defence/alarm calling in response to a carrion crow commuting over. On two occasions on 9 August begging calls were heard from within the plantation in response to adults flying over. The centre of all territorial activity was near the western edge of the plantation, and it is assumed that the nest site was very close to where this observed activity occurred. Subsequent to the August hobby surveys, three hobbies were seen together in flight over Broom Covert, and it is therefore reasonable to assume that at least one young bird fledged.

Ash Wood

Sightings of hobby activity in the Ash Wood area during territory mapping surveys, and calling birds heard incidentally on three separate occasions, also led to the potential for a further pair to be nesting in Ash Wood being investigated. The indications that a territorial bird or pair was present were circumstantial however, with the most compelling evidence being the behaviour of an adult bird on 5 August. This bird, initially seen perched on a dead tree in the north-east corner of the wood, was observed flying from the perch and returning to the wood on several occasions. The location of the perch is marked on **Figure 3.2** with a BTO two letter symbol, and the total number of hobby territories in **Table 3.1** is shown as 2(3) in recognition that a third pair could have been present. No indication of fledging has been recorded from Ash Wood, and as only one bird was ever recorded in the area there are a number of possible explanations for the observed activity. The nearest that a nest site could be to the preliminary works area if hobby did breed in Ash Wood would be approximately 1.3km distant. Further work is being conducted to identify whether prey remains, pellets, nests, or any other signs that indicate a potential nest site, are present in this area.

4.3.1 Summary of Hobby Activity

The results of the field surveys suggest that two pairs of hobby bred within the survey area. Both were within the BE Estate, in plantation to the south-east of Broom Covert and in the Goose Hills area of Dunwich Forest respectively. The nesting location in Broom Covert,

approximately 1.1km from the proposed new build, has been mapped with confidence, while the location in Goose Hills, which is approximately 300m from the build area, is more indicative. The presence of a third territory in Ash Wood cannot be discounted, as hobby nests have been recorded as close together as 200m (Sergio *et al*., 2001) and the local foraging resource is exceptional. There is no strong evidence to conclude that there are three active territories as a result of the survey work, however.

Wright (2001) (in Piotrowski (2003)) reported that between 15 and 25 pairs of hobby occur annually in Suffolk. While the species is very difficult to census accurately and the population continues to grow at national level, 2 pairs is likely to exceed 1% of the county total and the BE Estate is therefore of county importance for the species. The population is unlikely to be of national importance, however, as Brown & Grice (2005) estimated that between 1,000 and 2,000 pairs of hobby now breed in England, and the range of the species continues to expand.

4.4 Intertidal and Inshore Marine Survey

The survey work to date indicates that the warm water outfall that serves the built nuclear power stations at Sizewell provides a regionally important foraging resource for gulls and common terns, including a substantial proportion of breeding common terns and some black-headed gulls from the breeding colonies at Minsmere. Numbers of birds foraging and loafing in this area considerably exceed numbers that occur in the inshore waters off the preliminary works area, where no significant concentrations of any species have been found to date. Little tern, which is a qualifying species of the Minsmere to Walberswick SPA, has not been recorded foraging in the area on more than an occasional basis, and Mediterranean gull, which has a very low national breeding population (Mitchell *et al*., 2004) has not been recorded feeding or loafing in the survey area. At Dungeness Nuclear Power Station, small numbers of Mediterranean gull commonly forage around the warm water outfall, and growth in the small Minsmere breeding population may result in the outfall becoming a feeding resource for this species.

Common terns are known to switch rapidly between prey types and feeding methods as circumstances change (Snow & Perrins, 1998), while all gull species recorded in association with the outfall are also opportunistic feeders. It is therefore likely that these adaptable species are taking advantage of a food resource that has been made more accessible by the operation of the power station. Sea water is constantly pumped into the nuclear plant in order to cool the reactor, before being pumped back out to sea (the outfall). To prevent debris and large marine organisms entering the cooling water, the intake is covered with mesh. This mesh does not prevent small fish and amphipods being sucked in, however. The water is subsequently warmed, during which these organisms are killed or become moribund, and expelled where they can be picked off by surface feeders such as gulls and common tern.

The Minsmere common tern colony is of county importance, as ‘Seabird 2000’ data suggests that less than 200 pairs breed in Suffolk (Mitchell *et al*., 2004). The number of common terns feeding at the outfall during the breeding season, and the evidence of direct flights to and from the outfall from Minsmere, indicate that it is a key foraging area for this population.

The surveys have not indicated that there is a regularly used flight line over the upper reaches of the shore by commuting and migrating wildfowl or waders during the late spring passage, summer and early autumn passage periods. During the survey period recorded movements have been relatively small scale, and have occurred on a relatively broad front, with birds moving

parallel to the shore and showing no reaction to the built power station (i.e. they were not observed moving further offshore or inshore in response to it)..

4.5 Non-Breeding Birds and Passage Migrants

A bittern was heard 'booming' from an area of marsh approximately 450m due west of the preliminary works area (a field between Kenton Hills and Grimseys) on 16 April. It called at least six times, which allowed the surveyor to triangulate an approximate position by moving around the boundary of the wetland habitat. It had apparently been present the previous day, when it was heard by Alan Miller (SWT). It is highly unlikely that breeding occurred in this location, as bitterns tend to favour large reedbeds of over 200 hectares in extent (Gilbert *et al.*, 1998). The bird was not heard again during the survey work, although its location was communicated to the RSPB who have undertaken considerable work on bittern vocalisations and radio-tracking.

Bittern was first recorded at Sizewell in 1997, since when there have been virtually annual sightings. In 2002 and 2003, year-round use of the marshes by a single bird was noted, although most other records have been in winter or post-breeding. A radio-tagged bird was recorded commuting between Sizewell and Minsmere in winter 2000/01 (Sizewell Land Management Reviews [SWT / ADAS], 1998-2007). Due to the low populations of both breeding and wintering bittern in the UK, any site regularly supporting the species is of national importance. The Minsmere population is of European importance, however, and there is an ecological link between the two areas, meaning that the bird observed contributes to the integrity of the Minsmere SPA.

Waterfowl and waders recorded during the season included regular sightings of little egret on the grazing marshes; April records of small numbers of teal, tufted duck, feral greylag and Canada geese on the large pool in the Sizewell reedbed, and small numbers of passage green sandpiper and snipe feeding and commuting over the survey area. During the spring passage period single greenshank and whimbrel were recorded flying over the survey area.

Non-breeding raptors included a buzzard in July, regular sightings of foraging and commuting marsh harriers (which are a qualifying feature of the Minsmere to Walberswick SPA), a record of a merlin near Fiscal Policy on 4 May and a female goshawk near the main Sizewell power station car park on 16 April.

Tree pipit was recorded singing at Kenton Hills on 10 April, but subsequent visits did not record the species in this area, and it was assumed to be a passage bird. Other passage species recorded included ring ouzel, wood warbler (singing near the car park at Fiscal Policy), yellow wagtail, wheatear and whinchat.

5. Conclusions

The breeding bird surveys and desk study exercise have shown that the preliminary works area and immediately adjacent habitats support a limited bird community mainly comprising common and widespread passerines, a few of which are red-listed species of conservation concern. In close proximity to the proposed new build, the ditches support small numbers of breeding wildfowl including mute swan, mallard and moorhen. No waders were recorded breeding within the preliminary works area. The only highly protected species breeding in immediate proximity to the build area was Cetti's Warbler, although suitable breeding habitat for this species is around the periphery of the preliminary works area rather than within it. This suggests that the direct effects on the breeding bird community as a result of land take would be of limited importance. In contrast, the wider survey area, which took in the vast majority of the BE Estate, supports a considerable diversity of breeding and foraging species, some of which are qualifying species of the adjacent Minsmere to Walberswick SPA, some which are statutorily protected and others which are present in numbers of county importance.

Qualifying species of the Minsmere to Walberswick SPA that occur within the BE Estate are bittern and marsh harrier. Avocet, little tern and nightjar (which are also qualifying species) do not breed on or within the survey area, and have not been recorded foraging or commuting over areas where they are likely to be in any way affected by new nuclear build during the baseline survey programme. There is also no indication from historical data that effects on these species are likely to occur. Shoveler, teal, gadwall and woodlark breeding within the BE Estate at Sizewell are not considered to be directly ecologically linked to the Minsmere to Walberswick or Sandlings SPA populations respectively, as they are likely to forage within the confines of the marshes / the Estate boundary. The exact nature of breeding season use of the survey area by bittern is not understood at present, however. A male bittern was heard calling territorially within the Sizewell Marshes on two consecutive days in early summer. It is possible that foraging bitterns commute between the SPA and the Sizewell Marshes / adjacent areas of marsh owned by RSPB during the breeding season. Further survey work will therefore be required to determine the likely scale of any potential impact and to inform any Appropriate Assessment. In addition, although it is known that at least two marsh harriers commonly use the Sizewell Marshes (as both male and female birds have been recorded), further work will be required to indicate how many harriers use the area and with what frequency. Outline recommendations to address these data gaps are included in Section 6 (Recommendations).

The surveys and desk study have illustrated that the Sizewell Marshes SSSI is no longer of national importance for its breeding bird community. The bird community was not the principal interest of the SSSI at the time of designation, but does feature prominently in the site description. Breeding populations of several species that occur within the Sizewell Marshes are nevertheless of county importance (mute swan, gadwall, mallard, water rail and Cetti's warbler). It is likely that adequate mitigation can be developed to minimise any potential effects on these species without the necessity for further breeding season work, particularly given the annual surveys of the area that are undertaken by Suffolk Wildlife Trust and the depth of baseline data.

Highly protected breeding species that do not occur in the preliminary works area but are present within the wider survey area are hobby, barn owl, kingfisher and woodlark. Both hobby and woodlark breed in habitats that could be lost to site compounds or the site access road,

while barn owl and kingfisher breeding locations would be unlikely to be affected. It is likely that suitable mitigation to prevent and minimise effects on all of these species can be developed without further survey work.

This survey area also has a nightingale population that is of county importance and a number of other breeding species of particular conservation interest due to rapid declines at national and regional level (including turtle dove, spotted flycatcher, marsh tit and a range of declining farmland passerines). It is not envisaged that further generic breeding bird survey work will be required prior to an ES for the site being submitted. The RSPB has indicated that for this location it will accept data from breeding bird surveys as being relevant up to five years after it was collected, assuming no changes in management or other confounding factors (Kirsty Coutts, RSPB, pers comm.), and annual surveys conducted by SWT can also be used to inform the EIA process.

Surveys of the intertidal zone and inshore marine waters adjacent to the preliminary works area and the built nuclear power station have indicated that there is very little use of the shore in either area by seabirds and waders during the survey period. Gull and common tern foraging activity centres on the warm water outfall of the existing nuclear plant, and there is regular commuting between the breeding common tern colony at Minsmere and the outfall, indicating that this is an important feeding area for breeding bird populations of county importance. The waters adjacent to the preliminary works area had very low levels of use by feeding terns and feeding and loafing gulls during the work. No regular flight line of seabirds, wildfowl or waders over the preliminary works area was noted, although broad front movements of waders and commuting flights of small numbers of oystercatchers and avocets were recorded over the inshore waters (parallel to the shoreline). No avoidance of or attraction to the built nuclear power station was indicated by the flight lines of these or other wader species. Therefore, it seems reasonable to assume that a new power station would have no likely negative effects on species using the intertidal and inshore marine areas, whereas it would result in the likely creation of a new foraging resource.

Survey work, comprising bi-monthly intertidal surveys from both of the two observation points and a programme of winter passerine surveys to complement the winter wildfowl and farmland bird surveys conducted by SWT, is ongoing and will conclude in March 2008.

6. Recommendations

- Further survey work will be required in the 2008 breeding season to investigate the level of use of the survey area by bittern and marsh harrier from the Minsmere and Walberswick SPA populations. This information will be used to inform any Appropriate Assessment that is required. Survey methodologies will need to be discussed with consultees, particularly RSPB, prior to the instigation of work;
- The proximity of wader territories on the Minsmere South Marshes[27] to the preliminary works area will need to be investigated in order that potential effects can be assessed;
- Mitigation measures for key breeding species can begin to be explored through consultee meetings organised to discuss the results of the survey work and desk study that are detailed in this report;
- As the results of the various ecological surveys become available and the design of the project progresses, the Integrated Land Management Plan (ILMP) for the BE Estate (ADAS, 2006) should be reassessed to ensure that key species likely to be affected by the build have appropriate targeted conservation initiatives implemented elsewhere within the land holding.

[27] On land owned by RSPB.

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