



The Sizewell C Project

6.10 Volume 9 Rail

Chapter 7 Terrestrial Ecology and Ornithology

Appendix 7A Ecological Baseline and Method Statements

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VOLUME 9, CHAPTER 7, APPENDIX 7A – ECOLOGICAL BASELINE AND METHOD STATEMENTS

Documents included within this Appendix are as follows:

ANNEX 7A.1 - FIGURES (provided separately)

ANNEX 7A.2 - DESK STUDY

ANNEX 7A.3 - SECONDARY DATA

- **ANNEX 7A.3 - ALDHURST FARM WEST, BAT SURVEY**

REPORT 2012

- **ANNEX 7A.3 - LAND WEST OF LOVER'S LANE, BAT**

SURVEY REPORT 2012

- **ANNEX 7A.3 - PHASE 1 HABITAT SURVEY 2011**

- **ANNEX 7A.3 - BIRD SURVEY REPORT 2011-12**

- **ANNEX 7A.3 - GREAT CRESTED NEWT SURVEY 2012**

ANNEX 7A.4 - PRIMARY DATA

**ANNEX 7A.5 - DRAFT BAT METHOD STATEMENT TO
SUPPORT A LICENCE APPLICATION**



ANNEX 7A.6 - NON-LICENSABLE METHOD STATEMENTS:

- ANNEX 7A.6A - GREAT CRESTED NEWTS
- ANNEX 7A.6B - REPTILES

NOTE:

Please note that the red line boundary used in figures within this document may have since been amended, and therefore does not reflect the boundaries in respect of which development consent has been sought in this application. However, the amendment to the red line boundary does not have any impact on the findings set out in this document and all other information remains correct.



VOLUME 9: CHAPTER 7: APPENDIX 7A: ECOLOGICAL
BASELINE

Contents

Executive Summary.....	1
1. Ecological Baseline.....	4
1.1 Introduction.....	4
1.2 Legislative Framework.....	6
1.3 Scope of the Baseline.....	10
1.4 Desk-Study/Baseline Data.....	13
1.5 Baseline Conditions – Ecological Features and their Importance.....	43
References	79

Tables

Table 1.1: Specific Zol, study area and survey areas for ecological features	12
Table 1.2: Statutory sites located within 5km of the site	16
Table 1.3: Non-statutory designated site within 2km of the site boundary	18
Table 1.4: Habitat Suitability Index scores for ponds at the site	23
Table 1.5: Summary of amphibian surveys in 2014 (conventional survey methods) and 2016 (eDNA survey methods)	23
Table 1.6: Desk-study records for notable bird species and their status within 2km of the site	26
Table 1.7: Species of conservation concern recorded during the breeding bird surveys	28
Table 1.8: Species of conservation concern recorded during the Winter bird surveys.....	29
Table 1.9: Number of passes and relative bat activity recorded during transect surveys in 2011.....	31
Table 1.10: Relative activity levels recorded during static detector surveys in 2011.	32
Table 1.11: Summary of bat tree assessment results.....	37
Table 1.12: Criteria for assessment of ecological importance*	44
Table 1.13 Criteria for assessing the importance of the bat species within the Zol of the Project. Note that Zol differs between species	56
Table 1.14 Summary of geographical importance boundaries.....	57
Table 1.15 Summary of the elements considered in determining the geographical context (Ref 1.5) of each species’ importance.*	57
Table 1.16 Determination of IEFs to be taken forward for detailed assessment.....	71

Plates

None provided.

Figures

Figure 7.1: Location of Statutory Designated Sites within 5km of Green Rail Route

Figure 7.2: Location of Non-statutory Designated Sites within 2km of Green Rail Route

Figure 7.3: Green Rail Route Phase 1 Habitat Survey

Figure 7.4: Green Rail Route Great Crested Newt Surveys

Figure 7.5: Red and NERC Species Recorded on Green Rail Route during the Breeding Bird Surveys in April – June 2014

Figure 7.6: Schedule 1 Bird Species Recorded on the Green Rail Route during Winter Bird Surveys in November 2014 – March 2015

Figure 7.7: Red Listed and NERC Listed Bird Species Recorded on the Green Rail Route during Winter Bird Surveys in November 2014 – March 2015

Figure 7.8: Green Rail Route Bat Tree Assessment Results 2015

Figure 7.9: Green Rail Route Activity Transect Routes and SM2 Locations

Figure 7.10: Location of Common Pipistrelle Passes Recorded during Green Rail Route Activity Transect Routes 1 and 2, May – October 2014

Figure 7.11: Location of Soprano Pipistrelle Passes Recorded during Green Rail Route Activity Transect Routes 1 and 2, May – October 2014

Figure 7.12: Location of Barbastelle Passes Recorded during Green Rail Route Activity Transect Routes 1 and 2, May – October 2014

Figure 7.13: Location of Big Bat Passes Recorded during Green Rail Route Activity Transect Routes 1 and 2, May – October 2014

Figure 7.14: Location of *Myotis* spp. Passes Recorded during Green Rail Route Activity Transect Routes 1 and 2, May – October 2014

Figure 7.15: Location of Statutory Designated Sites within 5km and Non-statutory Designated Sites within 2km of the Saxmundham to Leiston branch line upgrades – Bratt's Black House

Figure 7.16: Ponds within 500m of Saxmundham to Leiston branch line upgrades – Bratt's Black House

APPENDICES

Annex 7A.1: Figures

Annex 7A.2: Desk Study

Annex 7A.3: Secondary Data

Annex 7A.4: Primary Data

Annex 7A.5: Draft Protected Species Licenses

Annex 7A.6: Non-licensable Method Statements

Executive Summary

Baseline ecological conditions were assessed within habitat, species or species assemblage-specific, Zones of Influence (Zol) of the green rail route (the 'proposed rail extension route') and Saxmundham to Leiston branch line upgrades (the 'proposed rail improvement works') (together the 'proposed development') and wider study area. The ecological baseline has specifically considered designated sites, plants and habitats, invertebrates, amphibians, reptiles, birds, bats and other terrestrial mammals.

A Zol of 5km was assigned for statutory designated sites, and a Zol of 2km was assigned to non-statutory designated sites, plants and habitats, invertebrates, reptiles, amphibians, birds and terrestrial mammals, which is considered to be conservative. Species-specific Zols were assigned to bat species, ranging from 10km (barbastelle (*Barbastellus barbastellus*)) to 2km (common pipistrelle (*Pipistrellus pipistrellus*)), based on the species' Core Sustenance Zones (CSZs) as defined by the Bat Conservation Trust (Ref 1.1).

Desk study data from the Suffolk Biodiversity Information Service was obtained within the relevant Zol, for notable species of conservation interest. A range of species considered to be typical of the habitats present within these areas was identified. Surveys were undertaken between 2011 to 2016 and have been used to help assess the current baseline conditions, these included:

- an extended Phase 1 habitat and protected species surveys in 2011 and 2014;
- targeted amphibian surveys in 2011 and 2014;
- breeding and wintering bird surveys in 2011, 2012, 2014 and 2015;
- bat activity and static detector surveys in 2011 and 2014; and
- bat tree assessments in 2016.

It should be noted that the above surveys were for the proposed rail extension route only, as no access was granted for the proposed rail improvement works. For the proposed rail improvement works, only one site was scoped into the assessment, Bratt's Black House, and only desk study information has been included within the baseline for this site.

Twelve statutory designated sites (two Ramsar sites, four SPAs, two SACs and four SSSIs) were identified within a 5km radius of the proposed development. Six non-statutory County Wildlife Sites (CWS) were identified within a 2km radius of the site.

The area within the site boundary predominantly consists of intensively managed arable land bounded by fences and hedgerows. The hedgerows are primarily species-poor with large gaps; however, three sections of hedgerow were assessed as being 'Important', under the Wildlife and Landscape Criteria of the Hedgerow Regulations (Ref

1.2). Several woodland blocks were identified, most notably an area of ancient semi-natural woodland (Buckle's Wood CWS) adjacent to the site at the north-western end of the route. Thirty-three waterbodies (ponds) are within 500m of the proposed development, with none holding water identified within the site boundary.

The proposed development supports an assemblage of plants, invertebrates and terrestrial mammals typical of the habitats present. A great crested newt (*Triturus cristatus*) meta-population was identified spread across a number of ponds within the amphibian Zol of the proposed development. Habitats present within the site are largely sub-optimal for reptiles. The proposed development also supports a small number of wintering Schedule 1 bird species, as listed on the Wildlife and Countryside Act (Ref 1.3), as well as a number of species listed on both the Red and Amber Birds of Conservation Concern (BoCC) lists (Ref 1.4) recorded during both the breeding and wintering bird seasons. Ten species of bat have been recorded within the Zol, and a number of trees with the potential to support roosting bats was identified within and adjacent to the proposed development. Bat activity surveys recorded predominantly common and soprano pipistrelle (*Pipistrellus pygmaeus*) activity with low levels of activity recorded of other species (this did include the nationally rare barbastelle). A Natterer's bat (*Myotis nattereri*) maternity roost was identified at Leiston Abbey (approximately 300m to the north). A common pipistrelle maternity roost was identified within a building at Gypsy Lodge approximately 360m to the west of the proposed development. A soprano pipistrelle roost, though not specifically identified, was considered likely to be present in close proximity to the proposed development with both pipistrelle species using the site as a core foraging area. The Zol of the proposed development supports breeding populations of barbastelle, Natterer's bat, brown long-eared bat (*Plecotus auritus*), and common and soprano pipistrelle. A single male barbastelle was recorded roosting within Wood Farm (within 50m of the proposed development boundary to the east) in 2010. An outlier and subsidiary badger (*Meles meles*) sett were identified that could be affected by the proposed development.

To ensure a robust Ecological Impact Assessment (EclA) process, species and habitats of conservation interest and/or legally protected or designated species and habitats within the relevant Zol of the Site have been assessed to determine whether or not they would qualify as Important Ecological Features (IEFs) as defined in the Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines on EclA (Ref 1.5) In addition, habitats and species have been assessed in accordance with the standard EIA methodology used elsewhere within the Environmental Statement (ES).

The CIEEM guidelines (Ref 1.5) define IEFs on the basis of nature conservation importance as well as legally protected and/or controlled species where there is the potential for a breach in the relevant legislation as a result of the proposed development. This baseline report focuses on those IEFs that have been assessed as being sufficiently important (in nature conservation terms) to be a material consideration in the planning decision. Those IEFs that qualify purely on the basis of legislative considerations are discussed in less detail and are addressed separately in the EclA.

On the basis of these criteria, the following species/habitats within the Zol of the proposed development have been classified as IEFs and scoped into the detailed assessment of the EclA:

Proposed rail extension route:

- Buckle's Wood CWS is an IEF and the county level under CIEEM guidelines (Ref 1.5) and of medium importance, following the EIA-specific assessment methodology.
- Great crested newt is an IEF at the county level under the CIEEM guidelines (Ref 1.5) and of medium importance, following the EIA-specific assessment methodology.
- The bat assemblage is an IEF at the county level under the CIEEM guidelines (Ref 1.5), and of medium importance following the EIA-specific assessment methodology.

Proposed rail improvement works - Bratt's Black House:

- Great crested newt is an IEF at the local level under the CIEEM guidelines (Ref 1.5) and of low importance, following the EIA-specific assessment methodology.

1. Ecological Baseline

1.1 Introduction

a) Purpose of this appendix

1.1.1. SZC Co. is proposing to build a new nuclear power station at Sizewell, known as Sizewell C. The new nuclear power station would be located on the Suffolk coast, north-east of the town of Leiston. The proposed site of Sizewell C lies within an area of high landscape and ecological sensitivity.

1.1.2. As part of the development proposals, a number of sites where associated development are required to support construction and operation of Sizewell C. These associated development sites are not located within the Sizewell C main development site (hereafter referred to as the 'main development site'). Further detail is provided in **Volume 1, Chapter 2**. Each of the associated development sites has been subject to a suite of ecological survey work and desk-study, and the ecological baseline has been developed for each associated development site. This appendix presents the ecological baseline for:

- the part of the green rail route comprising a temporary rail extension of approximately 1.7km from the existing Saxmundham to Leiston branch line to the proposed B1122 (Abbey Road) level crossing (the 'proposed rail extension route'); and
- Saxmundham to Leiston branch line upgrades (including track replacement and level crossing upgrades) (the 'proposed rail improvement works');
- (together the 'proposed development').

1.1.3. Detailed descriptions of the proposed development sites (referred to throughout this volume as the 'site' as relevant to the location of the works) the proposed development and different construction, operation and removal and reinstatement phases are provided in **Chapter 2** of this volume of the ES. A glossary of terms and list of abbreviations used in this chapter is provided in **Volume 1** of the ES.

1.1.4. To carry out a robust Ecological Impact Assessment (EclA) of the Scheme for the Environmental Impact Assessment (EIA), it is first necessary to determine the ecological baseline describing the existing conditions for the habitats and species that could be affected by the proposed development. Baseline conditions were determined through a combination of a desk-study and field surveys undertaken between 2011 and 2016.

1.1.5. This appendix to the proposed development **Chapter 7** of **Volume 9** of the **ES** presents the methodologies employed in carrying out the desk studies and detailed surveys (as well as the results of this work), and also evaluates the ecological features that could be affected. This then forms the ecological baseline for the impact assessment presented in **Chapter 7** of **Volume 9** of the **ES**.

b) **Structure of this appendix**

1.1.6. This appendix describes the ecological baseline conditions for designated habitats and sites, legally protected species and habitats, and species and habitats of conservation interest, within the Zone of Influence (Zol) of the proposed development and wider study area. Zol, study area and survey area are all defined in **section 3**.

1.1.7. Within this appendix, the following terms are used to describe the biological data underpinning the description of baseline conditions:

- Desk study – this refers to any third-party biological data held, for example, by the Suffolk Biodiversity Information Service or Suffolk Wildlife Trust (SWT), and that has been requested for the site and surrounding area.
- Secondary data – where available, this refers to relevant survey work which has been carried out by other parties (undertaken between 2011 and 2012). Whilst these surveys comprised detailed surveys carried out specifically for the site, and is therefore valuable for helping assess the current baseline conditions, the results relate to areas that now differ from the site boundary presented in the Development Consent Order (DCO) application which has been amended as a result of design development and the consultation process, and/or may require updating; therefore, this information has been treated as targeted and detailed secondary data.
- Primary data – this refers to survey work carried out from 2012 onwards specifically targeted at informing the proposed development. This has built upon the secondary data, and has been scoped with the consultees to ensure a robust and complete data set.

1.1.8. The remainder of this appendix is set out as follows.

- **Section 2** discusses the legislative framework of designated sites and legally protected and notable species and habitats.
- **Section 3** establishes the site boundary, Zol(s), study area and survey area for the proposed development.

- **Section 4** sets out the approach and methodology used for obtaining the desk-study information, secondary data and primary data used to inform the assessment, as well as the results of this data acquisition. The detail of the desk study information acquired is presented in **Annex 7A.2**, whilst the various other secondary data reports are presented in **Annex 7A.3**. Detailed results of any surveys carried out since 2012 are presented in **Annex 7A.4**.
- **Section 5** presents the collated baseline conditions for the relevant ecological receptors within the Zol. This section considers the nature conservation importance and legal protection for each ecological receptor and follows the Chartered Institute of Ecology and Environmental Management (CIEEM) guidelines (Ref 1.5) to assess whether the ecological receptors considered can be categorised as Important Ecological Features (IEFs). Those IEFs which may be materially affected by the proposed development are taken forward for detailed assessment within the EclA. The value and sensitivity of the ecological features are also assessed in accordance with the wider EIA methodology used elsewhere within the ES.

1.1.9. Figures summarising the ecological baseline with regard to IEFs are presented in **Annex 7A.1 - Figures**.

1.2 Legislative Framework

a) Introduction

1.2.1. This section provides a summary of the legislative and policy context regarding designated sites, legally protected and/or controlled species, and other habitats and species of nature conservation importance that could be affected by the proposed development. The aim is to summarise the key implications of this legislation and policy, particularly with regard to how it influences the assessment of IEFs.

b) Designated sites

1.2.2. Three classes of designated site are considered within this report.

- European designations: (Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar sites);
- national designations: (Sites of Special Scientific Interest (SSSIs)); and
- non-statutory Local (county) designations (County Wildlife Sites (CWSs)).

i. **European designated sites**

- 1.2.3. SPAs are classified in accordance with Article 4 of the European Community (EC) ‘Birds Directive’ (Ref 1.6). They are designated on behalf of rare and vulnerable birds (as listed on Annex I), and for regularly-occurring migratory species.
- 1.2.4. SACs are designated under the EC ‘Habitats Directive’ (Ref 1.7). Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive. The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds).
- 1.2.5. Ramsar sites are wetlands of international importance designated under the Ramsar Convention (Ref 1.8). They often cover a similar area to that already designated as a SAC and/or SPA, where these sites support a notable amount of wetland habitat.
- 1.2.6. Before a site can be designated as a European site, it must first have been designated as a SSSI. In many cases, a single European designation may encompass multiple SSSIs. The constituent habitats and species listed within the citations for European sites (often referred to as qualifying features) are considered to be of European/international importance for nature conservation.

ii. **National designated sites**

- 1.2.7. SSSIs are designated at the national (UK) level. Originally notified under the National Parks and Access to the Countryside Act (Ref 1.9), SSSIs were re-notified under the Wildlife and Countryside Act (Ref 1.3). Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act (Ref 1.10). The SSSI network in the UK provides statutory protection for the best examples of the country’s flora, fauna, and geological or physiographical features.
- 1.2.8. These sites are also used to underpin other national and international nature conservation designations (SACs, SPAs, Ramsar sites and National Nature Reserves (NNRs)). NNRs are declared by the national statutory nature conservation agencies under the National Parks and Access to the Countryside Act (Ref 1.9) and the Wildlife and Countryside Act (Ref 1.3).
- 1.2.9. The constituent habitats and species listed within SSSI and/or NNR citations are considered to be of national importance for nature conservation.

iii. Local designated sites

- 1.2.10. CWSs are non-statutory sites supporting habitats and/or species considered to be rare or vulnerable across the county.
- 1.2.11. In Suffolk they are identified via a panel that includes technical expertise from Natural England, SWT, Suffolk Biodiversity Information Service and Suffolk County Council (SCC). The panel evaluates proposed CWSs against agreed selection criteria to ensure that the sites meet the threshold for designation.
- 1.2.12. The constituent habitats and species listed within the citations of non-statutory designated sites are considered to be of county importance for nature conservation.

c) Legally protected and controlled species

- 1.2.13. Many species of animals and plants receive some degree of legal protection. For the purposes of this study, legal protection refers to species included on Schedules 1, 5 and 8 of the Wildlife and Countryside Act (Ref 1.3), species included on Schedules 2 and 5 of The Conservation of Habitats and Species Regulations (Ref 1.11), and badgers (*Meles meles*), which are protected under the Protection of Badgers Act (Ref 1.12).
- 1.2.14. Species that are fully protected under the Wildlife and Countryside Act (Ref 1.3) and/or Conservation of Habitats and Species Regulations (Ref 1.11), known as protected species and European Protected Species (EPS), respectively, tend to be the focus of impact assessments and nature conservation action in the UK. However, the geographical scale at which they are important varies from species to species. Thus, the designation of a species as an EPS does not necessarily mean that all individuals of that species are of European importance.
- 1.2.15. In addition, Schedule 9 of the Wildlife and Countryside Act (Ref 1.3) lists controlled species of animal that it is an offence to release or allow to escape into the wild, as well as species of plant that it is an offence to plant or otherwise cause to grow in the wild. These species are clearly not of any nature conservation importance (other than with regard to the damage they can do to habitats and species of importance), and are therefore not a material consideration in planning decisions. They do, however, require careful consideration in the design and implementation of development.

d) Priority habitats and species

- 1.2.16. Public bodies have a duty to conserve biodiversity, in accordance with Section 40 of the Natural Environment and Rural Communities (NERC) Act (Ref 1.13). In addition to designated sites and legally protected/controlled

species (discussed in **section 2.2** and **2.3**), a large number of habitats and species have been identified as a priority for biodiversity conservation within the UK. These features therefore also need due consideration in any EclA, although the level at which they are considered important will vary.

1.2.17. Priority habitats and species groupings considered within this report include:

- habitats and species of principal importance for the conservation of biological diversity in England, as listed under Section 41 of the NERC Act (Ref 1.13);
- species listed as being of conservation interest in the relevant UK Red Data Book (RDB) or the Birds of Conservation Concern (BoCC) Red List (Ref 1.14);
- Nationally Scarce species, which are species recorded from 16-100 10x10km grid squares in the UK;
- ancient woodland (i.e. areas that have been under continuous woodland cover since at least 1600, and which are listed within the relevant county Ancient Woodland Inventory); and
- habitats and species listed in the Suffolk's Biodiversity Action Plan (BAP) (Ref 1.14) and Suffolk's Priority Species and Habitats list (Ref 1.15).

1.2.18. It should be noted that a large number of habitats and species will qualify under more than one of the above instruments, and will also need to be considered at the correct spatial scale, so the process of assigning importance to these features is therefore a complex one. For example, within Section 41 of the NERC Act (Ref 1.13), habitats and species of principal importance for the conservation of biological diversity in England would be considered to be of national importance, reflecting the fact that these features have been assessed at a national level. However, this status relates to the total amount/population and distribution of habitat/species. The level of importance therefore pertains to the species/habitat concerned as a whole rather than to individual areas of habitat or species populations, which can be difficult to value objectively.

1.2.19. Within this ecological baseline report, detailed consideration is given to the importance assigned to each ecological feature (both habitats and species, and species assemblages), and this necessarily requires a degree of professional judgement.

1.3 Scope of the Baseline

a) Introduction

1.3.1. This section defines the terms ‘site boundary’, ‘Zol’, and ‘study area’ and ‘survey area’, and the terminology and approach applied to the ecological data.

b) Site boundary

1.3.2. Survey work conducted by pre-2012 was conducted for an area that differs from the site boundary proposed in the DCO application and upon which post-2012 ecological baseline surveys have been based. Further surveys undertaken to update any secondary data (where ecologically appropriate) and to take into account any changes to areas surveyed in relation to the site boundary. Please refer to **Figure 7.1 in Annex 7A.1** for the site boundary of the proposed development.

c) Defining the Zones of Influence

1.3.3. The Zol is defined as ‘the area over which ecological features may be affected by biophysical changes caused by a proposed project and associated activities’ (Ref 1.5).

1.3.4. It is not a simple task to define the extent of the Zol for the proposed development, as it follows that the Zol will be different for each ecological feature and with the biophysical change being considered. For example, disturbance to bird species caused by displaced recreational activities is likely to manifest itself over a larger area than disturbance caused to bird species arising from construction noise, which is likely to be limited to the area in close proximity to the construction activity.

1.3.5. An appropriate Zol has been defined for each ecological feature (species, assemblage or habitat) considered, using published information and professional judgement. Given the discrete nature of the associated development site proposals and the likelihood that effects arising from the proposed development will be highly localised, 5km is considered to be a suitable maximum radius over which to considered potential effects, unless otherwise defined for specific species or species groups. Statutory designated sites (SPAs, SACs, Ramsar sites and SSSIs) have been considered within a 5km radius, and CWS within a 2km radius.

1.3.6. For interest features of designated sites (i.e. species), only those designated sites falling within the Zol of that species or species assemblage are considered. For example, all statutory designated sites within 5km are considered, but only those falling within the 2km Zol for reptile species are

assessed for their specific value to reptile species (i.e. presence of reptile species as a cited interest feature).

- 1.3.7. Full details of the Zol defined for the considered ecological features is provided in **section 3.5**.

d) **Defining the study area and survey area**

- 1.3.8. The study area is the land within the site boundary and Zol (as defined within **section 3.3**) of the proposed development. This includes desk study data, primary data and secondary data (as defined in **section 1.2**). Again, it follows that the study area will differ depending on the type of data and the data sets being considered. For example, desk study data relating to barbastelle (*Barbastella barbastellus*) extends over 10km, whilst information pertaining to breeding bird species covers a much smaller geographical extent, limited to a 2km radius of the proposed development site boundary.

- 1.3.9. The survey area is defined as ‘*the geographical extent over which a particular field survey activity took place*’. Similarly, it follows that the survey area will differ depending on the type of survey being considered. For example, great crested newt (*Triturus cristatus*) surveys were undertaken within the site boundary and a 500m radius, whilst no surveys were undertaken for invertebrates, reptiles or terrestrial mammals as the Phase 1 habitat and protected species survey identified habitats within the site boundary to be sub-optimal for these species.

- 1.3.10. Professional judgement has been used to ensure that sufficient ecological information has been obtained within the likely Zol that has been defined for each habitat and species assemblage. The study area for each habitat and species assemblage generally closely corresponds to the Zol, whilst the survey areas are more limited in extent, being targeted at key areas where it is envisaged effects on ecological receptors may manifest themselves. Surveys undertaken at different time periods (see definitions of secondary and primary data in **section 1.2**) may encompass a different geographical area as site boundaries and development plans have developed and altered over time. For some ecological features, it was not considered necessary to undertake specific field survey work. In these instances, the ecological baseline has been informed by desk study or other secondary data obtained within the defined study area.

e) **Defining Zol, study area and survey area for ecological features**

- 1.3.11. **Table 1.1** defines the Zol, study area and survey area for the considered ecological features.

Table 1.1: Specific Zol, study area and survey areas for ecological features

Ecological Feature		Zol	Study Area	Survey Area
Designated Sites	Statutory designated	5km	5km	
	Non-statutory designated	2km	2km	N/A
Plants and Habitats		2km	2km	Within the site boundary*
Invertebrates		2km	2km	Not surveyed as habitat suboptimal
Reptile		2km	2km	Not surveyed as no suitable habitat identified
Amphibians		2km	2km	Within the site boundary* and a 500m buffer area**
Birds		2km	2km	Within the site boundary*
Bats	Daubenton’s bat (<i>Myotis daubentonii</i>)	2km	2km	Within the site*
	Natterer’s bat (<i>Myotis nattereri</i>)	4km	4km	
	Noctule (<i>Nyctalus noctula</i>)	4km	4km	
	Leisler’s bat (<i>Nyctalus leisleri</i>)	3km	3km	
	Common pipistrelle (<i>Pipistrellus pipistrellus</i>)	2km	2km	
	Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	3km	3km	
	Nathusius’ pipistrelle (<i>Pipistrellus nathusii</i>)	3km	3km	
	Serotine (<i>Eptesicus serotinus</i>)	4km	4km	
	Barbastelle	10km	10km	
	Brown long-eared bat (<i>Plecotus auritus</i>)	3km	3km	
Terrestrial Mammals		2km	2km	Not surveyed as habitat unsuitable

* Note that ‘within the site boundary’ includes land directly to the west of the current site boundary, which was included within the site boundary that was active at the time of surveying.

** This is in accordance with standing advice from Natural England for assessing the impacts of developments on great crested newts.

1.3.12. Consideration of the Zol, study area and survey area for bats has been undertaken on a species-specific basis to take into account species-specific variations in foraging and commuting distances. The Zol for bat species has therefore been determined on the basis of Core Sustenance Zones (CSZs), which have been defined by the Bat Conservation Trust (Ref 1.1), through an extensive literature review. With reference to planning and development the CSZ is defined as:

- The area surrounding the roost within which development work can be assumed to impact the commuting and foraging habitat of bats using the roost, in the absence of information on local foraging behaviour. This will highlight the need for species-specific techniques where necessary.
- The area within which mitigation measures should ensure no net reduction in the quality and availability of foraging habitat for the colony, in addition to mitigation measures shown to be necessary following ecological survey work.

1.3.13. CSZs may be used to indicate commuting and foraging areas used by bats in relation to a roost, and to interpret the results of data searches. The only variation that has been made from the use of CSZs is in the case of barbastelle. The CSZ determined for barbastelle is 6km; however, the Zol has been increased to 10km on the basis of the results of radio-tracking surveys across the main development site which showed barbastelle to be using larger areas in that location (**Volume 2, Appendix 14A8 - Bats**).

1.4 Desk-Study/Baseline Data

a) Approach and methodology

i. Desk study

1.4.1. Records were requested from Suffolk Biodiversity Information Service in December 2014 and those of protected or otherwise notable species of conservation interest within 2km of the site were obtained. A further desk-study data request was made to Suffolk Biodiversity Information Service in March 2016 for bat records within 10km of the site to take into account the CSZ (see **section 3**).

1.4.2. Statutory and non-statutory designated sites were considered within the following radii of the site:

- internationally (SPA, SAC and Ramsar) and nationally (SSSI and NNR) recognised sites within 5km; and

- locally recognised sites (Local Nature Reserves and CWS) within 2km.

1.4.3. Where designated sites were found to fall within the radii detailed above, citations were obtained from Suffolk Biodiversity Information Service /the Joint Nature Conservation Committee and Natural England’s websites. The citations were reviewed to allow for an assessment of the likely presence of any species or habitats of nature conservation importance which may pose a constraint to the site.

1.4.4. Suffolk’s Priority Species and Habitats list (Ref 1.15), and the habitats and species of principal importance included on the Section 41 list of the NERC Act (Ref 1.13), were also reviewed with reference to the habitats and species present, or likely to be present, within the site and wider study area.

ii. Secondary data

1.4.5. Early surveys were conducted from 2011 up until 2012 for the associated development sites; however, the site boundary for the proposed development has changed significantly since these were completed. This data was reviewed to understand the baseline conditions relevant to the current site boundary. Secondary data used to inform this baseline included:

- extended Phase 1 habitat survey in 2011 (Ref 1.16) which encompassed the eastern end of the site comprising arable fields bordered by Abbey Lane on the north and Abbey Road to the east (identified as AD Site 1). This included a badger survey;
- great crested newt surveys in 2011 (Ref 1.17);
- an assessment of the site for the four common reptile species (slow-worm (*Anguis fragilis*), common lizard (*Zootoca vivipara*), adder (*Vipera berus*) and grass snake (*Natrix helvetica helvetica*)) as part the 2011 extended Phase 1 habitat survey. No targeted reptile surveys were carried out;
- breeding and wintering bird surveys in 2011 and 2012 (Ref 1.18); and
- bat surveys (walked transects and static detectors) in 2011 (Ref 1.19, Ref 1.20).

1.4.6. Relevant reports methodology and results are provided in **Annex 7A.3**.

iii. Secondary data – Post-2012

1.4.7. As part of the Sizewell C main development site, a substantial number of detailed surveys have been carried out, some of the results of which fall within the Zol of the site. As part of the compilation of the site baseline, a

review of this data was conducted. Any ecological data considered to be within the relevant ZOI for species that may be impacted by the proposed development have been described within the relevant results section. Full details of all surveys conducted for the main development site have been described in **Volume 2, Technical Appendices 14A1 to 14A9** and have not been repeated here.

iv. Primary data

1.4.8. Further surveys were undertaken between 2014 and 2016 both to update any secondary data (where ecologically appropriate) and to take into account any changes to areas surveyed in relation to the current site boundary. Further surveys included:

- extended Phase 1 habitat and protected species survey in 2014. This included a badger survey;
- great crested newt surveys (Habitat Suitability Index¹ and population surveys) from April to June 2014, and eDNA surveys in 2016;
- breeding bird surveys (April to June 2014) and wintering bird surveys (November 2014 to March 2015); and
- bat surveys including transects and statics (2014) as well as updated potential tree roost assessments (2016).

1.4.9. Full details of the methodologies employed can be found in **Annex 7A.4**.

1.4.10. As detailed in **Table 7.4** of **Chapter 7** of **Volume 9** of the **ES**, Bratt's Black House is the only level crossing improvement to be screened in for further assessment. Access has not been granted for baseline surveys; therefore, the baseline has been composed from available desk-study information only.

b) Results

i. Proposed rail extension route

Designated and non-designated sites

1.4.11. Twelve statutory designated sites (two Ramsar sites, four SPAs, two SACs and four SSSIs) are within 5km of the site. Details of these sites are provided in **Table 1.2** whilst their locations are presented on **Figure 7.1** in **Annex 7A.1**.

¹ Habitat Suitability Index refers to the suitability of ponds for supporting great crested newts, a score of excellent indicates that the pond is suitable to support great crested newts.

Table 1.2: Statutory sites located within 5km of the site

Site name	Distance from the site (km)	Reason for designation
Minsmere to Walberswick Heaths and Marshes SAC, SPA, Ramsar site and SSSI	2.3km north-east at the nearest point	<p>Annex I habitats that are the primary reason for selection of the SAC include: annual vegetation of drift lines, which occurs on a well-developed beach strandline of mixed sand and shingle and supports species such as Sea Sandwort (<i>Honckenya peploides</i>) and Sea Beet (<i>Beta vulgaris ssp. maritima</i>); and European dry heaths dominated by Heather (<i>Calluna vulgaris</i>), Western Gorse (<i>Ulex gallii</i>) and Bell Heather (<i>Erica cinerea</i>). The presence of perennial vegetation of stony banks is an Annex I habitat listed as a qualifying feature of the SAC.</p> <p>The SPA qualifies under Article 4.1 of the EC Birds Directive (Ref 1.6) by supporting populations of European importance of the following species listed on Annex I of the Directive: avocet (<i>Recurvirostra avosetta</i>), bittern (<i>Botaurus stellaris</i>), little tern (<i>Sterna albifrons</i>), marsh harrier (<i>Circus aeruginosus</i>), nightjar (<i>Caprimulgus europaeus</i>) and woodlark (<i>Lullula arborea</i>) during the breeding season; and avocet, bittern and hen harrier (<i>Circus cyaneus</i>) over Winter. The site is also a wetland of international importance and is therefore also designated as a Ramsar site under the Ramsar Convention (Ref 1.8).</p> <p>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.</p>
Sandlings SPA	2.2km south-east at the closest point	<p>Supports populations of European importance of the following Annex I species:</p> <p><i>During the breeding season</i></p> <p>Nightjar and woodlark.</p>
Outer Thames Estuary SPA	3km east	<p>Supports populations of European importance of the following Annex I species:</p> <p><i>Overwinter/passage</i></p> <p>Red-throated diver (<i>Gavia stellata</i>).</p>
Sizewell Marshes SSSI	930m east at the closest point	<p>Sizewell Marshes SSSI are important for their large area of lowland, unimproved wet meadows which support assemblages of invertebrates and breeding birds. Several nationally scarce plants are also present.</p>

Site name	Distance from the site (km)	Reason for designation
Leiston to Aldeburgh SSSI	2.2km south-east at the closet point	This site supports 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. The variety of habitats support a diverse and abundant community of breeding and overwintering birds, a high number of dragonfly species and many scarce plants.
Alde-Ore Estuary SPA, SAC, Ramsar Site and SSSI	4.8km south	<p>Annex I habitats that are the primary reason for selection of the SAC include estuaries. Annex I habitats present as qualifying features, but not primary reason for selection include: mudflats and sandflats not covered by seawater at low tide; and Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>).</p> <p>The SPA qualifies under Article 4.1 of the EC Birds Directive (Ref 1.6) by supporting populations of European importance of the following species listed on Annex I of the Directive: avocet, lesser black-backed gull (<i>Larus marinus</i>), little tern, marsh harrier and sandwich tern (<i>Sterna sandvicensis</i>) during breeding season, and avocet, redshank (<i>Tringa totanus</i>) and ruff (<i>Calidris pugnax</i>) during Winter.</p> <p>The site is also a wetland of international importance and is therefore also designated as a Ramsar site under the Ramsar Convention (Ref 1.8).</p> <p>The SSSI contains a number of coastal formations and estuarine features including mud-flats, saltmarsh, vegetated shingle and coastal lagoons which are of special botanical and ornithological value.</p>

1.4.12. The development proposals for the site will involve no direct land take from any of these statutory designated sites.

1.4.13. Six non-statutory designated sites are within 2km of the site and are detailed in **Table 1.3**. The location of these non-statutory designated sites are illustrated on **Figure 7.2** in **Annex 7A.1**.

Table 1.3: Non-statutory designated site within 2km of the site boundary

Site name	Distance from the site (km)	Reason for designation
Buckle's Wood CWS	Adjacent to the site, in the western area of the site	The site contains numerous old coppice stools mainly comprising Hazel (<i>Corylus avellana</i>), with Ash (<i>Fraxinus excelsior</i>), Field Maple (<i>Acer campestre</i>) and Hornbeam (<i>Carpinus betulus</i>). Standard trees include mainly Oak (<i>Quercus</i> spp.). There is a good ditch and bank boundary with a mixed-species hedge which, together with the old coppice stools, indicates woodland of some considerable age. Buckle's Wood is also listed on the Ancient Woodland Inventory for Suffolk.
Sizewell Levels and Associated Areas CWS	750m east of the proposed development	A large area of land, consisting of woodland, plantation, wet meadow, osier beds and scrub situated behind Sizewell A and B power stations, is considered to be of both regional and national importance for wildlife conservation.
Leiston Common CWS	1.3km south-east	Leiston Common is an important site for wildlife conservation in Suffolk. Bell Heather, a rare plant in Suffolk, grows on Leiston Common together with more widespread plants for example Harebell (<i>Campanula rotundifolia</i>), Heath Bedstraw (<i>Galium saxatile</i>) and tormentil (<i>Potentilla erecta</i>). Another notable and uncommon feature of the site is the presence of an extensive and diverse lichen flora.
Theberton Woods CWS	2km north-west at the closet point	Theberton Woods is an important example of a semi-natural boulder clay woodland that supports a diverse woodland flora. Although the woodland is not included in the ancient woodland inventory, it is shown on the 1st series O.S. maps and there are some earthworks that suggest it may be ancient. The woodland contains a large number of ponds supporting a significant population of great crested newt. The site includes an arable reversion field which has developed a flora typical of wet chalky boulder clay. This flora is similar to that of the existing and adjacent CWSs of Leiston Airfield and Kiln Meadow.
Leiston Airfield CWS	1.8km north-west at the closet point	This site consists of a mosaic of species-rich grassland and scrub. It is situated on the site of Leiston disused airfield. Although a small area, it supports many plants characteristic of unimproved grassland.
Minsmere Valley Eastbridge to Reckford Bridge CWS	1.4km east at the closet point	This area of marshland is situated in the central portion of the Minsmere Valley. The entire valley is of extreme importance for wildlife, forming the last unspoilt and least improved of Suffolk's larger marshland river valleys.. In 1994 the majority of this CWS was confirmed as part of the Minsmere-Walberswick SSSI

- 1.4.14. These sites comprise lowland mixed deciduous woodland and species-rich grassland, with the Minsmere Valley supporting wetland habitat, and Leiston Common supporting acid grassland and heathland. Lowland mixed deciduous woodland, species-rich grassland, wetland habitat, and heath are listed under Section 41 of the NERC Act (Ref 1.13) and these habitats are also targeted for action under Suffolk’s Priority Species and Habitats list (Ref 1.15).
- 1.4.15. The development proposals will involve no direct land take from any of these non-statutory designated sites.

Plants and habitats

- 1.4.16. The desk-study identified a number of records for plant species within 2km of the site. These records have been sorted by location to identify those recorded within or close to the site boundary. The results are presented in **Annex 7A.2** whilst a summary is presented below.
- 1.4.17. The plant species identified by the desk-study data can be divided into two broad categories: species such as Sea Pea (*Lathyrus japonicus maritimus*) and Dune Fescue (*Vulpia fasciculata*) associated with coastal vegetation on sand and shingle habitats; and species characteristic of the margins of arable fields, including Common Cudweed (*Filago vulgaris*) and Corn Spurrey (*Spergula arvensis*). Four Nationally Scarce species² were identified: Mossy Stonecrop (*Crassula tillaea*), Sea Pea, Dune Fescue and Sand Soft-Brome (*Bromus hordeaceus. thominei*) all species associated with coastal habitats. None of these species were recorded as being present within the site, nor are they expected to be within its boundary.
- 1.4.18. The Phase 1 Habitat Survey map and associated Target Notes are presented in **Figure 7.3** in **Annex 7A.1**. Target Notes are described in **Annex 7A.4** and are not repeated in this document. Those hedgerows assessed against the Wildlife and Landscape criteria of the Hedgerows Regulations (Ref 1.2) are indicated by green ‘hedgerow numbers’ H1 etc. The results of this assessment are also presented in **Annex 7A.4**.
- 1.4.19. No non-native invasive plant species were identified within or immediately adjacent to the site. The site area comprise predominantly intensively managed arable fields. The crops were ‘clean’ and had been treated with herbicide, such that no scarce arable weeds or other notable plant species were identified.
- 1.4.20. The fields are bounded by fences and hedgerows, the majority of the hedgerows present being species-poor with large gaps. Hedgerows H1, H2,

² NS – Nationally Scarce (Occurring in 16-100 hectares in Great Britain).

and H4, support a diverse mix of shrub species including Elm (*Ulmus sp.*), Hawthorn and Field Maple (*Acer campestre*), and ground flora was dominated by Dog's Mercury (*Mercurialis perennis*), Nettle (*Urtica dioica*) and Alexanders (*Smyrniololus atrium*). Hedgerows H1, H2, and H4 are 'Important' when assessed against the Wildlife and Landscape Criteria of the Hedgerows Regulations (Ref 1.2). The remaining hedgerows are species-poor and dominated by Hawthorn. Hedgerows are a Suffolk BAP priority habitat (Ref 1.14) and are listed under Section 41 of the NERC Act (Ref 1.13).

1.4.21. A number of blocks of woodland are present. Of particular note is Buckle's Wood CWS, a 4.3ha block of ancient semi-natural woodland located adjacent to the site (described in detail in Target Note 1). Buckle's Wood CWS is dominated by Ash and Oak, with an understory of Hazel, Holly and Hawthorn. The ground flora is dominated by Bluebell (*Hyacinthoides non-scripta*) and Dog's Mercury. A small, broadleaved copse (0.1ha) is located immediately east of Buckle's Wood CWS alongside Buckleswood Lane. The copse is dominated by Oak, Field Maple and Hazel, with a ground flora including Greater Stitchwort (*Stellaria holostea*), Dog's Mercury, Moschatel (*Adoxa moschatellina*) and False Brome (*Brachypodium sylvaticum*), described in more detail in Target Note 6. A further small copse (0.4ha) is located approximately 150m east of the site, located in the middle of a large arable field to the north of Buckleswood Lane. This supported a similar suite of flora species as the woodland already described; a detailed description is given in Target Note 9. Lowland mixed deciduous woodland is a priority habitat (Ref 1.14) and is listed as a habitat of principal importance under Section 41 of the NERC Act (Ref 1.13).

1.4.22. Twenty-eight bodies (ponds) were identified within 500m of the site, with none holding water identified within the site boundary. Of these, Pond 42 is located within the site boundary while Pond 41 is adjacent to the site boundary. The sites of both ponds were dry at the time of surveying in 2014 and considered to no longer exist. Ponds are a habitat listed under Suffolk's Priority Species and Habitats list (Ref 1.15).

Invertebrates

1.4.23. The desk-study identified a diverse range of butterfly and moth records within 500m of the site. These were mainly associated with Kenton Hills Wood located east of the site, and Sizewell Marshes SSSI to the east. Desk-study records revealed one butterfly species (the white-letter hairstreak (*Satyrrium w-album*)) that is a RDB listed species, protected under Schedule 5 of the Wildlife and Countryside Act (Ref 1.3) and listed under Section 41 of the NERC Act (Ref 1.13), and on Suffolk's Priority Species and Habitats list (Ref 1.15). The five records for this species were outside of the site boundary. White-letter hairstreak feeds on Elm (*Ulmus sp.*) so could potentially be present along the hedgerows that border and are bisected by the site.

NOT PROTECTIVELY MARKED

- 1.4.24. Desk-study records revealed four butterfly species (small heath (*Coenonympha pamphilus*), grayling (*Hipparchia semele*), wall (*Lasiommata megera*) and white admiral (*Limenitis camilla*)) that are RDB listed species, listed under Section 41 of the NERC Act (Ref 1.13), and on Suffolk’s Priority Species and Habitats list (Ref 1.15). Of these species, there was one record for small heath, grayling, wall and white admiral within the site boundary; the remaining 28 were outside of the site.
- 1.4.25. Desk-study records revealed 24 moth species (see **Annex 7A.2**) listed under Section 41 of the NERC Act (Ref 1.13), and on Suffolk’s Priority Species and Habitats list (Ref 1.15). Desk-study records revealed two moth species (flame wainscot (*Mythimna flammea*), and shaded fan-foot (*Herminia tarsicrinalis*), that are ‘Rare’ RDB listed species, one (bulrush veneer (*Calamotropha paludella*)) that is Nationally Notable B³, and one (orange-rayed pearl (*Nascia ciliialis*)) that is Nationally Notable A⁴. All of these records were to the east of the site. The majority of these moth species are reed and fen specialists and will therefore not be present within the site boundary.
- 1.4.26. Desk-study records revealed two soldier fly species (*Stratiomys potamida* and *Vanoyia tenuicornis*). These species were not found within the site, being associated with Kenton Hills or Sizewell Marshes SSSI.
- 1.4.27. Desk-study records revealed the Norfolk hawker (*Anaciaeschna isosceles*) as an Endangered RDB listed dragonfly, protected under Schedule 5 of the Wildlife and Countryside Act (Ref 1.3) and listed under Section 41 of the NERC Act (Ref 1.13), and Suffolk’s Priority Species and Habitats list (Ref 1.15). The three desk-study records were from the Sizewell Marshes SSSI, to the east of the site.
- 1.4.28. The larval food plants of these species were largely absent from within the survey area. The Extended Phase 1 surveys did not identify any habitat of particular value to invertebrates. The majority of the site comprised arable fields and species-poor hedgerows of limited value for invertebrate species. Woodland blocks such as Buckle’s Wood CWS (Target Note 1), Target Note 6 and Target Note 9 (see **Figure 7.3** in **Annex 7A.1**), comprise ancient semi-natural woodland and are likely to support a more diverse assemblage of invertebrate species.

³ Taxa which do not fall within RDB categories, but which are none-the-less uncommon in Great Britain and thought to occur in between 31 and 100 10km squares of the National Grid or, for less-well recorded groups between eight and twenty vice-counties.

⁴ Taxa which do not fall within RDB categories, but which are none-the-less uncommon in Great Britain and thought to occur in 30 or fewer 10km squares of the National Grid or, for less-well recorded groups within seven or fewer vice-counties

Amphibians

- 1.4.29. The desk-study revealed six records of amphibians within 2km of the site. Species recorded comprised common toad (*Bufo bufo*) and great crested newt. Two common toad records were between 100 to 200m from the site boundary. Four great crested newt records were from within 500m of the site boundary. One was for Wood Farm (this relates to Pond 36), two were associated with Leiston Abbey (these relate to Ponds 2 and 3), and the remaining record does not appear to be associated with any pond visible on OS maps or aerial photographs. The full results of the desk study are presented in **Annex 7A.2**.
- 1.4.30. Suffolk is a stronghold for the great crested newt, particularly in the north-east of the county, where there is a higher abundance of ponds (Ref 1.21). Great crested newts and common toads are protected under Schedule 5 of the Wildlife and Countryside Act (Ref 1.3), are listed under Section 41 of the NERC Act (Ref 1.13) and Suffolk's Priority Species and Habitats list (Ref 1.15). Great crested newts are also protected under Schedule 2 of the Conservation of Habitats and Species Regulations (Ref 1.11).
- 1.4.31. Pre-2012 surveys identified 16 ponds within 500m of the site boundary as determined in 2011 (AD Site 1) (Ref 1.22). In 2011, access was granted to 14 ponds. Five of the ponds were no longer extant (the ponds having silted up or been ploughed out over time). Habitat Suitability Index surveys were carried out for nine ponds; one pond was also subject to presence/absence surveys. Great crested newts and great crested newt eggs were recorded at Pond WB3 (equivalent to Pond 28 for 2014 surveys).
- 1.4.32. Surveys post 2012 identified 28 ponds within 500m of the site, while an additional three were identified just outside 500m. Access was not granted to nine ponds in 2014 (Ponds 6, 17, 18, 20, 21, 22, 32, 36 and 37) for either scoping or survey work. In 2016, access was granted to Ponds 20, 21, 28 and 37 for eDNA. Ten ponds were scoped out for further survey work: Ponds 29 and 33 were not extant, and Ponds 7, 24, 31, and 39 to 42 were dry at the time of survey. Habitat Suitability Index and population surveys for great crested newts were conducted for 13 ponds in 2014 (Ponds 2, 3, 4, 23, 25, 26, 27, 28, 30, 54, 55, 56 and 57).
- 1.4.33. **Table 1.4** provides a summary of the habitat suitability of the ponds scoped into the 2014 surveys. The location of all ponds are shown on **Figure 7.4 (Annex 7A.1)**.

Table 1.4: Habitat Suitability Index scores for ponds at the site

Pond ID*	Habitat Suitability Index score	Comments
2	0.70 – Good	Ponds 2, 3 and 4 are close together in the Leiston Abbey grounds.
3	0.51 – Below Average	
4	0.77 - Good	
23	0.6 – Average	A large farm pond.
25	0.76 – Good	A small pond bordered by woodland and arable fields.
26	0.83 – Excellent	Located in a large hedge/tree line between arable fields.
27	0.65 – Average	A small pond by woodland and arable fields.
28	0.71 – Good	A garden pond in a small wooded area, with arable fields beyond the garden.
30	0.86 – Excellent	In a woodland covert, surrounded by arable fields.
54	0.66 – Average	A shallow pond surrounded by trees, with arable field close by to two sides, horse-grazed pasture on one side, and rough grassland on the final side.
55	0.64 – Average	In a tree-lined depression with gardens (mostly to lawn) on three sides, and scrub and small trees on the other side; there are arable fields to the south and east of the garden and horse-grazed pasture to the west.
56	0.43 – Poor	A large farm pond, surrounded by farmyard, garden and horse-grazed pasture.
57*	0.73 – Good	Surrounded by a small ring of scrub, with woodland on one side and arable fields on the remaining sides.

*Located just outside 500m.

1.4.34. Great crested newts were confirmed in 2014 in Ponds 2, 4, 26, 27, 30, 55 and 57, with evidence of breeding (eggs) in Ponds 2, 4, 30 and 55. Great crested newts were also confirmed from eDNA evidence in 2016 in Ponds 20, 21, 28 and 37. Summary survey results are presented in **Table 1.5**.

Table 1.5: Summary of amphibian surveys in 2014 (conventional survey methods) and 2016 (eDNA survey methods)

Pond ID*	GCN desk-study records	No. of surveys	Great crested newts			Other amphibians recorded
			Adults present	Eggs present	Max. no. GCN adults	
2	Yes ¹	6	Yes	Yes	1	Smooth newt, smooth/palmate newt
3	Yes ¹	4	No	No	-	-

Pond ID*	GCN desk-study records	No. of surveys	Great crested newts			Other amphibians recorded
			Adults present	Eggs present	Max. no. GCN adults	
4	Yes	6	Yes	Yes	44	Smooth newt, smooth/palmate newt
23	No	4	No	No	-	Common toad tadpoles
25	No	4	No	No	-	-
26	No	4	Yes	No	1	Smooth newt
27	No	6	Yes	No	1	Common frog, common toad tadpoles
30	No	6	Yes	Yes	12	Smooth newt, smooth/palmate newt, frog tadpoles,
54	No	4	No	No	-	-
55	No	6	Yes	Yes	18	Smooth newt, palmate newt
56	No	4	No	No	-	-
57*	No	4	Yes	No	3	Smooth newt, palmate newt
20*	No	eDNA	GCN present	na	na	na
21	No	eDNA	GCN present	na	na	na
28	No	eDNA	GCN present	na	na	na
37	No	eDNA	GCN present	na	na	na

*Located just outside 500m.

1.4.35. Ponds 2 and 4 at Leiston Abbey had a maximum of one and 44 adults respectively. Ponds 55 and 57 (which are approximately 300m away) each had a maximum of 18 and three adults respectively. This grouping of ponds represents a potential ‘medium-sized’ meta-population⁵ under English Nature (Ref 1.23) guidelines.

1.4.36. Ponds 20, 21, and 37 (all with confirmed great crested newts from eDNA analyses) are adjacent to each other and located in a large area of dense scrub and trees, with arable land to the east and north, a farmhouse garden

⁵ Great crested newts often exist in meta-populations, a group of associated populations which breed in and live around a cluster of ponds. This means that populations within separate ponds can migrate between ponds when pond conditions fluctuate and therefore ensure stability within the overall population.

(with lawn) and farm buildings to the west, and an area of tussocky grass to the south. There is therefore good foraging habitat and opportunities for hibernation sites. This grouping of ponds represents a potential meta-population of an unknown size (no population estimate surveys have been carried out to date for these ponds).

- 1.4.37. There is also a potential ‘medium-sized’ population at Pond 30 (maximum of 12 adults). The nearest ponds with great crested newts were approximately 400-500m away (namely Pond 28 (with a maximum of one adult from the 2011 surveys, and a positive result for eDNA in 2016) to the west, and Pond 36 to the south-west (from desk-study records). Isolated findings in 2016 of one adult great crested newt in Ponds 26 and 27 might relate to this meta-population as Pond 26 is approximately 500m from Pond 36, and Pond 27 is 300m from Pond 28.
- 1.4.38. Great crested newts populations are therefore found throughout the Zol: to the north in the land around Leiston Abbey (Ponds 2, 4, 55 and 57); in the middle of the Zol at Pond 30 and 36; to the west at Ponds 27 and 28 within adjacent woodland and gardens respectively; Ponds 20, 21 and 37 to the west (adjacent to Crossings Farm and Crossing Cottages); and Pond 26.
- 1.4.39. While great crested newts are distributed throughout the Zol, the majority of the site consists of arable fields which are of limited suitability to great crested newts. However, the field margins, hedgerows and blocks of woodland comprise suitable foraging habitat, with the woodland providing suitable hibernation sites, and field margins providing connectivity between ponds.
- 1.4.40. For full details of post-2012 survey results, please refer to **Annex 7A.4**.

Reptiles

- 1.4.41. The review of Suffolk’s Priority Species and Habitats list identified adder, common lizard, grass snake and slow-worm as priority species (Ref 1.15). In addition, all four species are included within Section 41 of the NERC Act (Ref 1.13).
- 1.4.42. The desk study revealed 11 records of reptiles within 2km of the site. Species recorded comprised grass snake, common lizard and adder. Three adder records were between 1.4 to 2.2km to the east of the site boundary, on the EDF Energy estate. One grass snake record was 100m from the site, at Wood Farm; the remaining five records were 0.9 to 3.0km from the site boundary. Two common lizard records were approximately 90m and 190m from the site boundary, with one record at Wood Farm, and one record at the western end of the site.

- 1.4.43. As part of a survey in May 2016 assessing the site for the roosting potential of trees for bats, a male grass snake was observed basking to the west of a pond in the woodland block south of Aldhurst Farm (at OS Grid Ref TM 43971 63538).
- 1.4.44. Within the site boundary, suitable habitat for reptiles is extremely limited but includes marginal habitats, such as field boundaries. These are restricted in extent and often isolated within large tracts of arable farmland, so therefore sub-optimal for reptiles.

Birds

- 1.4.45. The desk study presented in **Annex 7A.2** identified a considerable number of bird records. This large number of species are primarily associated with the Minsmere to Walberswick SPA/SSSI and Sizewell Marshes SSSI, both within 2.5km of the site. The majority of species are associated with wetland and coastal habitats and are therefore highly unlikely to be present within the site boundary. Professional judgement has therefore been used to identify those species considered most likely to use the habitat present within the site. Details of which statutory and non-statutory designated sites have particular species cited as interest features are provided in **Table 1.6**.

Table 1.6: Desk-study records for notable bird species and their status within 2km of the site

Bird Species	Sch 1 Wildlife and Countryside Act *	Section 41 NERC Act	Red List (BoCC)	Amber List (BoCC)
Marsh harrier (<i>Circus aeruginosus</i>)	✓			
Hobby (<i>Falco Subbuteo</i>)	✓			
Woodlark (<i>Lullula arborea</i>)	✓	✓		
Redwing (<i>Turdus iliacus</i>)	✓			
Fieldfare (<i>Turdus pilaris</i>)	✓		✓	
Barn owl (<i>Tyto alba</i>)	✓		✓	
Herring gull (<i>Larus argentatus</i>)		✓	✓	
Turtle dove (<i>Streptopelia turtur</i>)		✓	✓	
Cuckoo (<i>Cuculus canorus</i>)		✓	✓	
Grey partridge (<i>Perdix perdix</i>)		✓	✓	
Skylark (<i>Alauda arvensis</i>)		✓	✓	
Corn bunting (<i>Miliaria calandra</i>)		✓	✓	
Yellowhammer (<i>Emberiza citronella</i>)		✓	✓	

Bird Species	Sch 1 Wildlife and Countryside Act *	Section 41 NERC Act	Red List (BoCC)	Amber List (BoCC)
Linnet (<i>Carduelis cannabina</i>)		✓	✓	
Yellow wagtail (<i>Motacilla flava</i>)		✓	✓	
Spotted flycatcher (<i>Muscicapa striata</i>)		✓	✓	
House Sparrow (<i>Muscicapa striata</i>)		✓	✓	
Tree sparrow (<i>Passer montanus</i>)		✓	✓	
Nightingale (<i>Luscinia megarhynchos</i>)			✓	
Whinchat (<i>Saxicola rubetra</i>)		✓	✓	
Starling (<i>Sturnus vulgaris</i>)		✓	✓	
Song thrush (<i>Turdus philomelos</i>)		✓	✓	
Dunnock (<i>Prunella modularis</i>)		✓		✓
Reed bunting (<i>Emberiza schoeniclus</i>)		✓		✓
Bullfinch (<i>Pyrrhula pyrrhula</i>)		✓		✓

*Sch 1 W & CA: Schedule 1 of the Wildlife and Countryside Act (1.3).

- 1.4.46. In addition, a further 18 species that are either included on the Green List of BoCC (Ref 1.4), or of no conservation status, were also identified with records within 2km of the site boundary.
- 1.4.47. Of the bird species listed above, it is considered that the two bird species most likely to be encountered along the alignment of the site are nesting and wintering woodlark which occasionally use arable field margins, and foraging marsh harrier, with birds nesting at Minsmere known to forage along the edge of arable fields.
- 1.4.48. In 2011, bird surveys for AD Site 1 which covered the eastern end of the site. Although the survey work did not cover the full site boundary, it provides useful contextual information. Additional breeding and wintering bird surveys were conducted in 2014 and 2015. The results of these surveys are summarised below with the full details presented in **Annex 7A.3** and **Annex 7A.4** respectively.

Breeding bird survey results

- 1.4.49. During 2011 breeding bird surveys, no bird species listed on Schedule 1 of the Wildlife and Countryside Act (Ref 1.3) were recorded. A total of six species listed as both Red List species of BoCC (Ref 1.4) and Section 41 of the NERC Act (Ref 1.13) were recorded: skylark; song thrush; mistle thrush (*Turdus viscivorus*); house sparrow; and linnet. Six species listed as Amber

List of BoCC (Ref 1.4) were also recorded: dunnock; kestrel (*Falco tinnunculus*); black-headed gull (*Chroicocephalus ridibundus*); stock dove (*Columba oenas*); house martin (*Delichon urbicum*); and meadow pipit (*Anthus pratensis*).

1.4.50. During the 2014 surveys, no bird species listed on Schedule 1 of the Wildlife and Countryside Act (Ref 1.3) were recorded within the alignment of the rail route during the breeding bird survey. A total of four species listed on both the Red List of BoCC (Ref 1.4) and Section 41 of the NERC Act (Ref 1.13) were recorded during the breeding bird survey. Two species, dunnock and bullfinch, are listed on both Section 41 of the NERC Act (Ref 1.13), and on the Amber List of BoCC (Ref 1.4). Two additional species listed on the Amber List of BoCC (Ref 1.4) were also recorded: lesser black-backed gull and willow warbler (*Phylloscopus trochilus*). The results of breeding bird surveys are illustrated on **Figure 7.5** in **Annex 7A.1**. A summary of results can be found in **Table 1.7**.

Table 1.7: Species of conservation concern recorded during the breeding bird surveys

Bird Species	Section 41 NERC Act	Red List	Amber List
Herring gull	✓	✓	
Skylark	✓	✓	
Song thrush	✓	✓	
Yellowhammer	✓	✓	
Dunnock	✓		✓
Bullfinch	✓		✓
Lesser black-backed gull			✓
Willow warbler			✓

1.4.51. Herring gull forage widely over large areas and require a cliff or large flat-roofed building to nest, so will not be breeding within the site boundary. All others are considered likely to be breeding within the site as these are associated with arable habitats, with skylark the most numerous (up to ten individuals recorded). Arable farmland is extensive within Suffolk and the distribution of farmland bird species such as the red-listed species discussed above, will to a large extent be dependent on the diversity of the arable habitat. These fields are intensively managed and therefore would support fewer species than fields with large diverse margins or crops sown to benefit wild birds.

Winter bird survey results

- 1.4.52. During 2011-2012 Winter bird surveys, two species on the Schedule 1 of the Wildlife and Countryside Act (Ref 1.3) were recorded: redwing and fieldfare. A total of five Red List of BoCC (Ref 1.4) and NERC Act (Ref 1.13) species were recorded: lapwing (*Vanellus vanellus*); skylark; starling; house sparrow; and yellowhammer. In addition dunnock and bullfinch, both NERC Act (Ref 1.13) and Amber List of BoCC (Ref 1.4) listed species, were recorded. Two Amber List of BoCC (Ref 1.4) species were also observed: kestrel and black-headed gull.
- 1.4.53. During the 2014-2015 Winter bird surveys, three Wildlife and Countryside Act (Ref 1.3) Schedule 1 species were recorded. There were peregrine (*Falco peregrinus*), fieldfare and redwing. The location of these species are illustrated on **Figure 7.6** in **Annex 7A.1**. Redwing and fieldfare were recorded on one occasion each, with seven redwing recorded in December 2014 and three redwing recorded in January 2015. Both species are common Winter migrants, foraging over large areas of countryside and are likely to use the site area sporadically for foraging. A single peregrine was observed in December 2015. Peregrine also forage over large areas, and it is not unexpected that peregrine would occasionally forage over the site.
- 1.4.54. A total of seven species listed on both the Red List of BoCC (Ref 1.4) and Section 41 of the NERC Act (Ref 1.13) were recorded within the site. In addition, dunnock, a NERC Act (Ref 1.13) and Amber List of BoCC (Ref 1.4) species, was also recorded. In addition, a further six species listed on the Amber List of BoCC (Ref 1.4) were also recorded. The results of the wintering bird surveys are illustrated on **Figure 7.7** in **Annex 7A.1**. A summary of these results can be found in **Table 1.8**.

Table 1.8: Species of conservation concern recorded during the Winter bird surveys

Bird Species	Sch 1 Wildlife and Countryside Act *	Section 41 NERC Act	Red List (BoCC)	Amber List (BoCC)
Peregrine	✓			
Fieldfare	✓			
Redwing	✓			
Herring gull		✓	✓	
House sparrow		✓	✓	
Lapwing		✓	✓	
Skylark		✓	✓	

Bird Species	Sch Wildlife and Countryside Act *	Section 41 NERC Act	Red List (BoCC)	Amber List (BoCC)
Song thrush		✓	✓	
Starling		✓	✓	
Yellowhammer		✓	✓	
Dunnock		✓		✓
Black-headed gull				✓
Common gull (<i>Larus canus</i>)				✓
Kestrel				✓
Lesser black backed gull				✓
Meadow pipit				✓
Stock dove				✓

1.4.55. In addition to the above species, a total of 32 species of either no conservation concern (Green List of BoCC (Ref 1.4)) or uncategorised species were recorded during both the breeding and wintering bird surveys. These are listed in **Annex 7A.4**.

Bats

1.4.56. The desk-study identified 93 records of bat species within the species-specific Zols as detailed in **section 3.5**. Species recorded comprised Daubenton’s bat, Natterer’s bat, noctule, common pipistrelle, soprano pipistrelle, Nathusius’ pipistrelle, serotine, barbastelle and brown long-eared bat. Records were also identified for unspecified species within the *Myotis* spp. and *Pipistrellus* spp. groups.

1.4.57. Forty-five records, for eight species (Daubenton’s bat, Natterer’s bat, noctule, common pipistrelle, soprano pipistrelle, serotine, barbastelle and brown long-eared bat) as well as an unspecified *Pipistrellus* spp. were identified relating to bat roost locations, with further information identifying four of them as breeding roosts. None of the roost records were located within 500m of the site, with the closest roost records located approximately 520m to the south within Leiston (a common pipistrelle roost). Breeding roosts were identified within the relevant Zols for Natterer’s bat, soprano pipistrelle, brown long-eared bat, and an unidentified *Pipistrellus* spp. with the closest located 1.1km to the north-east within Upper Abbey Farm (Natterer’s bat) though breeding has not been recorded in every year.

- 1.4.58. None of the remaining 47 activity records were identified within the site boundary, with the closest record, for a common pipistrelle, located approximately 600m to the south within Leiston.
- 1.4.59. A single Leisler’s record (activity) was identified within the 3km Zol for this species. However, in recent years it has become apparent that there is significant overlap between the Leisler’s bat, noctule and serotine group (‘big bat’⁶ spp.) and that many calls cannot be identified to a species with confidence. This is particularly noted for Leisler’s bat, as call parameters for this species fall almost entirely inside those assigned to noctule and serotine. As such, it is not considered possible to reliably confirm a Leisler’s bat from echolocation calls.

Secondary data

Pre-2012 surveys within the site

- 1.4.60. Full details of the 2011 extended Phase 1 habitat survey results are provided in (Ref 1.24) in **Annex 7A.3**. The 2011 extended Phase 1 habitat survey (Ref 1.24) identified 11 trees within or adjacent to the site with the potential to support roosting bats. It was also considered that areas of improved grazing pasture, field margins and hedgerows present within the site provide a suitable foraging resource for bats.
- 1.4.61. Buildings within the survey area at Aldhurst Farm were considered to be in good condition. Some limited bat roost potential was identified for four buildings in the form of wooden cladding, a gap in a soffit box, gaps between a wooden gutter board and the wall, and a hole in a lintel.
- 1.4.62. Four species were identified during activity transect surveys within the AD Site 1 (Leisler’s bat, common pipistrelle, soprano pipistrelle and barbastelle,) as detailed in **Table 1.9**. However, as detailed in the footnote to **Table 1.9**, the overlap in the echolocation calls of Leisler’s bat with noctule and serotine means that many calls cannot be identified to the Leisler’s species with confidence. Given very few calls were initially identified, Leisler’s bat is not considered further in relation to the proposed rail extension route.

Table 1.9: Number of passes and relative bat activity recorded during transect surveys in 2011.

Species	Survey date			Total	Bat passes per hour (B/h)
	24.05.11	04.07.11	03.08.11		
Common pipistrelle	19	53	48	120	16.8

⁶ The ‘big bat’ species group includes calls identified specifically to noctule or serotine as well as those identified to the ‘big bat’ group (noctule, Leisler’s and serotine).

Species	Survey date			Total	Bat passes per hour (B/h)
	24.05.11	04.07.11	03.08.11		
Soprano pipistrelle	7	15	7	29	4.1
Common/soprano pipistrelle	0	0	3	3	0.4
Barbastelle	0	0	1	1	0.1
Leisler's bat*	0	0	1	1	0.1
Total	26	68	60	154	
Survey duration (mins)	137	145	147	429	
Total bat passes per hour (B/h)	11.4	28.1	24.5	21.5	

* This data is as presented in 2011. In the intervening years, it has become apparent that there is significant overlap between the Leisler's bat, noctule and serotine group, and many calls cannot be identified to a species with confidence. Re-examination of a number of 'Leisler's bat' calls from 2010/2011 suggests these calls should be reclassified as belonging to this group, not to species.

1.4.63. Common pipistrelle were the most frequently recorded species at 16.8B/h, accounting for over three-quarters of all recorded calls. Common pipistrelle were recorded along the northern boundary of the survey area and emergence surveys undertaken at Gypsy Lodge identified the presence of a common pipistrelle roost within buildings at this location. Twenty-three common pipistrelle were recorded emerging from under a barge-board on the north-west facing gable end of the northern house in July 2011. In August 2011, 24 were recorded emerging from the northern gable end of the southern house, and seven from the southern gable end of the northern house.

1.4.64. Soprano pipistrelle accounted for nearly all of the remaining activity at 4.1B/h. As with common pipistrelle, passes were primarily recorded along the northern boundary of the survey area, although chiefly in the eastern half. A single barbastelle pass was recorded on the edge of Lover's Lane approximately two hours after sunset.

1.4.65. At least eight species were identified during static bat detector surveys. A summary of the results of static detector surveys undertaken in 2011 (Ref 1.19) are detailed **Table 1.10**.

Table 1.10: Relative activity levels recorded during static detector surveys in 2011.

Species	Deployment dates			Total	Deployment dates
	Location A	Location B	Location C		
	11.05.11-22.05.11	21.06.11-03.07.11	02.08.11-16.08.11		
Group 1 species (all nights)					

Species	Deployment dates			Total	Deployment dates
	Location A	Location B	Location C		
	11.05.11-22.05.11	21.06.11-03.07.11	02.08.11-16.08.11		
Barbastelle	3	42	25	70	0.2
Leisler's bat*	1	7	3	11	<0.1
Nathusius' pipistrelle	4	0	1	5	<0.1
Group 1 total	8	49	39	86	
Group 2 species (3x3 nights)					
Common pipistrelle	639	455	125	1,219	16.5
Soprano pipistrelle	41	241	64	319	4.3
Common/soprano pipistrelle	4	26	5	35	0.5
<i>Myotis</i> spp.	3	0	11	14	0.2
Noctule	0	6	2	8	0.1
<i>Myotis</i> spp./brown long-eared bat	0	0	5	5	<0.1
<i>Nyctalus</i> spp.	0	2	0	2	<0.1
Common/Nathusius' pipistrelle	0	1	0	1	<0.1
Brown long-eared bat	1	0	0	1	<0.1
Group 2 total	688	704	212	1,605	

* These data are as presented in 2011. In the intervening years, it has become apparent that there is significant overlap between the Leisler's bat, noctule and serotine group, and many calls cannot be identified to a species with confidence. Re-examination of a number of 'Leisler's bat' calls from 2010/2011 suggests these calls should be reclassified as belonging to this group, not to species.

1.4.66. As noted during activity transects, common pipistrelle were significantly more frequently encountered than other species with activity levels remaining high throughout the night, peaking approximately two hours after sunset. As on transect surveys, soprano pipistrelle activity was moderate in comparison to other species at 4.3B/h. Soprano pipistrelle activity levels peaked within an hour of sunset and sunrise, with limited activity during the middle period of the night.

1.4.67. Barbastelle passes were recorded at all three static detector locations, with the greatest levels of activity recorded at static detector location B in June/July 2011 (see Figure 2.1 in 2011 report (Ref 1.19) in **Annex 7A.3**). All recorded barbastelle passes were at least an hour after sunset and an hour before sunrise.

- 1.4.68. Levels of activity recorded for noctule, Nathusius' pipistrelle, *Myotis* spp. and brown long-eared bat, were consistently low with no passes recorded within an hour of sunset or sunrise.
- 1.4.69. It was considered that the common pipistrelle roost identified at Gypsy Lodge was likely to be a single, mobile, maternity roost due to the timing and numbers recorded. It was also considered likely that a soprano pipistrelle roost was present in close proximity to the survey area. Both species were considered to use the survey area as a core foraging/commuting area.
- 1.4.70. No evidence was identified to suggest that barbastelle, *Myotis* spp., noctule, Nathusius' pipistrelle or brown long-eared bat roost(s) were within or close to the survey area, or that the site is an important foraging resource for these species.
- 1.4.71. Full details of bat surveys undertaken in 2011 are provided in (Ref 1.20) in **Annex 7A.3**.

Surveys within the EDF Energy estate

- 1.4.72. Data from the Sizewell C main development site baseline identified the presence of a breeding barbastelle population, estimated at 50+ individuals, centred on the immediately adjacent EDF Energy estate. Activity levels suggest that habitats within the EDF Energy estate are relied upon to a greater degree during the pre-maternity and early lactation period than later in the year; it is additionally considered that the majority of these individuals are likely to hibernate within the EDF Energy estate.
- 1.4.73. Three years of radio-tracking surveys undertaken of bats trapped within both the EDF Energy estate and the adjacent Royal Society for the Protection of Birds (RSPB) Minsmere Reserve to its north identified the use of 37 roosts by barbastelle, including 28 trees, two buildings and seven areas where the specific location of the roost could not be determined. Identified roosts included a barn at Wood Farm, within 50m to the east of the site boundary, which was found to be used by a single male barbastelle during 2010. Additional roosts in proximity to the site boundary included a barn at Hill Farm (500m to the north), used by a single non-breeding male in 2011 and a tree roost in woodland at Leiston Old Abbey (600m to the north-east) which was found to be used by seven tagged barbastelles over the course of the radio-tracking period in 2011. No evidence of use of these roosts was identified during radio-tracking surveys in 2014.
- 1.4.74. Barbastelle were found to use a wide range of habitats, and radio-tracking surveys identified the movement of individuals between the EDF Energy estate and the RSPB Minsmere Reserve to the north. However, extremely limited use of habitats within the site by tagged barbastelle was recorded,

with only a single individual, the male barbastelle identified roosting at Wood Farm in 2010, recorded foraging in proximity to Buckle's Wood CWS. A second individual tagged and tracked in 2014 used a large range that included the site although no activity was registered within the site boundary.

- 1.4.75. A maternity roost of at least 49 Natterer's bats was identified at Leiston Abbey (approximately 300m to the north of the site) in August 2011, and an additional maternity roost of over 50 individuals was identified within a single bat box within Kenton Hills (approximately 1km to the east). Natterer's bats have roosted in Upper Abbey Farm (approximately 1km to the north-east of the site) in multiple years between 1996 and 2014 (though were not always present during the breeding season), and tree roosts of unknown status were identified (through radio-tracking) within The Grove and Sandpytle Plantation. While small numbers of hibernating Natterer's bats have been recorded within Upper Abbey Farm, it is considered that most individuals hibernate elsewhere, because of their preference for underground sites (caves, mines etc). Natterer's bats use a wide range of habitats and recorded activity suggests a likely reliance on habitats within the EDF Energy estate and the surrounding area; however, primary data (see below) indicates that this species only occasionally uses the habitats within the site boundary.
- 1.4.76. Common pipistrelle, soprano pipistrelle and brown long-eared bat were shown to be widespread and common across the EDF Energy estate. Maternity colonies of all three species were identified within or in close proximity to the EDF Energy estate. Brown long-eared bat maternity roosts were recorded at Upper Abbey Farm and Ash Wood (approximately 1.9km to the north-east). A soprano pipistrelle maternity roost was identified within a bat box in Kenton Hills, and very early captures of pregnant female common pipistrelle during trapping surveys suggested the presence of undiscovered maternity roost(s) within or in close proximity to the EDF Energy estate (likely within buildings). Small numbers of brown long-eared bats have also been recorded hibernating within the EDF Energy estate. In addition, a range of hibernation resources, suitable for use by brown long-eared bats, common and soprano pipistrelles are likely to be available.
- 1.4.77. Noctule were recorded in moderate numbers across the EDF Energy estate with individual roosting bats recorded in bat boxes within Kenton Hills during both summer and winter months. Activity also suggested the presence of roosts within Nursery Covert, Ash Wood, The Grove, Goose Hill and Leiston Old Abbey woodland. However, no evidence of a maternity colony has been identified.
- 1.4.78. Daubenton's bat, Leisler's bat, serotine and Nathusius's pipistrelle were all recorded in only low numbers across the EDF Energy estate:

- While the potential for small numbers of hibernating Daubenton's bats within the EDF Energy estate cannot be ruled out, no evidence suggesting the presence of roosting in significant numbers could be identified. In addition, trapping surveys within the EDF Energy estate recorded only five Daubenton's bats, all male, providing no evidence for the presence of maternity roost(s) within or in close proximity to the EDF Energy estate.
- The difficulties associated with the identification of Leisler's bats from echolocation calls means that only a small number of calls could be assigned to Leisler's bats with a reasonable level of confidence. In addition, although not conclusive (due to this being a relatively high-flying species), no Leisler's bats were recorded across four years of trapping surveys. This species is therefore considered to be present only very infrequently across the EDF Energy estate.
- Serotines roost almost exclusively within buildings and there is therefore limited roost potential for this species within the EDF Energy estate; this is supported by activity levels, analysis of which found that no passes were recorded during the early evening. A known maternity roost is present at Theberton House, approximately 1.2km to the north.
- No Nathusius' pipistrelle roosts were identified during surveys throughout the EDF Energy estate and four years of trapping surveys resulted in no Nathusius' pipistrelle being caught (here or in the adjacent RSPB Reserve at Minsmere). Extensive static detector and activity surveys across the EDF Energy estate recorded very little early evening Nathusius' pipistrelle activity, further supporting the conclusion that this species is unlikely to roost within the EDF Energy estate or surrounding habitats.

Primary data

- 1.4.79. A summary of the results of bat surveys along the site is provided below. Full details of the results of bat surveys are provided in **Annex 7A.4**.
- 1.4.80. The 2014 extended Phase 1 habitat and protected species survey along the site identified the habitats present to be primarily arable fields of limited value to bats, although scattered mature trees were recorded. Fields are bounded by hedgerows containing a number of mature trees and several woodland blocks, including Buckle's Wood CWS. These habitats have the potential to support roosting bats and offer good commuting and foraging opportunities. **Figure 7.3** in **Annex 7A.1** presents the Extended Phase 1 habitat plan and associated target notes.

1.4.81. The bat tree assessment survey identified 53 features (on 25 individual trees) as potentially suitable for roosting bats. Sixteen trees are located within the site (ten of high potential, three of moderate potential, two of low-moderate potential, and one of low potential), while the remaining trees are located within immediately adjacent habitat, including a copse containing a number of trees with potential roost features located approximate 150m from the site. The location of assessed trees and woodland blocks is illustrated on **Figure 7.8** in **Annex 7A.1**. A summary of the results is provided in **Table 1.11**.

Table 1.11: Summary of bat tree assessment results

Tree roost assessment level.	Number of features identified
High potential	18
Moderate potential	4
Moderate-low potential	2
Low potential	1

1.4.82. Two activity transects were undertaken once a month from April to October 2014. Transect 1 was located within the northern half of the site, while Transect 2 covered the southern half. In addition, four static detectors were deployed once a month. The location of the transect routes and the static detectors monitoring stations (MS) along the site are illustrated on **Figure 7.9** in **Annex 7A.1**. The location of recorded bat passes on Transects 1 and 2 are provided on **Figures 7.10** to **7.14** in **Annex 7A.1**.

1.4.83. At least six bat species were recorded across both transects with common and soprano pipistrelle the most frequently recorded. All other species were recorded at very low levels. Activity levels across both transects were largely comparable, with activity levels on Transect 1 peaking in June 2014 at 16B/h and on Transect 2 in July 2014 at 17B/h. Activity levels were significantly reduced across both transects during both dawn and dusk surveys undertaken in October 2014. No passes were recorded in the 20 minutes following sunset, or the 20 minutes prior to sunrise for any species, across either transect.

1.4.84. Low numbers of passes by *Nyctalus* spp., *Pipistrellus* spp., common pipistrelle and soprano pipistrelle were recorded in the hour after sunset. Single passes by barbastelle, serotine, *Myotis* spp., *Nyctalus* spp., noctule, Nathusius’ pipistrelle and brown long-eared bat were recorded in the hour after sunset. Passes in the hour before sunrise were recorded for common pipistrelle (a single pass) and soprano pipistrelle.

1.4.85. During the course of the static detector surveys, seven species were recorded (Natterer’s bat, noctule, common pipistrelle, soprano pipistrelle, Nathusius’ pipistrelle, barbastelle, and brown long-eared bat), as well as

unidentified species belonging to four species groups ('big bat', *Myotis* spp., common/soprano pipistrelle and *Plecotus* spp., assumed to be brown long-eared bat). Recorded activity levels largely reflected those recorded during transect surveys, with activity dominated by common and soprano pipistrelle. All other species groups were recorded at significantly lower levels.

1.4.86. Nathusius' pipistrelle were largely absent during survey periods in July and August 2014, with a peak in activity recorded in October 2014 at 3.57 mean number of passes per night (mppn). A similar level of activity was also recorded in June 2014 at 3.29mppn, perhaps indicating a transient population.

1.4.87. Barbastelle activity across Transects 1 and 2 peaked in September 2014 with 11 passes recorded. This peak is reflected by activity levels recorded by static detectors with highs of 8.25mppn at MS02 and 8.33mppn at MS04 recorded in September 2014. A similar peak in barbastelle activity was recorded at MS02 in August 2014 (8.71mppn). Low numbers of barbastelle passes were recorded during the hour after sunset; however, none were in the first 30 minutes after sunset, with the majority of activity recorded over the middle period of the night.

Terrestrial Mammals

1.4.88. The desk-study revealed 11 records of terrestrial mammals within 2km of the site. Species recorded comprised otter (*Lutra lutra*), badger, hedgehog (*Erinaceus europaeus*), brown hare (*Lepus europaeus*), water vole (*Arvicola terrestris*) and harvest mouse (*Micromys minutus*).

1.4.89. One of the otter desk-study records was close to a ditch 0.8km from the site boundary; the other was 1.4km from the site boundary, not obviously associated with a water body. One water vole desk-study record was close to a ditch 1km from the site boundary to the west, while the remaining two records were associated with Sizewell Marshes SSSI, 1.0 to 1.1km to the east. Due to the lack of suitable watercourses within or nearby to the site, otter and water vole are not considered likely to be present within the site. In addition, no evidence for their occupation was identified during the Phase 1 habitat survey, and these species have been scoped out of this ecological baseline.

1.4.90. There was one hedgehog desk-study record on the EDF Energy estate, 1km to the north-east. Woodland blocks such as Buckle's Wood CWS (Target Note 1) and at Target Note 9 (see **Figure 7.3** in **Annex 7A.1**) and the hedgerows present provide potentially suitable habitat for hedgehogs and this species could be present within the site boundary. Hedgehog is a Suffolk Priority Species and Habitats listed species (Ref 1.15) and listed under Section 41 of the NERC Act (Ref 1.13).

- 1.4.91. There was one water shrew desk-study record associated with Buckle’s Wood CWS, 70m to the north-west of the site (Pond 25, see **Figure 7.4** in **Annex 7A.1**). During the 2014 amphibian surveys, one water shrew was found in Pond 25. Water shrews are reported as declining in Suffolk (Ref 1.25). The water shrew is on Suffolk’s Priority Species and Habitats list (Ref 1.15) and considered locally important.
- 1.4.92. There was one brown hare desk-study record 1.2km to the north-east of the site boundary, close to the EDF Energy estate. During a bat tree roost assessment survey in May 2016, a brown hare was flushed in a rape crop to the south of Aldhurst Farm (OS Grid Ref TM 44099 63763). The arable and hedgerow habitat present provide potentially suitable habitat for hares and this species could be present within the site boundary. The Suffolk BAP (Ref 1.14) states that brown hare is widespread in Suffolk; however, recent reports in the east of England in 2018 suggest brown hare are suffering from a disease epidemic with records of sick or dead animals (Ref 1.26), and with rabbit haemorrhagic disease type 2 now confirmed in brown hare from Dorset and Essex (Ref 1.27).
- 1.4.93. There was one desk-study record of badger record, 1.9km to the north-east of the site (associated with Ash Wood on the EDF Energy estate). Near the centre of AD Site 1, the 2011 surveys identified a single badger outlier sett with fresh spoil and a clear, debris-free entrance within a small copse indicated by Target Note 1 within the 2011 report (Ref 1.24). This is located approximately 70m north-west of the site.
- 1.4.94. No signs of badger were identified during the 2014 wxtended Phase 1 habitat survey. However, during a bat tree roost assessment survey in May 2016, a subsidiary sett was found adjacent to the site boundary, at the south-west corner of Aldhurst Farm (OS Grid Ref TM 4389 6367, within the site boundary) which constituted one large well-used entrance (with a wide and fresh spoil heap) approximately 3m into a field, and two further well-used entrances in a ditch bank. Badgers are protected under the Protection of Badgers Act (Ref 1.12).

ii. **Proposed rail improvement works**

- 1.4.95. As detailed in **Table 7.4** of **Chapter 7** of **Volume 9** of the **ES**, Bratt’s Black House is the only level crossing improvement to be screened in for further assessment. Access has not been granted for baseline surveys; therefore, the baseline has been composed from available desk-study information only.

Designated and non-designated sites

- 1.4.96. There is one statutory designated sites of nature conservation importance within 5km, this being Minsmere to Walberswick Heaths and Marshes SSSI

(4.9km north-east). A description of this SSSI is already provided in **Table 1.2**.

- 1.4.97. One non-statutory designated CWS is within 2km of the site, this being Kalsale morio Meadow CWS (300m north). Kalsale morio Meadow CWS is an unimproved neutral meadow with a populations of Green-winged Orchids (*Anacamptis morio*).
- 1.4.98. The development proposals will involve no direct land take from any of these statutory and non-statutory designated sites. The location of these site are shown on **Figure 7.15** in **Annex 7A.1**.

Plants and habitats

- 1.4.99. There were two desk-study records of plant species, Chicory (*Cichorium intybus*) and Gold-of-pleasure (*Camelina sativa*), identified approximately 150m north-east. Chicory is listed as vulnerable in England (Ref 1.28) and is found on roadsides, field margins and rough grassland. Field margins are found directly adjacent to the site boundary; therefore, this species could be present adjacent to the site.
- 1.4.100. The site comprises railway track and lineside habitat comprising dense scrub and hedgerows with a small number of scattered trees. A vehicle level crossing is present within the site. Hedgerows and trees were unable to be assessed through aerial imagery. Hedgerows are a Suffolk BAP priority habitat (Ref 1.15) and are listed under Section 41 of the NERC Act (Ref 1.13).
- 1.4.101. Seven waterbodies (ponds) are within 500m of the site (see **Figure 7.16** in **Annex 7A.1**); however, access for surveys was not granted for any of these ponds. Of these, all seven are outside of the site boundary. One pond is located within a small area of woodland, adjacent to the site (see **Figure 7.16**). Ponds are on Suffolk’s Priority Species and Habitats list (Ref 1.15 in **Annex 7A.1**) and are listed under Section 41 of the NERC Act (Ref 1.13).

Invertebrates

- 1.4.102. The desk-study identified two notable and/or legally protected invertebrate species within the Zol. Most notably recorded was purple emperor (*Apatura iris*) and white-letter hairstreak (*Satyrrium w-album*). Purple emperor is protected under Schedule 5 of the Wildlife and Countryside Act (Ref 1.3) and is associated with broad-leaved woodland. White-letter hairstreak is also protected under Schedule 5 of the Wildlife and Countryside Act (Ref 1.3) and is also listed on the RDB and likely to be associated with broad-leaved woodland containing Elm species (*Elmus* sp.). Aerial imagery shows that the site consists of a section of railway tracks with predominantly scrubby lineside habitat. Hedgerows of adjacent arable fields have a small number of

scattered trees; an assessment of these trees through aerial imagery is not possible. The railway tracks and lineside habitat are unlikely to be of particular importance to invertebrates, and the purple emperor and white-letter hairstreak are unlikely to be found within the site boundary.

Amphibians

- 1.4.103. There is one historical record (2005) of great crested newts located approximately 240m north of the site. Desk-study records were also identified for common toad and common frog (*Rana temporaria*) between 1.4km and 1.8km south west of the site.
- 1.4.104. There are only seven ponds within 500m of the site of which the closest is adjacent to the south of the site (see **Figure 7.16** in **Annex 7A.1**) (access for surveys not provided). The site offers limited potential in terms of breeding and foraging for great crested newts and other amphibians. Lineside and railway ballast habitat may offer sub-optimal but potentially suitable hibernating opportunities. From aerials, the pond located adjacent to site (see **Figure 7.16** in **Annex 7A.1**) may offer suitable foraging, breeding and hibernating opportunities. The surrounding arable fields holds limited suitability for foraging great crested newt, and hedgerows surrounding arable fields would provide suitable habitat for commuting and hibernation.
- 1.4.105. Great crested newts, common toad and common frogs are protected under Schedule 5 of the Wildlife and Countryside Act (Ref 1.3). Great crested newts and common toads are listed under Section 41 of the NERC Act (Ref 1.13) and Suffolk's Priority Species and Habitats list (Ref 1.15). Great crested newts are also protected under Schedule 2 of the Conservation of Habitats and Species Regulations (Ref 1.11).
- 1.4.106. The value of site with regards to great crested newt has been considered. There was an historical (2005) great crested newt record 240m north of the site. Due to the lack of baseline data available for the ponds within 500m of the site, the potential for great crested newt presence should be assumed as a worst-case scenario. Given the small nature of ponds within 500m of the site and the limited suitable terrestrial habitat on site, the population within 500m would not likely be maintained by the site, nor is the site likely to be key to supporting great crested newts from those ponds.

Reptiles

- 1.4.107. Reptile records were identified for grass snake, slow-worm and common lizard between approximately 1.1km and 1.7km south west from the site, all records were within Saxmundham.

- 1.4.108. Within the site boundary and wider area, suitable habitat for reptiles is limited but includes lineside habitats, such as dense scrub, a small cluster of trees and field boundaries, and therefore sub-optimal for reptiles. Overall, the available habitat to support reptile species is considered to be extremely limited and the site of little value to reptile species.
- 1.4.109. All three common species of reptile (i.e. grass snake, common lizard and slow-worm) are protected under Schedule 5 of the Wildlife and Countryside Act (Ref 1.3); listed under Suffolk's Priority Species and Habitats list (Ref 1.15) and Section 41 of the NERC Act (Ref 1.13).

Ornithology

- 1.4.110. Thirty-nine records were identified for birds within 2km of the site. Of these, 26 species were identified approximately 150m north-east of site, within arable land. Three Schedule 1 species were identified 150m north-east of the site; redwing, fieldfare and barn owl. An additional two Schedule 1 species were identified within 2km of the site, hobby and red kite (*Milvus milvus*).
- 1.4.111. Within the site, suitable habitat for birds is limited but includes potential nesting habitats, such as dense scrub, scattered trees and hedgerow boundaries.
- 1.4.112. All bird species are protected under the Wildlife and Countryside Act (Ref 1.3); listed under Suffolk's Priority Species and Habitats list (Ref 1.15) and Section 41 of the NERC Act (Ref 1.13).

Bats

- 1.4.113. Two records were identified for bats; Pipistrelle species (*Pipistrellus* sp.) and brown long-eared approximately 1.5km south-west and 1.8km west, respectively, from the site. From a review of satellite imagery, there is limited habitat suitable for foraging, commuting and roosting bats.
- 1.4.114. All bat species in the UK are protected under Schedule 5 of the Wildlife and Countryside Act (Ref 1.3), and some are listed on Suffolk's Priority Species and Habitats list (Ref 1.15) and Section 41 of the NERC Act (Ref 1.13).

Other Mammals

- 1.4.115. Hedgehog was identified from the desk study, approximately 1.1km west of the site.
- 1.4.116. The site offers suitable foraging and nesting habitat with connectivity to small areas of woodland outside of the site, and so is optimal for hedgehogs; however, given the small, discrete nature of the works, there is sufficient

optimal habitats within the surrounding area. Hedgehog is a Suffolk BAP species (Ref 1.14) and listed on Section 41 of the NERC Act (Ref 1.13).

1.5 Baseline Conditions – Ecological Features and their Importance

a) Assessment methodology

- 1.5.1. The purpose of this final section is to describe the distribution and relative abundance of the habitats and species present within the Zol of the site boundary, and to use this information, in the context of the wider distribution, to assess the importance of the habitats and species that could be affected by the site. This assessment will then be used, in conjunction with a description of the extent and magnitude of the predicted impacts of the scheme, to carry out the detailed ecological impact assessment presented in **Chapter 7 of Volume 9 of the ES**.
- 1.5.2. To comply with both the CIEEM Guidelines for Ecological Impact Assessment (Ref 1.5) and with the standard EIA methodology used elsewhere within the ES, both methodologies have been used to assess the habitats and species within the Zol of the site.
- 1.5.3. Under the CIEEM guidelines (Ref 1.5), the first stage is to identify IEFs, to include habitats, species and ecosystems, including ecosystem function and processes, with reference to the geographical context in which they are considered important. An assessment is then made of whether these IEFs will likely be subject to impacts and, if so, these are taken forward into the EclA as a material consideration in the planning decision. Where protected species are present and there is the potential for a breach of the legislation, those species are also considered to be IEFs to be included in the EclA.
- 1.5.4. Those IEFs that qualify purely on the basis of legislative considerations (such as badgers) rather than as a result of their conservation status, are addressed separately in the EclA from those that are of material concern, with the latter being assessed in greater detail. For both, the ES outlines what measures are required to prevent any contravention of the legislation.
- 1.5.5. In line with the CIEEM guidelines (Ref 1.5), the importance of an ecological feature, as determined with reference to legal, policy and/or nature conservation considerations, has been assessed within the following geographical context:
- International and European importance;
 - National importance (i.e. UK or England);
 - Regional importance (i.e. the East of England);

- County importance (i.e. Suffolk); and
- Local importance (within Zol of the scheme).

1.5.6. The following table has also been used in order to assess the ecological features in accordance with the wider EIA methodology (**Table 1.12**).

Table 1.12: Criteria for assessment of ecological importance*

Importance	Criteria	
High	International; UK; National (England)	Very high importance and rarity. Feature/resource possesses key characteristics which contribute significantly to the distinctiveness, rarity and character of the site (for example designated features of international/national importance, such as SACs, SPAs, Ramsar sites and SSSIs).
Medium	Regional (East Anglia); County (Suffolk)	Medium importance and rarity, regional scale. Feature/resource possesses key characteristics which contribute significantly to the distinctiveness and character of the site/receptor (for example designated features of regional or county importance, such as County Wildlife Sites (CWSs), County BAP habitats, etc.).
Low	Local - district/ borough (Suffolk Coastal)	Low or medium importance and rarity, local scale. Feature/resource possesses characteristics which are only locally significant. Feature/resource not designated or only designated at a district or local level (for example local nature reserve).
Very low	Within the Zol	Feature/resource characteristics do not make a significant contribution to local character or distinctiveness. Feature/resource not designated.

* As part of the assessment process, the sensitivity of the ecological features should also be assessed. Sensitivity has not been addressed within the ecological baseline. Sensitivity and a detailed rationale explaining how a particular sensitivity rating has been arrived at for each ecological features is addressed in the Environment Statement. [Note that Importance and Sensitivity are assessed separately, as they are to an extent independent of each other (e.g. a feature of high value could be of low sensitivity, and vice versa)].

b) Description and assessment of ecological features

1.5.7. This section sets out the relevant ecological features and their importance and discusses each in turn. For each feature, its importance is described by:

- Description and distribution: the habitat or species is described in terms of its distribution and abundance locally, regionally and nationally.
- Assessment: the habitat or species is described by its protected/nature conservation status, and other measures of value, to determine its relative importance both in terms of the CIEEM guidelines (Ref 1.5) and the wider EIA assessment methodology.

1.5.8. As outlined in **section 2**, the legislative and policy framework for each ecological receptor is considered in full and, together with professional judgement, is used to assign a value to each ecological receptor. This technical appendix gives a detailed rationale for the value assigned to each ecological receptor and the conclusions reached.

i. Proposed rail extension route

Feature: Designated sites

Description and distribution

1.5.9. Twelve statutory designated sites (two Ramsar sites, four SPAs, two SACs and four SSSIs) were identified within a 5km radius of the site boundary. Six non-statutory designated sites (three CWS) were identified within a 2km radius of the site boundary. These sites are detailed in **Table 1.2** and **Table 1.3**.

Assessment

1.5.10. Given that:

- one of the statutory designated sites (Minsmere to Walberswick Heaths and Marshes SAC, Ramsar and SPA) supports Annex 1 habitats and species of European importance listed on Article 4 of the EC Birds Directive (Ref 1.6), and is a wetland of international importance;
- two of the statutory designated sites (Sandlings SPA and Outer Thames Estuary SPA) support populations of European importance of Annex 1 species;
- the SSSIs (Minsmere to Walberswick SSSI, Sizewell Marshes SSSI and Leiston to Aldeburgh SSSI) support habitats and species of national importance; however,
- no direct land take of these sites will occur and these sites are sufficiently far away so that no indirect impact pathways have been identified;

then these statutory sites within the Zol would be:

- an IEF at the international (SPA, SAC and Ramsar sites)/national (SSSI sites) level under the CIEEM guidelines (Ref 1.5);
- of high importance, following the EIA-specific assessment methodology; and

- scoped out of the detailed assessment as there would be no direct or indirect impacts.

1.5.11. Given that the CWSs (Sizewell Levels and Associated Areas, Leiston Common, Theberton Woods, Leiston Airfield and Minsmere Valley Eastbridge to Reckford Bridge):

- support habitat types listed on Section 41 of the NERC Act (Ref 1.13) and are targeted for action in the Suffolk BAP (Ref 1.14); however,
- no direct land take of these sites will occur, and these sites are sufficiently far away so that no indirect impact pathways have been identified;

then the CWSs (Sizewell Levels and Associated Areas, Leiston Common, Theberton Woods, Leiston Airfield and Minsmere Valley Eastbridge to Reckford Bridge) would be:

- an IEF at the county level under the CIEEM guidelines (Ref 1.5);
- of medium importance, following the EIA-specific assessment methodology; but
- scoped out of the detailed assessment as there would be no direct or indirect impacts.

1.5.12. Given that Buckle's Wood CWS:

- supports habitat types listed on Section 41 of the NERC Act (Ref 1.13) and has been targeted for action within the Suffolk BAP (Ref 1.14);
- has been recorded on the ancient woodland inventory for Suffolk; and
- would be retained in its entirety, but could experience indirect impacts as it is adjacent to the site;

then Buckle's Wood CWS would be:

- an IEF at the county level under the CIEEM guidelines (Ref 1.5); and
- medium importance, following the EIA-specific assessment methodology.

Feature: Plants and habitats

Description and distribution

- 1.5.13. The main habitat present, arable farmland, is widespread in Suffolk and no botanically rich arable margins were identified. Only three lengths of species-rich hedgerow were identified within the site boundary, the majority being defunct sections of hedgerow. Hedgerows have been targeted for action in the Suffolk BAP (Ref 1.29). At the last assessment (2004), there were an estimated 12,500 to 15,000km of species-rich hedgerow in the county (Ref 1.29).
- 1.5.14. In addition to Buckle's Wood CWS, there are two other broadleaved woodland blocks identified that are relatively discrete and limited in area (0.1 and 0.4ha in extent). A small, broadleaved copse (0.1ha), is located immediately east of Buckle's Wood CWS alongside Buckleswood Lane. The Suffolk BAP (Ref 1.30) identifies that there are 15,466ha of broadleaved woodland within Suffolk. Lowland mixed deciduous woodland is a priority habitat (Ref 1.15) and is listed under Section 41 of the NERC Act (Ref 1.13).
- 1.5.15. The Suffolk BAP states that Suffolk '*has a very high density of ponds with an estimate of 22,635 across the county*' (Ref 1.14), with 28 ponds identified within 500m of the site; however, no ponds holding water were identified within the site boundary.

Assessment

- 1.5.16. Given that arable habitat:
- is widespread in Suffolk and no botanically rich margins were identified; then the arable habitat within the Zol would:
 - not be an IEF under the CIEEM guidelines (Ref 1.5); and
 - be of very low importance, following the EIA-specific assessment methodology.
- 1.5.17. Given that for hedgerows:
- only three lengths of species-rich hedgerow were identified within the site, the majority being defunct sections of hedgerow; and
 - no ponds holding water were identified within the site boundary;
- hedgerows and pond habitats within proposed development Zol would:

- not be an IEF under the CIEEM guidelines (Ref 1.5); and;
- be of low importance, following the EIA-specific assessment methodology.

1.5.18. Given that for woodland:

- the broadleaved copse is located immediately east of Buckle’s Wood CWS alongside Buckleswood Lane, but is only 0.1ha in extent and separated from Buckle’s Wood CWS; and;
- lowland mixed deciduous woodland is on Suffolk’s Priority Species and Habitats list (Ref 1.15) and is listed under Section 41 of the NERC Act (Ref 1.13);
- would be retained in its entirety;

then the 0.1ha broadleaved copse located immediately east of Buckle’s Wood CWS would:

- not be an IEF under the CIEEM guidelines (Ref 1.5); and;
- be of low importance, following the EIA-specific assessment methodology.

Feature: Invertebrates

Description and distribution

1.5.19. Desk-study records identified that RDB-listed species such as white-letter hairstreak, purple emperor, small heath and grayling could occur within the site, all of which are listed under Section 41 of the NERC Act (Ref 1.13), and Suffolk’s Priority Species and Habitats list (Ref 1.15). White-letter hairstreak feeds on Elm (*Ulmus* sp.) so could be present along the hedgerows that border and are bisected by the site. Purple emperor is a woodland specialist so is unlikely to be present within the site boundary, but could be present within Buckle’s Wood CWS adjacent to the site boundary.

1.5.20. During field studies, no habitat of particular value for invertebrates within the site was identified. The majority of the site comprises arable fields, with some species-rich hedgerows but with hedgerows largely defunct or species-poor, or with no other features of particular importance to invertebrate species. The blocks of woodland, particularly the areas of ancient woodland, and the species-rich hedgerows, are likely to be of some value to invertebrates; in particular, moth and butterfly species. Buckle’s Wood CWS comprises ancient semi-natural woodland and is likely to support a diverse assemblage of invertebrate species.

Assessment

1.5.21. Given that for invertebrates:

- the majority of the site comprises arable fields of limited value to invertebrate species;
- Buckle's Wood CWS, is likely to support a diverse assemblage of invertebrate species, would be retained in its entirety; and
- the hedgerows within the site boundary are of limited value to invertebrates;

then the invertebrate assemblage within the Zol would:

- not be an IEF under the CIEEM guidelines (Ref 1.5); and;
- be of very low importance, following the EIA-specific assessment methodology.

Feature: Amphibians

Description and distribution

1.5.22. Great crested newts were confirmed in Ponds 2, 4, 20, 21, 26, 27, 28, 30, 37, 55 and 57, with evidence of breeding (from eggs) in Ponds 2, 4, 30 and 55. Ponds 28 and 36 also had evidence of great crested newts in 2011, and Ponds 2 and 4 also had desk-study records of great crested newts (see **Figure 7.2** in **Annex 7A.1**).

1.5.23. Great crested newts are found throughout the Zol: to the north in the land around Leiston Abbey (Ponds 2, 4, 55 and 57); in the middle of the Zol at Pond 30 and 36; to the west at Ponds 27 and 28 with adjacent woodland and gardens respectively; Ponds 20, 21 and 37 to the west (adjacent to Crossings Farm and Crossing Cottages); and Pond 26. Although the majority of the site consists of arable fields of limited suitability for foraging great crested newts, the field margins, hedgerows and blocks of woodland are suitable foraging habitat, with the woodland providing suitable hibernation sites, and hedgerows and associated margins providing some, but limited, connectivity between ponds and woodland features.

1.5.24. Suffolk (along with Cheshire) boasts the highest density of ponds in England, and is considered to be a stronghold for the great crested newt, particularly in the north-east of the county (which covers the EDF Energy estate) (Ref 1.31). Analysis of 900 of Suffolk's 22,000 estimated ponds between 2004 to 2007 (Ref 1.31) revealed that, whilst over 14% of the ponds surveyed contained great crested newts, large and thriving populations were only

recorded at a small number of ponds (sunny, well-vegetated ponds with good surrounding habitat) and the majority of Suffolk's ponds were found to be unsuitable for newts (due to heavy shade and organic matter, and/or the presence of predatory fish or damagingly high duck populations).

- 1.5.25. Desk-study records were also identified for common toad (*Bufo bufo*) between 100 and 200m from the site alignment. It is considered that the woodland blocks would provide suitable foraging habitat and the larger ponds suitable breeding habitat. It is envisaged that the woodland blocks would support a small population of common toads.

Assessment

- 1.5.26. Given that the great crested newt:

- is legally protected;
- is on Suffolk's Priority Species and Habitats list (Ref 1.15), is listed under Section 41 of the NERC Act (Ref 1.13), and are protected under Schedule 5 of the Wildlife and Countryside Act (Ref 1.3) and Schedule 2 of the Conservation of Habitats and Species Regulations (Ref 1.11);
- is widespread but patchily distributed with populations of conservation interest in the UK, and has a population stronghold in the Suffolk; and
- has been found within the Zol, with the populations distributed on either side of the site boundary;

then the population of this species located within the Zol would be:

- an IEF at the county level under the CIEEM guidelines (Ref 1.5); and
- of medium importance, following the EIA-specific assessment methodology.

- 1.5.27. Given that the common toad:

- is on Suffolk's Priority Species and Habitats list (Ref 1.5) and listed under Section 41 of the NERC Act (Ref 1.13);
- it likely to be found in low numbers within woodland blocks; and
- all woodland blocks (which would provide suitable foraging habitat) are being retained external to the site boundary;

then the population of this species within the Zol would:

- not be an IEF under the CIEEM guidelines (Ref 1.5); and
- be of very low importance, following the EIA-specific assessment methodology.

Feature: Reptiles

Description and distribution

- 1.5.28. On the basis of the 2014 extended Phase 1 habitat and protected species survey, the majority of the site consists of large tracts of arable farmland, so is sub-optimal for reptiles. Marginal habitat suitable for reptiles within the site boundary includes mosaics of rough grassland, tall ruderal herbs and bare ground, with scrub or hedgerows providing cover, though these are restricted in extent and often isolated within large tracts of arable farmland.
- 1.5.29. There were only incidental sightings of a grass snake and two slow-worms within the site boundary and there were no desk-study records of reptiles within the site. The nearest adder records were 1.4km away, nearest grass snakes' records were 100m away, and nearest common lizard records 100m away.
- 1.5.30. A review of the Suffolk's Priority Species and Habitats list identified adder, grass snake, common lizard and slow-worm as a priority species (Ref 1.14). In addition, adders, grass snakes, common lizards and slow-worms are included within Section 41 of the NERC Act (Ref 1.13).

Assessment

- 1.5.31. Given that:
- only a single grass snake and two slow-worms were recorded within the site;
 - there were no desk-study records within the site boundary; and
 - the habitat is considered predominantly to be sub-optimal for reptiles;
- then the reptile assemblage within the Zol would:
- not be an IEF under the CIEEM guidelines (Ref 1.5); and;
 - be of very low importance, following the EIA-specific assessment methodology.

Feature: Birds

Description and distribution

- 1.5.32. A number of Schedule 1 species of the Wildlife and Countryside Act (Ref 1.3) were reported in the desk-study; however, these species are likely to be incidental sightings of species passing through the survey area. No Schedule 1 species were recorded during the breeding bird surveys. Fieldfare, redwing and peregrine were recorded during the Winter bird survey only. Fieldfare and redwing are common Winter visitors and are included on Schedule 1 due to the rarity of breeding occurring within the UK. Peregrines are known to nest on the Sizewell A and B power stations and the habitat within the site is likely to form part of a peregrine's large foraging territory.
- 1.5.33. A small number of BoCC Red List species (Ref 1.4) were observed during the breeding and wintering bird surveys, including skylark, song thrush, and yellowhammer. All are considered to be breeding within the site, with skylark the most numerous, with up to ten individuals recorded. In addition, bullfinch and dunnoek, both BoCC Amber List (Ref 1.4) and NERC Act (Ref 1.13) listed species, are also likely to use the habitats in the study area.
- 1.5.34. Arable farmland is extensive within Suffolk and the distribution of farmland bird species such as the red listed species discussed above will, to a large extent, be dependent on the diversity of the arable habitat. Fields with large diverse margins or crops sown to benefit wild birds are likely to support a greater number and diversity of bird species than intensively managed arable farmland present along the site.

Assessment

- 1.5.35. Given that:
- no Schedule 1 breeding bird species of the Wildlife and Countryside Act (Ref 1.3) were recorded;
 - intensively managed arable habitat, and the breeding and wintering bird assemblage it supports, is widespread in Suffolk, and the arable habitat is not being managed specifically to benefit breeding birds; and
 - the nesting and foraging resource of Buckle's Wood CWS is being retained;
- notwithstanding the legal protection afforded to nesting bird species, then the breeding and wintering bird assemblage within the Zol would:
- not be an IEF under the CIEEM guidelines (Ref 1.5); and

- be of low importance, following the EIA-specific assessment methodology.

Feature: Bats

Description and distribution

- 1.5.36. Ten species of bats have been recorded within the Zol through the desk-study, secondary data and primary data review. The species recorded include Daubenton's bat, Natterer's bat, noctule, Leisler's bat, common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, serotine, barbastelle and brown long-eared bat.
- 1.5.37. Areas of woodland, hedgerows and scattered mature trees within and in land adjacent to the site were considered to have potential for roosting bats and to provide good quality commuting and foraging opportunities. Sixteen trees were identified as having the potential to support bat roosts, including ten trees of high potential (this assessment excluded trees within the woodland).
- 1.5.38. Activity and static detector surveys demonstrated that activity within the site and within adjacent habitats was dominated by common and soprano pipistrelle.
- 1.5.39. Surveys in 2011 (Ref 1.19) identified the presence of a common pipistrelle maternity roost in Gypsy Lodge, located approximately 360m to the west of the site. The level and timing of soprano pipistrelle activity was also indicative of the presence of a roost in close proximity. All other species were recorded at low levels, with the timing and level of suggesting occasional use of this habitat for foraging and commuting. No clear evidence was identified to suggest the presence of additional roosts or commuting routes in close proximity to the site.
- 1.5.40. A Natterer's bat maternity roost of at least 49 individuals in August 2011 was identified at Leiston Abbey, approximately 300m north of the site boundary. Despite its proximity, surveys within site boundary indicate that use of these habitats by Natterer's bats is intermittent and at only very low levels.
- 1.5.41. Surveys undertaken within the adjacent EDF Energy estate identified the presence of breeding populations of Natterer's bat, soprano pipistrelle, barbastelle and brown long-eared bat, as well as the likely presence of a breeding population of common pipistrelle in close proximity to the EDF Energy estate. Desk-study records additionally identified a serotine maternity roost within the Zol of the site. Several of these species are likely to hibernate within the EDF Energy estate (particularly barbastelle); however, it is very unlikely that any of the species hibernate within the site. A single male barbastelle was recorded roosting within Wood Farm (within 50m of the site

boundary to the east) in 2010. Noctule, Daubenton's bat, serotine and Nathusius' pipistrelle were also noted to use habitat within the Zol.

Assessment

1.5.42. Given that:

- Barbastelle are nationally rare with a restricted distribution and are listed on Suffolk's Priority Species and Habitats list (Ref 1.15), Section 41 of the NERC Act (Ref 1.13) and on Annex II of the Habitats Directive (Ref 1.7). However, barbastelle only accounted for a small proportion of the overall activity recorded along the site and immediately adjacent habitats. While a breeding population of barbastelle is using the Zol of the site (defined as 10km), including the EDF Energy estate, for foraging and roosting (all types); there is little indication (from surveys that included radio-tracking) that the site is of importance to barbastelle.
- Natterer's bat may forage and are known to breed within the Zol with a known maternity roost identified at Leiston Abbey; however, this species has been recorded in only very low numbers within the site and immediately adjacent habitat. Therefore, the habitats within the site are unlikely to be relied upon by Natterer's bat.
- Although low levels of noctule passes were recorded in the hour after sunset, noctule activity was generally only recorded at very low levels and this species is unlikely to be reliant on habitat within or immediately adjacent to the site.
- Common and soprano pipistrelle are common and widespread in the UK and Suffolk, and were the most frequently recorded species within the site and immediately adjacent habitat. A common pipistrelle maternity roost was identified at Gypsy Lodge and activity indicated the presence of a soprano pipistrelle roost in close proximity, with high levels of use of the site by both species.
- Only very low levels of Nathusius' pipistrelle activity were recorded with only a single record identified in the Zol (defined as 3km). This species is scarce in Suffolk, having only recently been classified as a resident rather than a migrant Winter visitor.
- Serotine are widespread in Suffolk. Serotine were recorded on only two occasions, and habitats within the site and immediately adjacent are unlikely to be relied upon by serotine for foraging or roosting.
- Brown long-eared bats are common and widespread in the UK and within Suffolk. Although brown long-eared bats are known to be under-

recorded, activity levels were consistently very low. Habitat within the site is unlikely to provide an important roosting or foraging resource.

- Very few *Myotis* calls were recorded from the site, and the majority of these were unlikely to be Daubenton's bat because the habitat is unsuitable for this species (Daubenton's bats are closely associated with water bodies). This species was recorded only in low numbers across the adjacent EDF Energy estate and there was no evidence to suggest the presence of important roosts of this species within the Zol (greater numbers are found to the north of the Zol, associated with the RSPB Minsmere Reserve). This species is therefore not considered further within this assessment.

then the bat assemblage within the Zol would be:

- an IEF at a county level under CIEEM guidelines (Ref 1.5); and
- of medium importance, following the EIA-specific assessment methodology.

1.5.43. Full details of the criteria considered during the assessment of bats at the site are provided in **Table 1.13** to **Table 1.15**.

Table 1.13 Criteria for assessing the importance of the bat species within the Zol of the Project. Note that Zol differs between species

Source of data	Published data		Information derived from project data (inc local desk-study information) supported by professional judgement based on known species ecological traits			
KEY to SCORE	Conservation status	Status UK/Suffolk	Status within the site	Breeding roosts (maternity) within the Zol	Hibernation within the Zol	Use of habitats within the Zol for foraging/commuting
Red [score 3]	+ Habs. Dir. Annex II [additional importance applied if species is qualifying feature of a SAC]	Nationally rare	Population apparently centred on the site (for at least part of the year); 50+ individuals rarest/rarer species.	Maternity colony of rarest/rarer species within the site.	Majority of individuals likely to hibernate within the site and adjacent areas.	High reliance on habitats present within the site (inside or outwith the construction site boundary).
Amber [score 2]	+ NERC Act	Nationally uncommon /less common	Fewer than 50 rarest/rarer species; 50+ more common species. <i>Note these are very broad estimates.</i>	Maternity colony of more common species within the site; rarer species outside the site but within Zol.	Hibernation within Zol very likely; within the site probable	Moderate reliance on habitats present within the site (based on data and species preferences); higher reliance on habitats outside of the site.
Green [score 1]	EPS only	Common/widespread	Present in lower numbers than above (in low or very low numbers).	No evidence of maternity roost within the site; more common species outside the site but within Zol	Majority of individuals are likely to hibernate outside the site (or outside the Zol)	Low reliance on habitats present within the site; species considered to be generalist and adaptable.

Table 1.14 Summary of geographical importance boundaries

Geographic importance: Local	Geographic importance: County	Geographic importance: Regional	Geographic importance: National
A score of 6-10 This matrix does not allow for finer definitions of Local importance (district, borough, Zol, site) for which professional judgement is required.	A score of 11 to 13	A score of 14 to 16	A score of 17+ International if species is qualifying feature of a SAC
The boundaries between these are subjective based on an even distribution of possible scores between the three categories.			

Table 1.15 Summary of the elements considered in determining the geographical context (Ref 1.5) of each species' importance.*

Species**	Conservation Status	Status UK/Suffolk (Ref 1.32) (Ref 1.33)	Recorded Activity within site and Zol	Breeding Roosts (maternity) within the Zol	Hibernation within the Zol	Use of habitats within the Zol for foraging/commuting	Geographic context of importance
Barbastelle	Habs. Dir. Annex II EPS NERC Act	Nationally rare/ Widespread but uncommon in Suffolk.	Recorded at low levels in 2011 and 2015. A peak of 16.4% of total activity on static detectors but more commonly <4% ⁷ . Consistently higher activity levels in 2015 adjacent to Buckle's Wood CWS, but little activity in hour after sunset.	No evidence within (and low likelihood) of breeding roosts within the proposed development. A small number of trees with roost features preferred by barbastelle (i.e. oaks with loose bark or hazard beans) identified within the proposed development.	No evidence (and very low likelihood) within the proposed development. Assumed likely to hibernate within EDF Energy estate. Desk-study identified four roosts (of unknown type) within Zol.	Habitats within the site largely unsuitable but adjacent and bisecting woodland blocks and hedgerows may be used as occasional foraging/commuting habitat (no evidence from radio-tracking bats trapped in the vicinity).	County (score of 11)

⁷ In 2015. Unable to compare to data collected in 2011 due to a disparity in the number of nights analysed per species. Note that although barbastelle accounted for 16.4% of the total activity in October this was primarily due to consistently low levels of activity across all species groups and accounted for just 2.88mppn. The high otherwise was recorded in August at 4.2% (equivalent to 6.43mppn).

NOT PROTECTIVELY MARKED

Species**	Conservation Status	Status UK/Suffolk (Ref 1.32) (Ref 1.33)	Recorded Activity within site and Zol	Breeding (maternity) Roosts within the Zol	Hibernation within the Zol	Use of habitats within the Zol for foraging/commuting	Geographic context of importance
			Estimated population of 50+ using EDF Energy estate (adjacent to east) and surrounding habitats, but radio-tracked individuals not found in proximity to site.	Maternity colony centred on EDF Energy estate; with 30+ roosts identified. Desk-study identified four additional roosts (of unknown type) within Zol.		Habitat mosaic in Zol offers reasonable connectivity and foraging opportunities with a high reliance on the EDF Energy estate.	
Natterer's bat	EPS	Nationally common, widespread in the UK/ Widespread but uncommon in Suffolk	Only very low numbers identified specifically to Natterer's (7% of <i>Myotis</i> spp. calls) ⁸ . Counts of 50+ recorded within the adjacent EDF Energy estate.	No evidence within the site. Maternity colony present within EDF Energy estate with a variety of potential roost resources also present in Zol, one of which is within Leiston Abbey ruins, 300m to north of site	No evidence within the site and hibernation preferences strongly indicate unlikely within the site or immediately adjacent habitats. Eight roosts (of unknown type) in Zol.	Known to use a wide range of habitats. The site open and sub-optimal. May use adjacent woodland blocks but unlikely to be large enough for reliance. The Zol provides habitat on which Natterer's bat rely.	Local (score of 8)
Noctule	EPS NERC Act	Common in England/ Widespread but uncommon in Suffolk	Recorded in very low numbers during activity surveys in 2011 and 2015. 2015 static detector levels peaked in July at 8.25mppn but primarily <2mppn.	No evidence within or adjacent to the site. Trees and woodland with some roost potential adjacent. Five roosts (of unknown type), all within bat boxes, within Zol.	No evidence within or adjacent to the site. Trees and woodland with some roost potential adjacent. Five roosts (of unknown type), all	Use almost all landscape types and less reliant on linear features. Unlikely to be heavily reliant on the Site or immediately adjacent habitat but Zol will	Local (score of 8)

⁸ Note. Moderate numbers of *Myotis* spp. calls were recorded but most could not be identified to a specific species.

NOT PROTECTIVELY MARKED

Species**	Conservation Status	Status UK/Suffolk (Ref 1.32) (Ref 1.33)	Recorded Activity within site and Zol	Breeding (maternity) Roosts within the Zol	Hibernation within the Zol	Use of habitats within the Zol for foraging/commuting	Geographic context of importance
			Accounted for almost half of 'big bat' calls (45%) ⁹ in that year. Moderate activity levels recorded within EDF Energy estate.		within bat boxes, within Zol.	provide habitats on which noctule rely.	
Common pipistrelle	EPS	Common and widespread in the UK and Suffolk	Common and widespread across the site. Most frequently recorded species across the site.	Habitat within the site largely unsuitable; however, maternity roost identified in Gypsy Lodge (350m west). Adjacent trees and woodland blocks have some features suitable (but larger roosts are found in buildings). Four roosts (of unknown type) in Zol.	Few Winter roosts are known; these tend to be solitary individuals. Four roosts (of unknown type) in Zol.	Habitat within the site largely unsuitable; however, activity in 2011 suggested the site supports foraging and commuting. Generalist, widespread and common.	Local (score of 7)
Soprano pipistrelle	EPS NERC Act	Common and widespread in UK and Suffolk	Common and widespread across the site.	Habitat within the site largely unsuitable (and larger roosts are found in buildings). Activity suggests a roost may be present in close proximity to the site with	Few Winter roosts are known; these tend to be solitary individuals. Four roosts (of unknown type) in Zol.	Habitat within the site largely unsuitable; however, activity in 2011 suggested site	Local (score of 8)

⁹ Note. 'Big bat' calls may contain additional noctule passes that cannot be identified to a specific species.

NOT PROTECTIVELY MARKED

Species**	Conservation Status	Status UK/Suffolk (Ref 1.32) (Ref 1.33)	Recorded Activity within site and Zol	Breeding (maternity) Roosts within the Zol	Hibernation within the Zol	Use of habitats within the Zol for foraging/ commuting	Geographic context of importance
				activity peaking in the hour after sunset and before sunrise. Single maternity roost (within bat box(es) in Kenton Hills) identified 1.8km from proposed rail route.		supports foraging and commuting. Generalist, though with a bias towards riparian habitats.	
Nathusius' pipistrelle	EPS	Uncommon in the UK/Rare in Suffolk	Recorded in only very low numbers; largely absent from the site in July and August.	Habitat within the site largely unsuitable although adjacent trees and woodland blocks have some features potentially suitable. Variety of roost resources within Zol.	Habitat within the site largely unsuitable although adjacent trees and woodland blocks have some features potentially suitable. Variety of roost resources within Zol, considered likely to hibernate within EDF Energy estate..	Generalist, though with a bias towards riparian habitats	Local (score of 7)
Serotine	EPS	Uncommon but widespread in UK and Suffolk.	Extremely low numbers recorded only ¹⁰ .	No evidence within Site and roosting preferences strongly indicate unlikely within the site or adjacent habitats.	No evidence within Site and roosting preferences strongly indicate unlikely within the site or adjacent habitats.	The site is open and sub-optimal. Known to use the Zol but in low numbers.	Local (score of 7)

¹⁰ Note. 'Big bat' calls may contain serotine passes that cannot be identified to the species level.

NOT PROTECTIVELY MARKED

Species**	Conservation Status	Status UK/Suffolk (Ref 1.32) (Ref 1.33)	Recorded Activity within site and Zol	Breeding (maternity) within the Zol	Roosts within the Zol	Hibernation within the Zol	Use of habitats within the Zol for foraging/commuting	Geographic context of importance
				Maternity roost known at Theberton House (1.2km north) A further roost (of unknown type) was identified within Zol.	Two roosts (of unknown type) within Zol.			
Brown long-eared bat	EPS NERC Act	Common and widespread in UK and Suffolk	Very low activity levels recorded throughout survey periods with a single peak in September 2015 (2.67mppn) ¹¹ .	No evidence within the site and largely unsuitable. Trees and woodland blocks adjacent have some features potentially suitable to support breeding roost(s). Two breeding roost within Zol (Upper Abbey Farm, 1km north-east and Ash Wood Cottages, 1.9km north-east).	No evidence within the site and largely unsuitable. Twelve roosts (of unknown type) in Zol. Use a range of habitats for hibernation so may hibernate within Zol; considered likely to hibernate within EDF Energy estate.	Often under-recorded, generalist	Local (score of 7)	

*The different elements that make up the assigned 'importance' have been broadly categorised and colour-coded to show how each element contributes to the assessment (key provided above: Red scores 3; Amber scores 2; Green scores 1)

**Only those species for which calls were identified to the species level are considered in this table. Species groups are not considered here due to the variation in the considered parameters (in each column) between species within a species group.

For example, no calls were assigned by the auto-ID software to Daubenton's bat within Myotis spp. group (this is not unusual, as Myotis calls are rarely possible to identify to a species). However, those calls identified as Myotis are more likely to be Natterer's bat (and therefore are included within the Natterer's bat assessment above) because of the lack of suitable habitat for Daubenton's bat.

¹¹ Note that this species is often under-recorded due to the nature of its echolocation calls.

Feature: Terrestrial mammals

Description and distribution

- 1.5.44. Pre-2012 surveys (Ref 1.24) recorded a single badger outlier sett near the centre of AD Site 1 and a subsidiary sett was found within the south-west corner of Aldhurst Farm in 2016, adjacent to the site boundary. National badger surveys were undertaken between 1985-1988 and 1994-1997 to detect changes in the badger population (Ref 1.34, Ref 1.35). The national surveys detected a large increase in badger numbers over a ten-year period, and evidence from other surveys between 1996 and 2002 suggests that populations may still be increasing, although there was limited information to confirm any trends (Ref 1.36). A further survey of badger setts across England and Wales between 2011 and 2013, concluded there had been a 103% increase in social groups over the last 25 years (Ref 1.37, Ref 1.32). There has also been an increase in Suffolk's badger population since the 1980s (Ref 1.25).
- 1.5.45. Desk-study records have identified brown hare within the site and a single individual was flushed from near Aldhurst farm during bat survey work. East Anglia has been a reservoir for brown hare, holding approximately 20% of the national population across the three counties (Cambridgeshire, Suffolk and Norfolk) (Ref 1.38). Brown hare is widespread in Suffolk (ref 1.25); however, recent reports in the east of England in 2018 suggest brown hare are suffering from a disease epidemic with records of sick or dead animals (Ref 1.39). The individual recorded on site would not comprise a significant contribution to the wider population of this highly mobile species.
- 1.5.46. There were no records of hedgehog within the site. Hedgehogs occur in a wide variety of habitat types including grasslands, forests and suburban areas (Ref 1.40). Buckle's Wood CWS, broadleaved woodland and the hedgerows present provide potentially suitable habitat for hedgehogs and this species could be present within the site boundary. Hedgehog is on Suffolk's Priority Species and Habitats list (Ref 1.15) and Section 41 of the NERC Act (Ref 1.13). However, the majority of the site is arable fields, and so suboptimal for hedgehogs, and Buckle's Wood CWS, woodland and majority of the hedgerows are being retained as part of the site.
- 1.5.47. One water shrew was found in Pond 25 in 2014 during amphibian surveys and a single desk-study record was associated with Buckle's Wood 70m to the north-west of the site boundary. Water shrews are considered to be declining in Suffolk (Ref 1.14). The water shrew is on Suffolk's Priority Species and Habitats list (Ref 1.15), considered locally important, but is not included within Section 41 of the NERC Act (Ref 1.13). Pond 25 will be

retained in its entirety and this record is not considered to provide significant contribution to the potential wider population.

Assessment

1.5.48. Given that:

- only an outlier and subsidiary badger sett was found that could be affected by the site;
- badgers are widespread across England and Wales, and populations are increasing both in England and Wales and in Suffolk (Ref 1.37);

then the badgers within the Zol of the proposed development would be:

- an IEF at the local level under the CIEEM guidelines (Ref 1.5) (owing to their legal protection rather than their status); and
- of low importance, following the EIA-specific assessment methodology.

1.5.49. Due to the status, badgers have been scoped out of the detailed assessment; however, due to the legal protection offered to badgers and their setts, the badger population within the Zol requires secondary mitigation to ensure compliance with the legislation.

1.5.50. Given that the remaining mammal assemblage:

- is, in the case of the brown hare, on Suffolk's Priority Species and Habitats list (Ref 1.15) and Section 41 of the NERC Act (Ref 1.13); while the habitat within the site boundary is suitable for brown hare, the population on site (one to two individuals) would not be a significant contribution to the wider population of this highly mobile species;
- is, in the case of water shrew, legally protected, and is on Suffolk's Priority Species and Habitats list (Ref 1.15), exists within Zol within a habitat that will be fully retained, and the population within the site boundary is not a significant contributor to the wider population;
- is, in the case of hedgehog, on Suffolk's Priority Species and Habitats list (Ref 1.15) and Section 41 of the NERC Act (Ref 1.13); however, there was an absence of desk-study and survey records for hedgehogs within the site boundary, and limited suitable habitat;

then the brown hare, water shrew and hedgehog within the Zol would:

- not be IEFs under the CIEEM guidelines (Ref 1.5); and

- be of very low importance, following the EIA-specific assessment methodology.

ii. Proposed rail improvement works – Bratt’s Black House

Feature: Designated sites

Description and distribution

One statutory designated site (one SSSI) and one non-statutory designated sites (one CWS) were identified within 5km and 2km respectfully from the site boundary. The sites are detailed in **section 4.2b)i**.

Assessment

1.5.51. Given that:

- the Minsmere to Walberswick Heaths and Marshes SSSI support habitats and species of national importance; however,
- no direct land take of this sites would occur and these sites are sufficiently far away so that no indirect impact pathways have been identified;

then the Minsmere to Walberswick Heaths and Marshes SSSI within the ZoI would be:

- an IEF at the national level under the CIEEM guidelines (Ref 1.5);
- of high importance, following the EIA-specific assessment methodology; and
- scoped out of the detailed assessment as there would be no direct or indirect impacts.

1.5.52. Given that the Kalsale morio Meadow CWS:

- support habitat types listed on Section 41 of the NERC Act (Ref 1.13) and are targeted for action in the Suffolk BAP (Ref 1.14); however,
- no direct land take of this sites would occur, and these sites are sufficiently far away so that no indirect impact pathways have been identified;

then the Kalsale morio Meadow CWS would be:

- an IEF at the county level under the CIEEM guidelines (Ref 1.5);

- of medium importance, following the EIA-specific assessment methodology; but
- scoped out of the detailed assessment as there would be no direct or indirect impacts.

Feature: Plants and habitats

Description and distribution

- 1.5.53. The site comprises railway track and lineside habitat of dense scrub, adjacent to arable fields and hedgerows with a small number of scattered trees. A vehicle level crossing is present within the site. Hedgerows and trees within site were unable to be assessed through aerial imagery. Hedgerows have been targeted for action in the Suffolk BAP (Ref 1.14). Given the small, discrete nature of the hedgerow habitat available within the site boundary at this location, the impacts to this feature are unlikely to be significant.
- 1.5.54. Seven ponds are within 500m of the site boundary; however, no ponds were identified within the site.

Assessment

- 1.5.55. Given that for hedgerows and ponds:
- hedgerows are within the site boundary, but works are small and discrete in nature leading to limited loss; and
 - no ponds holding water were identified within the site boundary;
- hedgerows and pond habitats within proposed development ZoI would:
- not be an IEF under the CIEEM guidelines (Ref 1.5); and;
 - be of low importance (ponds)/very low importance (hedgerows), following the EIA-specific assessment methodology.

Feature: Invertebrates

Description and distribution

- 1.5.56. The desk-study identified two notable and/or legally protected invertebrate species within the ZoI, purple emperor (*Apatura iris*) and white-letter hairstreak (*Satyrrium w-album*). Purple emperor is protected under Schedule 5 of the Wildlife and Countryside Act (Ref 1.3) and is associated with broad-leaved woodland. White-letter hairstreak is also protected under Schedule 5 of the Wildlife and Countryside Act (Ref 1.3) and is also listed on the RDB

and likely to be associated with broad-leaved woodland containing Elm species (*Elmus* sp.).

- 1.5.57. The railway tracks and lineside habitat are unlikely to be of particular importance to invertebrates, and the purple emperor and white-letter hairstreak are unlikely to be found within the site boundary. The invertebrate assemblage within the Zol of the site is therefore of local importance under the CIEEM guidelines (Ref 1.5) and of very low importance under the EIA-specific methodology.

Assessment

- 1.5.58. Given that for invertebrates:

- the majority of the site comprises railway tracks and lineside habitat of limited value to invertebrate species;
- the hedgerows within the site boundary are of limited value to invertebrates

then the invertebrate assemblage within the Zol would:

- not be an IEF under the CIEEM guidelines (Ref 1.5); and;
- be of very low importance, following the EIA-specific assessment methodology.

Feature: Amphibians

Description and distribution

- 1.5.59. There was an historical (2005) great crested newt record 240m north of the site. Due to the lack of baseline data available for the ponds within 500m of the site, the potential for great crested newt presence should be assumed as a worst-case scenario.
- 1.5.60. Desk-study records were also identified for common toad and common frog between 1.4km and 1.8km south-west of the site.
- 1.5.61. The site offers limited potential in terms of breeding and foraging for great crested newts and other amphibians. Lineside and railway ballast habitat may offer suitable hibernating opportunities. From aerials, the pond located adjacent to site may offer suitable foraging, breeding and hibernating opportunities. The surrounding arable fields holds limited suitability for foraging great crested newt, hedgerows surrounding arable fields would provide suitable habitat for commuting and hibernation.

Assessment

1.5.62. Given that the great crested newt:

- is legally protected;
- is on Suffolk's Priority Species and Habitats list (Ref 1.15), is listed under Section 41 of the NERC Act (Ref 1.13), and are protected under Schedule 5 of the Wildlife and Countryside Act (Ref 1.3) and Schedule 2 of the Conservation of Habitats and Species Regulations (Ref 1.11);
- is widespread but patchily distributed with populations of conservation interest in the UK, and has a population stronghold in the Suffolk; and
- due to the historic desk-study record found 240m away, great crested newts presence should be assumed as a worst-case scenario;
- given the small nature of ponds within 500m of the site and the limited suitable terrestrial habitat on site, the population within 500m would not likely be maintained by the site, nor is the site likely to be key to supporting great crested newts from those ponds;

then the population of this species located within the Zol would be:

- an IEF (due to the lack of survey information) at the local level under the CIEEM guidelines (Ref 1.5); and
- of low importance, following the EIA-specific assessment methodology.

1.5.63. Given that the for other amphibians:

- common toad is on Suffolk's Priority Species and Habitats list (Ref 1.15) and listed under Section 41 of the NERC Act (Ref 1.13);
- the site offers limited potential in terms of breeding and foraging for great crested newts and other amphibians; and

then the population of other amphibians within the Zol would:

- not be an IEF under the CIEEM guidelines (Ref 1.5); and
- be of very low importance, following the EIA-specific assessment methodology.

Feature: Reptiles

Description and distribution

- 1.5.64. Reptile records were identified for grass snake, slow-worm and common lizard between approximately 1.1km and 1.7km south-west from the site. Overall, the available habitat to support reptile species is considered to be extremely limited and the site of little value to reptile species.

Assessment

- 1.5.65. Given that:
- all reptile desk-study records were over 1km from the site; and
 - the habitat is considered predominantly to be sub-optimal for reptiles; then the reptile assemblage within the ZoI would:
 - not be an IEF under the CIEEM guidelines (Ref 1.5); and;
 - be of very low importance, following the EIA-specific assessment methodology.

Feature: Birds

Description and distribution

- 1.5.66. Thirty-nine records were identified for birds within 2km of the site. Of these, 26 species were identified approximately 150m north-east of site, within arable land. Three Schedule 1 species were identified 150m north-east of the site; redwing, fieldfare and barn owl. An additional two Schedule 1 species were identified within 2km of the site, hobby and red kite.

- 1.5.67. Habitats within the site are very limited for nesting and foraging birds, and species would not be dependent on these, with more substantial suitable habitat available within the wider area.

Assessment

- 1.5.68. Given that for birds:
- all desk-study records were external to the site;
 - habitats within the site are very limited for nesting and foraging birds, and species would not be dependent on these, with more substantial suitable habitat available within the wider area;

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- works are small and discrete in nature and unlikely to result in significant impacts to birds;

notwithstanding the legal protection afforded to nesting bird species, then the breeding and wintering bird assemblage within the Zol would:

- not be an IEF under the CIEEM guidelines (Ref 1.5); and
- be of very low importance, following the EIA-specific assessment methodology.

Feature: Bats**Description and distribution**

- 1.5.69. Two records were identified for bats; Pipistrelle species (*Pipistrellus* sp.) and brown long-eared approximately 1.5km south-west and 1.8km west, respectively, from the site. From a review of satellite imagery, there is limited habitat suitable for foraging, commuting and roosting bats.

Assessment

- 1.5.70. Given that for bats:

- all desk-study records were external to the site;
- habitats within the site provide limited suitable habitat for foraging, commuting and roosting bats;
- works are small and discrete in nature and unlikely to result in significant impacts to bats;

then the bat assemblage within the Zol would:

- not be an IEF under the CIEEM guidelines (Ref 1.5); and
- be of very low importance, following the EIA-specific assessment methodology.

Feature: Terrestrial mammals**Description and distribution**

- 1.5.71. Only hedgehog was identified from the desk-study, approximately 1.1km west of site. The site offers suitable foraging and nesting habitat with connectivity to small areas of woodland outside of the site, and so is optimal for hedgehogs; however, given the small, discrete nature of the works, there is sufficient optimal habitats within the surrounding area.

Assessment

1.5.72. Given that for hedgehog:

- is, in the case of hedgehog, on Suffolk's Priority Species and Habitats list (Ref 1.15) and Section 41 of the NERC Act (Ref 1.13);
- the site offers suitable foraging and nesting habitat with connectivity to small areas of woodland outside of the site, and so is optimal for hedgehogs;
- works are small and discrete in nature and unlikely to result in significant impacts to hedgehog with sufficient, optimal habitats within the surrounding area;

then the hedgehog within the Zol would:

- not be an IEF under the CIEEM guidelines (Ref 1.5); and
- be of very low importance, following the EIA-specific assessment methodology.

c) Summary of ecological features/receptors

1.5.73. Following a review of the known baseline within the Zol, **Table 1.16** lists the ecological features/receptors and details which will be carried forward into the detailed assessment. Those carried forward are IEFs of sufficient conservation value that will be sufficiently affected by the proposed development to require material consideration within the assessment.

1.5.74. There are a number of ecological receptors that, while not of significant nature conservation value within the Zol, do require some consideration because of the legislative protection afforded to them. While not taken forward for detailed assessment, these are considered further in the ES, where appropriate secondary mitigation is prescribed to ensure legislative compliance.

Table 1.16 Determination of IEFs to be taken forward for detailed assessment

Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope in/Out
Proposed rail extension route			
Statutory designated sites within 5km of the site boundary	International and National/High	These statutory designated sites support a range of habitats and European and nationally protected species. Given the distance of these sites from the proposed development (the nearest being 930m away), no direct or indirect impacts are anticipated on these statutory designated sites. Statutory designated sites have therefore been scoped out of the detailed assessment (please refer to Table 1.2 for the full list of these).	Scoped out
Non-statutory Designated Sites within 2km of the site boundary (excluding Buckle’s Wood CWS)	County/Medium	CWS support a range of habitats types that are listed on Section 41 of the NERC Act (Ref 1.13) and which are targeted for action in the Suffolk BAP (Ref 1.14). Given the distance of these sites (with the exception of Buckle’s Wood CWS) (the nearest being 750m away) from the site, no direct land take of these sites will occur, and no obvious impact pathways have been identified. Five CWS (Sizewell Levels and Associated Areas, Leiston Common, Theberton Woods, Leiston Airfield and Minsmere Valley Eastbridge to Reckford Bridge) have therefore been scoped out of the detailed assessment.	Scoped out
Buckle’s Wood CWS and the woodland immediately east alongside Buckleswood Lane	County/Medium	Buckle’s Wood CWS is listed on the Ancient Woodland Inventory and is targeted for action in the Suffolk BAP (Ref 1.14). This CWS also supports habitat types that are priority habitats (Ref 1.15) and is listed under Section 41 of the NERC Act (Ref 1.13). While it would be retained in its entirety, this CWS could experience indirect impacts as it is adjacent to the site. Buckle’s Wood CWS has therefore been scoped into the detailed assessment.	Scoped in
Broadleaved woodland (excluding Buckle’s Wood CWS).	Local/Low	The broadleaved copse (0.1ha) is located immediately east of Buckle’s Wood CWS alongside Buckleswood Lane, but is only 0.1ha in extent and separated from Buckle’s Wood CWS. The copse would be retained in their entirety, and has therefore been scoped out of the assessment.	Scoped out
Pond within the site boundary and Zol	Local/Low	Ponds are a habitat listed under Suffolk’s Priority Species and Habitats list (Ref 1.15). There are 28 ponds within the Zol. Pond 42, which was dry at the time of survey, will be lost during construction, while all others are outside the site boundary. The ponds within the wider area are known to support populations of great	Scoped out

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Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope in/Out
		crested newt, which has been assessed as a receptor in its own right. Ponds have therefore been scoped out of the detailed assessment.	
Hedgerows	Local/Low	Hedgerows are a habitat listed under Suffolk’s Priority Species and Habitats list (Ref 1.15). There will be the loss of a small section of species-rich ‘important’ hedgerow to accommodate the proposed rail extension route, as well as two small sections of defunct, species-poor hedgerows; remaining hedgerows will be retained. Hedgerows are widespread in Suffolk and it is not considered that the loss of a small section of species-rich hedgerow at this location would result in a significant impact. Therefore, hedgerows have been scoped out of the detailed assessment.	Scoped out
Invertebrate assemblage	Local/Very Low	During field studies, no habitat of particular value for invertebrates within the site was identified. The majority of the site comprises of arable fields, with some species-rich hedgerows but with hedgerows largely defunct or species poor, or with no other features of particular importance to invertebrate species. Invertebrates have therefore been scoped out of the detailed assessment.	Scoped out
Great crested newts	County/Medium	Great crested newt is found throughout the site: to the north in the land around Leiston Abbey (Ponds 2, 4, 55 and 57); in the middle of the Zol at Pond 30 and 36; to the west at Ponds 27 and 28 within adjacent woodland and gardens respectively; Ponds 20, 21 and 37 to the west (adjacent to Crossings Farm and Crossing Cottages); and Pond 26. Great crested newt is on Suffolk’s Priority Species and Habitats list (Ref 1.15), is protected under Schedule 5 of the Wildlife and Countryside Act (Ref 1.3), and Schedule 2 of the Conservation of Habitats and Species Regulations (Ref 1.11), and listed under Section 41 of the NERC Act (Ref 1.13). Although the majority of the site consists of arable fields of limited suitability for foraging great crested newts, the field margins, hedgerows and blocks of woodland are suitable foraging habitat, with the woodland providing suitable hibernation sites, and hedgerows and associated margins providing some connectivity between ponds. Great crested newts have therefore been scoped into the detailed assessment.	Scoped in
Common toad	Local/Very Low	Woodland blocks are likely to support a small population of common toads. Common toad is listed under Section 41 of the NERC Act (Ref 1.13). While a species of principal importance, all woodland blocks are	Scoped out

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Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope in/Out
		located outside of the site boundary. This species has therefore been scoped out of the detailed assessment; however, mitigation measure employed to protect great crested newts would also protect this species. These have been detailed in section 7.5 of Chapter 7 of Volume 9 of the ES.	
Reptile assemblage	Local/Very Low	There is limited habitat available to support reptile species along the rail extension route site and the habitat within the site boundary was of little value to reptile species. Reptiles have therefore been scoped out of the detailed assessment, but details of the mitigation measures that would be employed to safeguard reptiles have been detailed in section 7.5 of Chapter 7 of Volume 9 of the ES.	Scoped out
Breeding and wintering bird assemblage	Local/Low	<p>The breeding and wintering bird assemblage identified within the site is representative of the habitats present and the populations observed on site are comparable to the populations within the wider area. The intensively managed arable habitat, and the breeding and wintering bird assemblage it supports, is widespread in Suffolk and the arable habitat is not being managed specifically to benefit birds. In addition, the nesting and foraging resource of the surrounding woodlands are being retained. It is therefore not considered that any significant impacts would occur on the breeding and wintering bird populations.</p> <p>Breeding and wintering birds are therefore scoped out of the detailed assessment. However, nesting birds are protected under the Wildlife and Countryside Act (Ref 1.3). Details of the mitigation measures that should be employed to safeguard birds have been detailed in section 7.5 of Chapter 7 of Volume 9 of the ES.</p>	Scoped out
Roosting, foraging and commuting bats	County/Medium	<p>At least seven bat species have been recorded within the site; with ten known from desk study review and surveys undertaken on the adjacent EDF Energy estate. The Zol of the site is known to support breeding populations of barbastelle, Natterer’s bat, common pipistrelle, soprano pipistrelle, serotine, barbastelle and brown long-eared bat.</p> <p>A number of trees were identified within the site boundary that have a high or medium potential to support roosting bats. Surveys in 2011 identified the presence of a common pipistrelle maternity roost in Gypsy Lodge. It was also considered that the level and timing of soprano pipistrelle activity was indicative of the presence of a soprano pipistrelle roost in close proximity.</p> <p>A Natterer’s bat maternity roost of at least 49 individuals in August 2011 was identified at Leiston Abbey, approximately 300m north of the site boundary, with a breeding population within the EDF Energy estate.</p>	Scoped in

Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope in/Out
		<p>Despite its proximity, surveys within site boundary indicate that use of these habitats by Natterer's bats is intermittent and at only very low levels.</p> <p>A single male barbastelle was identified foraging in Buckle's Wood CWS and roosting at Wood Farm (50m away from the site boundary) in 2010. Subsequent site-specific surveys, however, indicated that the site is not of significant value to the adjacent breeding population of barbastelle.</p> <p>All other species were recorded at low levels of activity, with the timing and level of use suggesting occasional use of this habitat for foraging and commuting</p> <p>The degree of sensitivity bats display varies between species; however, it is recognised that all bat species can be negatively impacted by anthropogenic activities. All bat species in the UK are protected under Annex IV of the Habitats Directive (Ref 1.7), transposed to UK law under the Conservation of Habitats and Species Regulations (Ref 1.11). Additional relevant legislation includes the Wildlife and Countryside Act (Ref 1.3), and the NERC Act (Ref 1.13).</p> <p>The bat assemblage is therefore scoped into the detailed assessment.</p>	
Badgers	Local/Low	<p>Surveys recorded two badger setts within the site boundary and study area.</p> <p>Badgers are widespread across England and Wales, and populations are increasing both in England and Wales and in Suffolk (Ref 1.37). Badgers have therefore been scoped out of the detailed assessment, but details of the mitigation measures that should be employed to safeguard badgers have been detailed in section 7.5 of Chapter 7 of Volume 9 of the ES.</p>	Scoped out
Brown hare	Local/Very Low	<p>A single brown hare was recorded on site during surveys. While a limited number of brown hare are likely to be found within or adjacent to the site, there is sufficient adjacent habitat to support this species, and the population found within the site boundary is not considered to be a significant contribution to the potential wider population within the ZoI. The effects of the site on this highly mobile species are unlikely to be significant and brown hare have therefore been scoped out of the detailed assessment.</p> <p>Brown hare is listed under Suffolk's Priority Species and Habitats (Ref 1.15) and Section 41 of the NERC Act (Ref 1.13). Details of the mitigation measures that should be employed to safeguard brown hare have been detailed in section 7.5 of Chapter 7 of Volume 9 of the ES.</p>	Scoped out

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Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope in/Out
Water shrew	Local/Very Low	<p>One water shrew was found in Pond 25 in May 2014 during amphibian surveys and a single desk-study record was associated with Buckle’s Wood CWS 70m to the north-west of the site boundary. The population found within these pond is not considered to be substantial to the wider population of the species, and this habitat type is being retained in its entirety as part of the site. Water shrews are considered to be declining in Suffolk (Ref 1.14). The water shrew is also on Suffolk’s Priority Species and Habitats list (Ref 1.15) and considered locally important, but is not included within Section 41 of the NERC Act (Ref 1.13), so is not identified as a species of principal importance for the purpose of conserving biodiversity in England</p> <p>Therefore, this species has been scoped out the detailed assessment, but details of the mitigation measures that should be employed to safeguard water shrew have been detailed in section 7.5 of Chapter 7 of Volume 9 of the ES.</p>	Scoped out
Hedgehog	Local/Very Low	<p>The majority of the site comprises arable fields, and so is suboptimal for hedgehogs, and there were no records of hedgehogs on the site. Buckle’s Wood CWS, broadleaved woodland and the boundary hedgerows present provide potentially suitable habitat for hedgehogs and this species could be present within the site boundary. Buckle’s Wood, broadleaved woodland and the majority of hedgerows are being retained. While hedgehog are likely to be found within or adjacent to the site, there is sufficient adjacent habitat to support this species and the effects of the site on this species is unlikely to be of significance.</p> <p>Hedgehog has therefore been scoped out of the detailed assessment, but details of the mitigation measures that should be employed to safeguard hedgehog have been detailed in section 7.5 of Chapter 7 of Volume 9 of the ES.</p>	Scoped out
Proposed rail improvement works - Bratt’s Black House			
Statutory designated sites within 5km of the site boundary	National/High	<p>Minsmere to Walberswick Heaths and Marshes SSSI supports a range of habitats and nationally protected species. Given the distance of this site from the proposed development (4.9km away), no direct or indirect impacts are anticipated on this statutory designated site.</p> <p>Minsmere to Walberswick Heaths and Marshes SSSI has therefore been scoped out of the detailed assessment.</p>	Scoped out

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Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope in/Out
Non-statutory Designated Sites within 2km of the site boundary	County/Medium	Kalsale morio Meadow CWS supports habitats types that are listed on Section 41 of the NERC Act (Ref 1.13) and which are targeted for action in the Suffolk BAP (Ref 1.14). Given the distance of this site from the proposed development (300m away), no direct land take will occur, and no obvious impact pathways have been identified. Kalsale morio Meadow CWS has therefore been scoped out of the detailed assessment.	Scoped out
Hedgerows	Local/Very Low	Hedgerows are a habitat listed under Suffolk's Priority Species and Habitats (Ref 1.15). Hedgerows are widespread in Suffolk and given the small, discrete nature of the hedgerow habitat available within the site boundary at this location, it is not considered that the loss of a small section of hedgerow would result in a significant impact. Therefore, hedgerows have been scoped out of the detailed assessment.	Scoped out
Ponds within the Zol	Local/Low	Ponds are a habitat listed under Suffolk's Priority Species and Habitats (Ref 1.15). No ponds are within the site boundary at this location. The closest pond is adjacent to the site and will be retained in its entirety. Ponds have therefore been scoped out of the detailed assessment.	Scoped out
Invertebrate assemblage	Local/Very Low	During desk studies, no habitat of particular value for invertebrates within the site was identified. The majority of the site comprises a section of railway tracks with predominantly scrubby lineside habitat. Invertebrates have therefore been scoped out of the detailed assessment.	Scoped out
Great crested newts	Local/Low	Great crested newt is on Suffolk's Priority Species and Habitats list (Ref 1.15), is protected under Schedule 5 of the Wildlife and Countryside Act (Ref 1.3), and Schedule 2 of the Conservation of Habitats and Species Regulations (Ref 1.11), and listed under Section 41 of the NERC Act (Ref 1.13). Given the small nature of ponds within 500m of the site and the limited suitable terrestrial habitat on site, the population within 500m would not likely be maintained by the site, nor is the site likely to be key to supporting great crested newts from those ponds. There was an historical (2005) great crested newt record 240m north of the site. Due to the lack of baseline data available for the ponds within 500m of the site, the potential for great crested newt presence should be assumed as a worst-case scenario. Due to the lack of survey information, great crested newts have therefore been scoped into the detailed assessment.	Scoped in

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Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope in/Out
Other amphibians	Local/Very Low	Given the discrete nature of the works and limited suitable habitat within the site, other amphibians have been scoped out of the detailed assessment.	Scoped out.
Reptiles	Local/Very Low	<p>Within the site boundary, suitable habitat for reptiles is limited but includes lineside habitats, such as dense scrub, a small cluster of trees and field boundaries, and therefore sub-optimal for reptiles. Overall, the available habitat to support reptile species is considered to be extremely limited and the site of little value to reptile species.</p> <p>Reptiles have therefore been scoped out of the detailed assessment, but details of the mitigation measures that would be employed to safeguard reptiles have been detailed in section 7.5 of Chapter 7 of Volume 9 of the ES.</p>	Scoped out.
Bird assemblage	Local/Very Low	<p>Within the site boundary and given the discrete nature of the proposed works, suitable habitat for foraging and breeding birds is limited.</p> <p>Breeding and wintering birds are therefore scoped out of the detailed assessment, but details of the mitigation measures that should be employed to safeguard birds have been detailed in section 7.5 of Chapter 7 of Volume 9 of the ES.</p>	Scoped out
Bat assemblage	Local/Very Low	<p>Within the site boundary and given the discrete nature of the proposed works, suitable habitat for foraging, roosting and commuting bats is limited.</p> <p>Bats have therefore been scoped out of the detailed assessment. All bat species in the UK are protected under Annex IV of the Habitats Directive (Ref 1.7), transposed to UK law under the Conservation of Habitats and Species Regulations (Ref 1.11). Additional relevant legislation includes the Wildlife and Countryside Act (Ref 1.3), and the NERC Act (Ref 1.13). Details of the mitigation measures that should be employed to safeguard bats have been detailed in section 7.5 of Chapter 7 of Volume 9 of the ES.</p>	Scoped out
Hedgehog	Local/Very Low	The site offers suitable foraging and nesting habitat with connectivity to small areas of woodland outside of the site, and so is optimal for hedgehogs; however, given the small, discrete nature of the works, there is sufficient optimal habitats within the surrounding area and the effects of the site on this species is unlikely to be of significance.	Scoped out

Feature/Receptor	Importance (CIEEM/EIA Methodology)	Justification	Scope in/Out
		Hedgehog has therefore been scoped out of the detailed assessment, but details of the mitigation measures that should be employed to safeguard hedgehog have been detailed in section 7.5 of Chapter 7 of Volume 9 of the ES .	

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VOLUME 9, CHAPTER 7: APPENDIX 7A:
ANNEX 7A.2: DESK STUDY

Contents

1.	Methodology	1
1.2	Plants.....	2
1.3	Invertebrates.....	4
1.4	Amphibians.....	12
1.5	Reptiles.....	14
1.6	Birds	16
1.7	Bats	47
1.8	Terrestrial mammals.....	52

Tables

Table 1.1:	Proposed rail extension route desk-study results for plants.....	2
Table 1.2:	Proposed rail improvement works (Bratt’s Black House) desk-study results for plants.....	3
Table 1.3:	Proposed rail extension route desk-study results for invertebrates.....	4
Table 1.4:	Proposed rail improvement works (Bratt’s Black House) desk-study results for invertebrates.....	12
Table 1.5:	Proposed rail extension route desk-study results for amphibians	12
Table 1.6:	Proposed rail improvement works (Bratt’s Black House) desk-study results for amphibians	13
Table 1.7:	Proposed rail extension route desk-study results for reptiles.....	15
Table 1.8:	Proposed rail improvement works (Bratt’s Black House) desk-study results for reptiles.....	16
Table 1.9:	Proposed rail extension route desk-study results for birds.....	17
Table 1.10:	Proposed rail improvement works (Bratt’s Black House) desk-study results for birds.....	37
Table 1.11:	Proposed rail extension route desk-study results for bats.....	47
Table 1.12:	Proposed rail improvement works (Bratt’s Black House) desk-study results for bats.....	52
Table 1.13:	Proposed rail extension route desk-study for terrestrial mammals	52
Table 1.14:	Proposed rail improvement works (Bratt’s Black House) desk-study results for terrestrial mammals	54

Plates

None provided.

Figures

None provided.

1. Methodology

1.1.1. This desk study has been prepared for

- the part of the green rail route comprising a temporary rail extension of approximately 1.7km from the existing Saxmundham to Leiston branch line to the proposed B1122 (Abbey Road) level crossing (the 'proposed rail extension route'); and
- Saxmundham to Leiston branch line upgrades (including track replacement and level crossing upgrades) (the 'proposed rail improvement works');
- (together the 'proposed development').

1.1.2. Detailed descriptions of the proposed development sites (referred to throughout this volume as the 'site' as relevant to the location of the works) the proposed development and different construction, operation and removal and reinstatement phases are provided in **Chapter 2** of this volume of the ES. A glossary of terms and list of abbreviations used in this chapter is provided in **Volume 1** of the ES.

1.1.3. Desk-study records of protected or otherwise notable species of conservation interest within 2km (unless otherwise stated) of the site boundary were obtained from Suffolk Biodiversity Information Service (SBIS) in December 2014 and 2018. A second data request was made in March 2016 for records of bats within 10km of the proposed development.

1.1.4. As detailed in **Table 7.4** of **Chapter 7** of **Volume 9** of the **ES**, Bratt's Black House is the only level crossing improvement of the proposed rail improvement works to be screened in for further assessment. Desk-study records for Bratt's Black House were obtained from SBIS in June 2018.

1.2 Plants

a) Green rail route

1.2.1. **Table 1.1** below summarises the desk-study results for plants within the 2km Zone of Influence (Zol) of the site.

Table 1.1: Proposed rail extension route desk-study results for plants

Species	Location	Site Details	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
Dune Fescue (<i>Vulpia fasciculata</i>)	Sizewell	Beach	TM46R	2013		N/A*
Sand Soft-brome (<i>Bromus hordeaceus</i> subsp. <i>thominei</i>)	Sizewell	Beach	TM46R	2013		N/A*
Mossy Stonecrop (<i>Crassula tillaea</i>)	Sizewell	Beach	TM46R	2013		N/A*
Sea Pea (<i>Lathyrus japonicus</i> subsp. <i>maritimus</i>)	Sizewell	Beach	TM46R	2013		N/A*
Corn Spurrey (<i>Spergula arvensis</i>)	Sizewell	Near Sizewell Marshes Sites of Special Scientific Interest (SSSI), wide headland on field of gourds	TM454643	2005		1.0km north-east
	Leiston	and Knodishall	TM46L	2002		N/A*
Smooth Cat's-ear (<i>Hypochaeris glabra</i>)	Sizewell	Beach	TM46R	2013		N/A*

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Species	Location	Site Details	Grid Reference	Year	Abundance	Approximate distance from the site boundary*
Common Cudweed (<i>Filago vulgaris</i>)	Sizewell	Beach	TM46R	2013		N/A*
	Theberton		TM46M	2005	1 count	N/A*
	Leiston		TM46L	2003	1 count	N/A*
Hound's-tongue (<i>Cynoglossum officinale</i>)	Sizewell	Beach	TM46R	2013		N/A*

*Distance from the site boundary can only be calculated where the grid reference has been received in full

b) Proposed rail improvement works - Bratt's Black House

1.2.2. **Table 1.2** below summarises the desk-study results for plants within the 2km Zone of Influence (Zol) of the site.

Table 1.2: Proposed rail improvement works (Bratt's Black House) desk-study results for plants

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
Chicory (<i>Cichorium intybus</i>)	Kelsale-cum-Carlton	Maple Farm Kelsale	TM46C	52.22142387	1.514213599	2015	1 Count of occasional	0.15km north-east
Gold-of-pleasure (<i>Camelina sativa</i>)	Kelsale-cum-Carlton	Maple Farm Kelsale	TM46C	52.22142387	1.514213599	2015	1 Count of present	0.15km north-east

1.3 Invertebrates

a) Proposed rail extension route

1.3.1. **Table 1.3** below summarises the desk-study results for invertebrates recorded within 2km Zol of the site.

Table 1.3: Proposed rail extension route desk-study results for invertebrates

Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary
White-letter hairstreak (<i>Satyrrium w-album</i>)	Kenton Hills		TM454637	1.592899273	52.21635312	2004	1 count of abundant	980m east
	Kenton Hills		TM454639	1.593044283	52.21814786	2003	1 count	960m east
	Kenton Hills		TM453640	1.591655724	52.21908976	1996	10 count of present	860m east
	East Suffolk		TM4664	1.601883136	52.21877769	1996	1 count of abundant	1.5km north-east
	Kenton Hills		TM465645	1.609552541	52.22304101	1996		2.1km north-east
Small heath (<i>Coenonympha pamphilus</i>)	Leiston	Upper Abbey Farm transect summary	TM4564	1.58727249	52.21922323	2011	1 count of abundant	570m east
	Sizewell Marshes SSSI	Sizewell Marshes SSSI, Leiston Common	TM4563	1.586548725	52.21024945	2009	2 count	610m north-west

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary
	Sizewell	Sizewell Marshes SSSI, Rackham Pits Wood	TM4663	1.601156438	52.20980405	2008	1 count	630m north-east
	Sizewell	Sizewell Upper Abbey Farm	TM456652	1.596910055	52.22972453	2006	1 count	1.7km north-east
	East Suffolk		TM4464	1.572661465	52.21966697	1998	1 count of abundant	Within the site boundary
	East Suffolk		TM4664	1.601883136	52.21877769	2000	1 count of abundant	1.5km north-east
Grayling (<i>Hipparchia semele</i>)	Leiston	Upper Abbey Farm transect summary	TM4564	1.58727249	52.21922323	2011	1 count of abundant	570m north-east
	Leiston	Leiston Abbey Farm near Ash Wood	TM4665	1.602610215	52.2277513	2010	2 count	1.9km north-east
	Sizewell		TM4664	1.601883136	52.21877769	2006	1 count	1.5km north-east
	Sizewell	Sizewell area	TM460653	1.602828413	52.23044338	2009	3 count	2.1km north-east
	Kenton Hills		TM465642	1.609333994	52.22034895	2003	1 count	1.9km north-east
	Kenton Hills		TM454639	1.593044283	52.21814786	2003	1 count	960m east
	Sizewell	Sizewell Marshes SSSI	TM4663	1.601156438	52.20980405	2005	1 count of abundant	630m north-east

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary
	East Suffolk		TM4464	1.572661465	52.21966697	1995	1 count of abundant	Within the site boundary
	Kenton Hills		TM454638	1.592971776	52.21725049	1995	4 count of present	970m east
	Leiston	Kenton Walks	TM448640	1.584350316	52.21931212	1995		370m north-east
Wall (<i>Lasiommata megera</i>)	Sizewell	Sizewell area	TM4663	1.601156438	52.20980405	2003	1 count	630m north-east
	Leiston	Upper Abbey Farm	TM4564	1.58727249	52.21922323	2004	1 count of abundant	570m north-east
	Kenton Hills		TM465642	1.609333994	52.22034895	2003	1 count	1.9km north-east
	East Suffolk		TM4262	1.542008724	52.2026006	2001	1 count of abundant	1.4km south-west
	East Suffolk		TM4664	1.601883136	52.21877769	2000	1 count of abundant	1.5km north-east
	East Suffolk		TM4264	1.543438283	52.22054903	1999	1 count of abundant	1.2km north-west
	East Suffolk		TM4464	1.572661465	52.21966697	1998	1 count of abundant	Within the site boundary
White admiral (<i>Limenitis camilla</i>)	Kenton Hills		TM4664	1.601883136	52.21877769	2011	1 count of abundant	1.5km north-east
	Kenton Hills		TM457643	1.597717802	52.22160364	2010	1 count of abundant	1.3km north-east

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary
	Kenton Hills		TM4564	1.58727249	52.21922323	2009	1 count of abundant	570m north-east
	Kenton Hills		TM454639	1.593044283	52.21814786	2003	1 count	960m east
	Kenton Hills		TM454637	1.592899273	52.21635312	1996		980m east
	Leiston	Leiston Kenton Walks	TM448640	1.584350316	52.21931212	1995	1 count of c	370m north-east
	East Suffolk		TM4464	1.572661465	52.21966697	1995	1 count of abundant	Within the site boundary
	Kenton Hills		TM457638	1.597354788	52.2171168	1995	14 count of present	1.3km north-east
	Kenton Hills		TM454638	1.592971776	52.21725049	1994	12 count of present	970m east
	Leiston	Kenton Hills	TM465645	1.609552541	52.22304101	1996	1 count of present	2.1km north-east
Norfolk hawkler (<i>Aeshna isosceles</i>)	Sizewell		TM46R	1.600430121	52.20083039	2009		290m south-east
	Sizewell	Sizewell, Goose Hill (marshes?)	TM4664	1.601883136	52.21877769	2010		1.5km north-east
	Sizewell Marshes SSSI	Sizewell Marshes SSSI	TM4663	1.601156438	52.20980405	2010		630m north-east
Garden tiger (<i>Arctia caja</i>)	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east
White ermine	Kenton Hills		TM460642	1.602028521	52.22057241	2003	1 count	1.6km north-east

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary
<i>(Spilosoma lubricipeda)</i>	Kenton Hills		TM456639	1.595966354	52.21805875	2011		1.2km east
	Kenton Hills		TM464645	1.608091366	52.22308574	2011		2.0km north-east
	Kenton Hills		TM458639	1.598888409	52.21796957	2011		1.4km east
	Sizewell	Sizewell Marshes SSSI	TM4663	1.601156438	52.20980405	1998	2 count	630m north-east
	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east
Buff ermine <i>(Spilosoma luteum)</i>	Kenton Hills		TM464645	1.608091366	52.22308574	2011		2.0km north-east
	Kenton Hills		TM4664	1.601883136	52.21877769	2000		1.5km north-east
	Sizewell	Sizewell Marshes SSSI	TM4663	1.601156438	52.20980405	1998	21 count	630m north-east
Cinnabar <i>(Tyria jacobaeae)</i>	Sizewell	Sizewell Marshes SSSI	TM4663	1.601156438	52.20980405	2009	3 count	630m north-east
	Leiston Common		TM4563	1.586548725	52.21024945	2009	2 count	610m north-west
	Kenton Hills		TM460642	1.602028521	52.22057241	2003	1 count	1.6km north-east
	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east
	Kenton Hills		TM454638	1.592971776	52.21725049	1996		970m east
Bulrush veneer <i>(Calamotropha paludella)</i>	Kenton Hills		TM453639	1.591583242	52.21819238	2002		860m east
	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east
Orange-rayed pearl	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary
<i>(Nascia ciliaris)</i> Oak hook-tip <i>(Watsonalla binaria)</i>	Kenton Hills		TM453639	1.591583242	52.21819238	2002		860m east
	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east
Shaded fan-foot <i>(Herminia tarsicrinalis)</i>	Kenton Hills		TM458639	1.598888409	52.21796957	2011		1.4km east
Latticed heath <i>(Chiasmia clathrata)</i>	Kenton Hills		TM453639	1.591583242	52.21819238	2002		860m east
	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east
Small phoenix <i>(Ecliptopera silaceata)</i>	Kenton Hills		TM453639	1.591583242	52.21819238	2002		860m east
	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east
August thorn <i>(Ennomos quercinaria)</i>	Kenton Hills		TM453639	1.591583242	52.21819238	2002		860m east
Oblique carpet <i>(Orthonama vittata)</i>	Kenton Hills		TM453639	1.591583242	52.21819238	2002		860m east
Dark spinach <i>(Pelurga comitata)</i>	Kenton Hills		TM453639	1.591583242	52.21819238	2002		860m east
Shaded broad-bar <i>(Scotopteryx chenopodiata)</i>	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east
Blood-vein <i>(Timandra comae)</i>	Kenton Hills		TM453639	1.591583242	52.21819238	2002		860m east
	Sizewell	Sizewell Marshes SSSI	TM4663	1.601156438	52.20980405	1998	1 count	630m north-east

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary
	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east
Dark-barred twin-spot carpet (<i>Xanthorhoe ferrugata</i>)	Kenton Hills		TM453639	1.591583242	52.21819238	2002		860m east
	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east
Ghost moth (<i>Hepialus humuli</i>)	Sizewell	Sizewell Marshes SSSI	TM4663	1.601156438	52.20980405	1998	1 count	630m north-east
Grey dagger (<i>Acronicta psi</i>)	Kenton Hills		TM456639	1.595966354	52.21805875	2011		1.2km east
	Kenton Hills		TM458639	1.598888409	52.21796957	2011		1.4km east
	Kenton Hills		TM4563	1.586548725	52.21024945	2007		610m north-west
Knot grass (<i>Acronicta rumicis</i>)	Kenton Hills		TM453639	1.591583242	52.21819238	2002		860m east
Mouse moth (<i>Amphipyra tragopoginis</i>)	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east
Mottled rustic (<i>Caradrina morpheus</i>)	Sizewell	Sizewell Marshes SSSI	TM4663	1.601156438	52.20980405	1998	1 count	630m north-east
Small square-spot (<i>Diarsia rubi</i>)	Kenton Hills		TM453639	1.591583242	52.21819238	2002		860m east
	Sizewell	Sizewell Marshes SSSI	TM4663	1.601156438	52.20980405	1998	1 count	630m north-east
	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east
White-line dart	Kenton Hills		TM453639	1.591583242	52.21819238	2002		860m east

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary
<i>(Euxoa tritici)</i>	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east
Rosy rustic <i>(Hydraecia micacea)</i>	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east
Rosy minor <i>(Mesoligia literosa)</i>	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east
Shoulder-striped wainscot <i>(Mythimna comma)</i>	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east
Flame wainscot <i>(Mythimna flammea)</i>	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east
Lunar yellow underwing <i>(Noctua orbona)</i>	Kenton Hills		TM458639	1.598888409	52.21796957	2011		1.4km east
Hedge rustic <i>(Tholera cespitis)</i>	Sizewell		TM4664	1.601883136	52.21877769	1996	1 count	1.5km north-east
<i>Stratiomys potamida</i>	Eastbridge		TM4565	1.587996636	52.22819699	1999		1.2km north-east
<i>Vanoyia tenuicornis</i>	Sizewell Marshes SSSI		TM4663	1.601156438	52.20980405	1999		630m north-east

b) Proposed rail improvement works - Bratt's Black House

1.3.2. **Table 1.4** below summarises the desk-study results for invertebrates recorded within 2km Zol of the site.

Table 1.4: Proposed rail improvement works (Bratt's Black House) desk-study results for invertebrates

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
Purple emperor (<i>Apatura iris</i>)	Saxmundham	East Green / Theberton Wood Saxmundham	TM46C	52.22142387	1.514213599	2009	2 Count	150m north-east
White-letter hairstreak (<i>Satyrrium w-album</i>)	Saxmundham	Saxmundham	TM383637	52.21946938	1.489160175	2011	2 Count	1.5km west
	Saxmundham		TM3863	52.21331671	1.484284196	2009	1 Count of A	2km south-west

1.4 Amphibians

a) Proposed rail extension route

1.4.1. **Table 1.5** below summarises the desk-study results for amphibians recorded within 2km Zol of the site.

Table 1.5: Proposed rail extension route desk-study results for amphibians

Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary
Common toad	Leiston	Wood Farm, Westward Ho	TM437631	1.56763011	52.21172317	2011		190m east

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary
(<i>Bufo bufo</i>)	Leiston	Pond behind Highbury Cottages	TM432629	1.560182059	52.21014922	1999	100 count of male; several hundred count of spermatial [SIC]	190m south
Great crested newt (<i>Triturus cristatus</i>)	Leiston	Wood Farm, Westward Ho	TM437631	1.56763011	52.21172317	2011		190m east
	Leiston		TM436630	1.56609729	52.21086998	2011		120m south-east
	Leiston	Abbey Fish Pond	TM445642	1.580111531	52.2212401	1998	Several count of spermatial [SIC]	290m north
	Leiston	Former Abbey Farm (Abbey Grounds)	TM445643	1.580183789	52.22213748	1998	Several count of spermatial [SIC]	390m north

b) Proposed rail improvement works - Bratt's Black House

1.4.2. **Table 1.6** below summarises the desk-study results for amphibians recorded within 2km Zol of the site.

Table 1.6: Proposed rail improvement works (Bratt's Black House) desk-study results for amphibians

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
Common frog (<i>Rana temporaria</i>)	Saxmundham	Alma Place	TM384631	52.2140413	1.490198799	2015	2 Count of Pair	1.69km south-west
	Saxmundham	Chapel Road	TM383633	52.21587949	1.48887853	2014	1 Count	1.69km south-west

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
	Saxmundham		TM38686322	52.21499706	1.494374383	2013		1.39km south-west
	Saxmundham	20 South Entrance	TM385629	52.21220309	1.491518961	2011		1.72km south-west
Common toad (<i>Bufo bufo</i>)	Saxmundham	Henley Close / St Johns Rod footpath	TM385635	52.21758791	1.491941713	2010		1.43km south-west
Great crested newt (<i>Triturus cristatus</i>)	Kelsale-cum-Carlton	Kelsale Pond borders garden	TM3980064200	52.22330586	1.511432796	2005		0.24km north

1.5 Reptiles

a) Proposed rail extension route

1.5.1. **Table 1.7** below summarises the desk-study results for reptiles recorded within 2km Zol of the site.

Table 1.7: Proposed rail extension route desk-study results for reptiles

Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary
Grass snake (<i>Natrix helvetica helvetica</i>)	Leiston	Near Ash Wood	TM461653	1.604289838	52.23039871	2011		2.2km north-east
	Leiston	Wood Farm, Westward Ho	TM437631	1.56763011	52.21172317	2011		190m east
	Sizewell	Near Goose Hill, Sizewell	TM466645	1.611013712	52.22299626	2008		2.2km north-east
	Sizewell	Sizewell Marshes SSSI	TM454638	1.592971776	52.21725049	2008		970m east
	Leiston	Kenton Hills Leiston	TM454643	1.59333435	52.22173734	2004		1.0km north-east
	Leiston	Leiston, Sandy (Ropes) Lane	TM454647	1.593624477	52.22532683	2004		1.2km north-east
Common lizard (<i>Zootoca vivipara</i>)	Leiston	Wood Farm, Westward Ho	TM437631	1.56763011	52.21172317	2011		190m east
	Leiston	Leiston/Saxmund am	TM428631	1.554482138	52.21212039	1999	1 count of female	90m south-west
Adder (<i>Vipera berus</i>)	Sizewell	Kenton Hills	TM459640	1.600422088	52.21882232	2012		1.5km east
	Leiston	By footpath near Round House	TM455651	1.595376055	52.22887174	2009		1.6km north-east
	Sizewell	Near Goose Hill	TM466645	1.611013712	52.22299626	2008		2.2km north-east

b) Proposed rail improvement works - Bratt's Black House

1.5.2. **Table 1.8** below summarises the desk-study results for reptiles recorded within 2km Zol of the site.

Table 1.8: Proposed rail improvement works (Bratt’s Black House) desk-study results for reptiles

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
Common lizard (<i>Zootoca vivipara</i>)	Saxmundham	Railway Station	TM386633	52.21574968	1.493261901	2016	1 Count	1.42km south-west
	Saxmundham	Alma Place	TM3846263094	52.21396062	1.491100433	2016	1 Count	1.64km south-west
Grass snake (<i>Natrix helvetica helvetica</i>)	Saxmundham	41 Fairfield Road	TM383634	52.21677697	1.488948936	2016	2 Count	1.65km south-west
	Saxmundham	Fairfield Road garden	TM384633	52.21583624	1.490339658	2015		1.60km south-west
	Saxmundham	Street Farm, Saxmund-ham	TM390632	52.21467888	1.499035736	2013		1.14km south
	Saxmundham	20 South Entrance	TM385629	52.21220309	1.491518961	2011		1.72km south-west
Slow-worm (<i>Anguis fragilis</i>)	Saxmundham	Abbott's Grange	TM388631	52.21386811	1.496043036	2015	1 Count of female	1.36km south
	Saxmundham	6 Station Approach	TM385631	52.21399803	1.491659863	2015	1 Count	1.64km south-west
	Saxmundham	Railway station	TM386633	52.21574968	1.493261901	2014	1 Count	1.42km south-west
	Saxmundham	2 The Limes	TM384637	52.21942613	1.49062142	2010		1.47km west

1.6 Birds

a) Proposed rail extension route

1.6.1. **Table 1.9** below summarises the desk-study results for birds within 2km Zol of the site.

Table 1.9: Proposed rail extension route desk-study results for birds

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
Greater white-fronted goose (<i>Anser albifrons</i>)	Sizewell		TM4664	1995	18 count of flying north; 40 count of flying south	N/A*
Greylag goose (<i>Anser anser</i>)	Sizewell	Sizewell Marshes SSSI	TM4563	2010	87 count	N/A*
	Lower Abbey Farm Marshes	Lower Abbey Marshes	TM4665	2010	1 count	N/A*
Brent goose (<i>Branta bernicla</i>)	Sizewell		TM4664	1995	2 count of adult	N/A*
Barnacle goose (<i>Branta leucopsis</i>)	Sizewell	Sizewell Marshes SSSI	TM4563	2011	100 count	N/A*
Tundra swan (<i>Cygnus columbianus</i>)	Theberton		TM4365	2010	9 count	N/A*
	Sizewell	Sizewell Upper Abbey Farm	TM4564	2010	14 count	N/A*
	Sizewell Levels and Associated Areas		TM463640	1995	18 count of adult	1.8km east
	Sizewell		TM4664	1995	25 count of adult	N/A*
Velvet scoter (<i>Melanitta fusca</i>)	Sizewell		TM4664	1994	1 count of flying south	N/A*
Common scoter (<i>Melanitta nigra</i>)	Sizewell		TM4664	1995	80 count of flying south	N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
Common shelduck (<i>Tadorna tadorna</i>)	Sizewell	Sizewell South Marsh	TM4663	2011	3 count	N/A*
	Sizewell		TM4664	1993	3 count of pair	N/A*
Common swift (<i>Apus apus</i>)	Sizewell		TM4664	1995	2 count of adult	N/A*
Ringed plover (<i>Charadrius hiaticula</i>)	Sizewell		TM4664	1993	3 count of pair	N/A*
Northern lapwing (<i>Vanellus vanellus</i>)	Sizewell	Sizewell Marshes SSSI	TM4563	2011	1 count	N/A*
	Sizewell	Sizewell South Marsh	TM4663	2007		N/A*
	Sizewell		TM4664	1993	1 count of pair	N/A*
Little gull (<i>Hydrocoloeus minutus</i>)	Sizewell		TM4664	1995	5 count of adult; 6 count of immature	N/A*
Herring gull (<i>Larus argentatus</i>)	Sizewell		TM4664	1994	500 count of adult	N/A*
Mediterranean gull (<i>Larus melanocephalus</i>)	Leiston Common		TM4563	2010	12 count	N/A*
	Sizewell		TM4664	1995		N/A*
Little tern (<i>Sternula albifrons</i>)	Sizewell	Sizewell	TM4664	1999	3 count	N/A*
Red-necked phalarope (<i>Phalaropus lobatus</i>)	Sizewell		TM4664	1995	1 count of juvenile	N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
Ruddy turnstone (<i>Arenaria interpres</i>)	Sizewell		TM4664	1993	6 count of flying south	N/A*
Eurasian curlew (<i>Numenius arquata</i>)	Sizewell		TM4664	1993	13 count of flying north	N/A*
Whimbrel (<i>Numenius phaeopus</i>)	Sizewell		TM4664	1995	35 count of flying north	N/A*
Green sandpiper (<i>Tringa ochropus</i>)	Sizewell		TM4664	1994		N/A*
Black tern (<i>Chlidonias niger</i>)	Sizewell		TM4664	1995	3 count of adult	N/A*
Roseate tern (<i>Sterna dougallii</i>)	Sizewell		TM4664	1995		N/A*
Common tern (<i>Sterna hirundo</i>)	Sizewell		TM4664	1995	250 count of adult	N/A*
Arctic tern (<i>Sterna paradisaea</i>)	Sizewell		TM4664	1995	4 count of adult	N/A*
Sandwich tern (<i>Sterna sandvicensis</i>)	Sizewell		TM4664	1994	40 count of adult	N/A*
Great egret (<i>Ardea alba</i>)	Sizewell	Sizewell Marshes SSSI	TM4563	2010	1 count	N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
Great bittern (<i>Botaurus stellaris</i>)	Minsmere B. R.	Minsmere Royal Society for the Protection of Birds (RSPB) Reserve	TM4664	1999	3 count	N/A*
	North Warren	North Warren	TM4564	1999	1 count	N/A*
	Sizewell	Sizewell Marshes SSSI	TM4563	2011	1 count	N/A*
	North Warren	North Warren	TM4565	1999	1 count	N/A*
	Leiston	Minsmere RSPB Reserve	TM4663	1999	1 count	N/A*
Little egret (<i>Egretta garzetta</i>)	Sizewell	Sizewell Marshes SSSI	TM4563	2011	1 count	N/A*
Black-crowned night heron (<i>Nycticorax nycticorax</i>)	Sizewell	Sizewell Kenton Hills	TM4664	2008	1 count	N/A*
Eurasian spoonbill (<i>Platalea leucorodia</i>)	Leiston Common		TM4563	2007	1 count	N/A*
European turtle dove (<i>Streptopelia turtur</i>)	Sizewell	Sizewell Marshes SSSI	TM4563	2011	1 count	N/A*
	Sizewell		TM4664	1993	4 count of pair	N/A*
	East Suffolk	East Suffolk	TM4564	2002	1 count	N/A*
	East Suffolk	East Suffolk	TM4464	2002	2 count	N/A*
	Sizewell Levels and Associated Areas	Sizewell Marshes SSSI	TM4663	1998	9 count	N/A*
Common kingfisher	Sizewell	Sizewell Marshes SSSI	TM4663	2011	1 count	N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
<i>(Alcedo atthis)</i>	Sizewell	Sizewell Marshes SSSI	TM4563	2011	1 count	N/A*
	Sizewell	Sizewell Kenton Hills	TM4564	2011	1 count	N/A*
	Sizewell	Sizewell Goose Hill	TM4664	2011	1 count	N/A*
European bee-eater <i>(Merops apiaster)</i>	Sizewell	Sizewell Ash Wood	TM4665	2011	1 count	N/A*
Common cuckoo <i>(Cuculus canorus)</i>	Sizewell	Sizewell Marshes SSSI	TM4563	2009	2 count of male	N/A*
	Sizewell	Sizewell Black Walks	TM4565	2011	1 count	N/A*
	Lower Abbey Farm Marshes	Lower Abbey Marshes	TM4665	2010	1 count	N/A*
	Sizewell	Sizewell Kenton Hills	TM4664	2008	1 count	N/A*
Northern goshawk <i>(Accipiter gentilis)</i>	Sizewell		TM4664	1995	1 count of male; 1 count of female	N/A*
Eurasian marsh harrier <i>(Circus aeruginosus)</i>	Sizewell	Sizewell Marshes SSSI	TM4563	2011	3 count	N/A*
	Sizewell		TM4664	1995	1 count of immature	N/A*
	Sizewell Levels and Associated Areas	Goose Hill	TM464645	1995		2.0km north-east
	East Suffolk	East Suffolk	TM430640	1995		740m north-west
	Leiston	Leiston	TM447637	1995		200m east
	Leiston	Leiston	TM424629	1995		580m south-west
Hen harrier	Leiston	Leiston (north)	TM4463	2011	1 count	N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
<i>(Circus cyaneus)</i>	Sizewell	Sizewell Marshes SSSI	TM4563	2010	1 count	N/A*
	Theberton		TM4365	2008	1 count	N/A*
	Sizewell		TM4664	1994		N/A*
Red kite <i>(Milvus milvus)</i>	Leiston	Leiston (north)	TM4463	2011	1 count	N/A*
	Eastbridge	Eastbridge (south)	TM4565	2007	1 count	N/A*
	Leiston	Leiston (north-east)	TM4563	2007	1 count	N/A*
European honey-buzzard <i>(Pernis apivorus)</i>	Theberton		TM4365	2008	1 count	N/A*
Merlin <i>(Falco columbarius)</i>	Sizewell		TM4664	1995		N/A*
Peregrine falcon <i>(Falco peregrinus)</i>	Leiston	Leiston Abbey	TM4464	2010	1 count of frequent	N/A*
	Leiston	Leiston (north-east)	TM4563	2007	1 count	N/A*
	Sizewell		TM4664	1995	1 count of immature; 2 count of adult	N/A*
Eurasian hobby <i>(Falco subbuteo)</i>	Sizewell	Sizewell Ash Wood	TM4665	2011	2 count	N/A*
	Sizewell	Sizewell Goose Hill	TM4664	2011	1 count	N/A*
	Sizewell	Sizewell Marshes SSSI	TM4563	2011	1 count	N/A*
	Sizewell	Sizewell Kenton Hills	TM4564	2011	2 count	N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
	Sizewell	Sizewell Reckham Pits Wood	TM4663	2010	1 count	N/A*
Common kestrel (<i>Falco tinnunculus</i>)	Sizewell	Sizewell Marshes SSSI	TM4563	2011	1 count	N/A*
	Leiston	Leiston	TM428628	1996		290m south-west
	Leiston	Western Marsh	TM457638	1996		1.2km east
	Sizewell	Broom Covert	TM4664	1995	1 count of male	N/A*
Grey partridge (<i>Perdix perdix</i>)	East Suffolk	East Suffolk	TM4565	2002	1 count	N/A*
	Aldringham Common and Walks / Thorpeness Golf Course	Aldringham Common & Walks	TM4663	1999	2 count	N/A*
	Theberton	Theberton	TM4365	1999	2 count	N/A*
	Sizewell		TM4664	1995		N/A*
	Theberton	Theberton	TM4465	1998	2 count	N/A*
Black-throated diver (<i>Gavia arctica</i>)	Sizewell		TM4664	1995		N/A*
Great northern diver (<i>Gavia immer</i>)	Sizewell		TM4664	1994	1 count of flying south	N/A*
Red-throated diver (<i>Gavia stellata</i>)	Sizewell		TM4664	1995	50 count of adult	N/A*
Sky lark	East Suffolk	East Suffolk	TM4464	2002	5 count	N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
<i>(Alauda arvensis)</i>	Sizewell	Sizewell Marshes SSSI	TM4563	2011	4 count	N/A*
	Kenton Hills	Kenton Hills / Sizewell Marshes SSSI	TM4564	2010	2 count	N/A*
	East Suffolk	East Suffolk	TM4565	2002	4 count	N/A*
	East Suffolk	East Suffolk	TM4364	2002	4 count	N/A*
	Leiston	Leiston	TM4463	1998	c.80 count	N/A*
	Theberton	Theberton	TM4365	1999	50 count	N/A*
	Kenton Hills	Kenton Hills	TM4664	1998	c.100 count	N/A*
Horned lark <i>(Eremophila alpestris)</i>	Sizewell		TM4664	1995	14 count of adult	N/A*
Wood lark <i>(Lullula arborea)</i>	Kenton Hills	Kenton Hills / Sizewell Marshes SSSI	TM4564	2010	1 count	N/A*
	Leiston	Abbey Farms, Leiston	TM4565	1997		N/A*
	Leiston Common		TM4563	2007	2 count	N/A*
	Sizewell	Sizewell	TM4664	1999	1 count	N/A*
Bohemian waxwing <i>(Bombycilla garrulus)</i>	Leiston	Leiston (north)	TM4463	2011	12 count	N/A*
	Leiston	Leiston Abbey	TM4464	2008	4 count	N/A*
Eurasian treecreeper	Sizewell	Sizewell Marshes SSSI	TM4563	2011	5 count	N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
<i>(Certhia familiaris)</i>	Lower Abbey Farm Marshes	Sizewell Lower Abbey Marshes	TM4665	2011	1 count	N/A*
	Sizewell	Sizewell South Marsh	TM4663	2011	1 count	N/A*
	Sizewell	Sizewell Kenton Hills	TM4564	2010	2 count	N/A*
	Sizewell		TM4664	1993	8 count of pair	N/A*
Lapland longspur <i>(Calcarius lapponicus)</i>	Sizewell		TM4664	1995		N/A*
Corn bunting <i>(Emberiza calandra)</i>	Sizewell	Sizewell	TM4664	1999	3 count	N/A*
Yellowhammer <i>(Emberiza citrinella)</i>	Sizewell	Sizewell Marshes SSSI	TM4563	2011	5 count	N/A*
	Knodishall	Knodishall Burrell's Farm	TM4162	2009	55 count	N/A*
	Sizewell		TM4664	1993	11 count of pair	N/A*
Reed bunting <i>(Emberiza schoenilus)</i>	Sizewell		TM4664	1995	45 count of flying south	N/A*
	Sizewell	Sizewell South Marsh	TM4663	2011	2 count	N/A*
	Sizewell	Sizewell Marshes SSSI	TM4563	2011	1 count	N/A*
	Lower Abbey Farm Marshes	Sizewell Lower Abbey Marshes	TM4665	2011	1 count	N/A*
Snow bunting <i>(Plectrophenax nivalis)</i>	Sizewell		TM4664	1995	14 count of adult	N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
Common linnet (<i>Carduelis cannabina</i>)	Sizewell	Sizewell Marshes SSSI	TM4563	2011	11 count	N/A*
	Sizewell	Sizewell Reckham Pits Wood	TM4663	2010	1 count	N/A*
	Sizewell	Sizewell Black Walks	TM4565	2010	2 count	N/A*
	Lower Abbey Farm Marshes	Lower Abbey Marshes	TM4665	2010	3 count	N/A*
	Theberton	Theberton Westhouse Crossing	TM4163	2009	60 count	N/A*
	Sizewell	Sizewell	TM4664	1999	40 count	N/A*
	Theberton	Theberton	TM4365	1999	70 count	N/A*
European goldfinch (<i>Carduelis carduelis</i>)	Sizewell	Sizewell Marshes SSSI	TM4563	2011	14 count	N/A*
	Kenton Hills	Kenton Hills / Sizewell Marshes SSSI	TM4564	2010	2 count	N/A*
	Sizewell		TM4664	1993	5 count of pair	N/A*
European greenfinch (<i>Carduelis chloris</i>)	Sizewell		TM4664	1993	5 count of pair	N/A*
	Sizewell	Sizewell Marshes SSSI	TM4563	2011	10 count	N/A*
Common redpoll (<i>Carduelis flammea</i>)	Sizewell	Sizewell Kenton Hills	TM4564	2011	1 count	N/A*
	Sizewell		TM4664	1993	1 count of pair	N/A*
Eurasian siskin	Kenton Hills	Kenton Hills / Sizewell Marshes SSSI	TM4564	2010	3 count	N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
<i>(Carduelis spinus)</i>	Sizewell	Sizewell Goose Hill	TM4664	2007	80 count	N/A*
Hawfinch <i>(Coccothraustes coccothraustes)</i>	Sizewell		TM4664	1994	1 count of dead	N/A*
Brambling <i>(Fringilla montifringila)</i>	Sizewell	Sizewell Goose Hill	TM4664	2011	2 count	N/A*
	Sizewell	Sizewell Kenton Hills	TM4564	2011	1 count	N/A*
	Sizewell	Sizewell Ash Wood	TM4565	2008	1 count	N/A*
Common crossbill <i>(Loxia curvirostra)</i>	Sizewell	Sizewell Kenton Hills	TM4564	2011	11 count	N/A*
	Sizewell	Sizewell Goose Hill	TM4664	2011	4 count	N/A*
	Sizewell	Sizewell Walk Barn	TM4665	2011	16 count	N/A*
	Leiston	Leiston Sewage Works	TM4563	2008	40 count	N/A*
Common bullfinch <i>(Pyrrhula pyrrhula)</i>	Leiston Common		TM4563	2011	1 count	N/A*
	East Suffolk	East Suffolk	TM4364	2002	1 count	N/A*
	Kenton Hills	Kenton Hills	TM4664	1999	3 count	N/A*
European serin <i>(Serinus serinus)</i>	Sizewell	B site	TM4664	1994	1 count of female	N/A*
House martin <i>(Delichon urbicum)</i>	Sizewell		TM4664	1995		N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
Barn swallow (<i>Hirundo rustica</i>)	Lower Abbey Farm Marshes	Lower Abbey Farm Marshes	TM4665	2010	1 count	N/A*
	Sizewell	Sizewell Marshes SSSI	TM4563	2011	2 count	N/A*
	Sizewell		TM4664	2008	3 count	N/A*
Red-backed shrike (<i>Lanius collurio</i>)	Leiston Common		TM4563	2007	1 count	N/A*
	Sizewell		TM4664	1993	1 count of male	N/A*
Meadow pipit (<i>Anthus pratensis</i>)	Sizewell	Sizewell Reckham Pits Wood	TM4663	2010	1 count	N/A*
	Sizewell		TM4664	1993	32 count of pair	N/A*
Tree pipit (<i>Anthus trivialis</i>)	Sizewell		TM4664	1994	1 count of calling/vocalising	N/A*
Pied wagtail (<i>Motacilla alba</i>)	Sizewell		TM4664	1995	50 count of adult	N/A*
	Sizewell	Sizewell Marshes SSSI	TM4563	2011	3 count	N/A*
	Kenton Hills	Kenton Hills / Sizewell Marshes SSSI	TM4564	2010	1 count	N/A*
White wagtail (<i>Motacilla alba</i> subsp. <i>alba</i>)	Sizewell		TM4664	1995	8 count of adult	N/A*
Grey wagtail (<i>Motacilla cinerea</i>)	Sizewell	Broom Covert	TM4664	1995		N/A*
Yellow wagtail	Sizewell		TM4664	1993	4 count of present	N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
<i>(Motacilla flava)</i>						
Spotted flycatcher <i>(Muscicapa striata)</i>	East Suffolk	East Suffolk	TM4464	2002	1 count	N/A*
	Westleton	Westleton	TM453648	2000	1 count	1.3km north-east
	Sizewell	Sizewell	TM4664	1999	1 count	N/A*
Northern wheatear <i>(Oenanthe oenanthe)</i>	Theberton	Theberton Westhouse Crossing	TM4163	2009	1 count of frequent	N/A*
	Leiston Common		TM4563	2011	1 count	N/A*
	Sizewell	Sizewell Walk Barn	TM4665	2011	1 count	N/A*
	Sizewell		TM4664	1995		N/A*
Greenland wheatear <i>(Oenanthe oenanthe subsp. leucorhoa)</i>	Sizewell		TM4664	1995	2 count of adult	N/A*
Blue tit <i>(Cyanistes caeruleus)</i>	Sizewell	Sizewell Marshes SSSI	TM4563	2011	92 count	N/A*
	Kenton Hills	Kenton Hills / Sizewell Marshes SSSI	TM4564	2010	2 count	N/A*
	Sizewell		TM4664	1993	50 count of present	N/A*
Great tit <i>(Parus major)</i>	Sizewell	Sizewell Marshes SSSI	TM4563	2011	54 count	N/A*
	Kenton Hills	Kenton Hills / Sizewell Marshes SSSI	TM4564	2010	6 count	N/A*
	Sizewell		TM4664	1993	35 count of pair	N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
Coal tit (<i>Periparus ater</i>)	Sizewell		TM4664	1993	20 count of present	N/A*
	Sizewell	Sizewell Reckham Pits Wood	TM4663	2010	1 count	N/A*
	Sizewell	Sizewell Marshes SSSI	TM4563	2011	16 count	N/A*
	Kenton Hills	Kenton Hills / Sizewell Marshes SSSI	TM4564	2010	1 count	N/A*
	Sizewell	Sizewell Black Walks	TM4565	2010	1 count	N/A*
Willow tit (<i>Poecile montanus</i>)	Sizewell	Kenton Hills	TM4664	1994		N/A*
Marsh tit (<i>Poecile palustris</i>)	Lower Abbey Farm Marshes	Sizewell Lower Abbey Farm Marshes	TM4665	2011	1 count	N/A*
	Sizewell	Sizewell Kenton Hills	TM4564	2011	1 count	N/A*
	Sizewell	Sizewell Marshes SSSI	TM4563	2011	5 count	N/A*
	Sizewell		TM4664	1993	1 count of breeding confirmed; 4 count of pair	N/A*
House sparrow (<i>Passer domesticus</i>)	Lower Abbey Farm Marshes	Sizewell Lower Abbey Marshes	TM4665	2011	6 count	N/A*
	Sizewell	Sizewell Black Walks	TM4565	2011	6 count	N/A*
	Leiston Common		TM4563	2010	3 count	N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
	Sizewell	dunes	TM4664	1994	110 count of adult	N/A*
Eurasian tree sparrow (<i>Passer montanus</i>)	Sizewell	Sizewell Ash Wood	TM4565	2008	1 count	N/A*
Hedge accentor (<i>Prunella modularis</i>)	Sizewell	Sizewell Marshes SSSI	TM4563	2011	29 count	N/A*
	Kenton Hills	Kenton Hills / Sizewell Marshes SSSI	TM4564	2010	1 count	N/A*
	Sizewell		TM4664	1993	20 count of present	N/A*
Firecrest (<i>Regulus ignicapilla</i>)	Sizewell	dunes	TM4664	1994	2 count of adult	N/A*
Goldcrest (<i>Regulus regulus</i>)	Sizewell	Sizewell Marshes SSSI	TM4563	2011	1 count	N/A*
	Sizewell	Sizewell Marshes SSSI	TM4663	2011	5 count	N/A*
	Kenton Hills	Kenton Hills / Sizewell Marshes SSSI	TM4564	2010	4 count	N/A*
	Sizewell		TM4664	1993	10 count of present	N/A*
European robin (<i>Erithacus rubecula</i>)	Kenton Hills	Kenton Hills / Sizewell Marshes SSSI	TM4564	2010	3 count	N/A*
	Sizewell	Sizewell Marshes SSSI	TM4563	2011	55 count	N/A*
	Sizewell		TM4664	1994	15 count of adult	N/A*
Common nightingale	Sizewell	Sizewell Black Walks	TM4565	2011	1 count	N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
<i>(Luscinia megarhynchos)</i>	Sizewell	Sizewell Marshes SSSI	TM4663	2011	1 count	N/A*
	Leiston Common		TM4563	2010	1 count	N/A*
	Sizewell		TM4664	1993	1 count of singing/mating calls	N/A*
Black redstart <i>(Phoenicurus ochruros)</i>	Sizewell		TM4664	2008	1 count	N/A*
Common redstart <i>(Phoenicurus phoenicurus)</i>	Sizewell	Sizewell Marshes SSSI	TM4563	2011	1 count	N/A*
	Sizewell		TM4664	1993	1 count of present	N/A*
Whinchat <i>(Saxicola rubetra)</i>	Sizewell		TM4664	1995	8 count of adult	N/A*
Stonechat <i>(Saxicola torquata)</i>	Sizewell	Sizewell Marshes SSSI	TM4563	2010	2 count	N/A*
	Sizewell	Sizewell Marshes SSSI	TM4664	1995	2 count of male; 2 count of female	N/A*
Common starling <i>(Sturnus vulgaris)</i>	Theberton		TM4365	2008	5000 count	N/A*
	Sizewell		TM4664	1993	4 count of pair	N/A*
Cetti's warbler <i>(Cettia cetti)</i>	Lower Abbey Farm Marshes	Sizewell Lower Abbey Marshes	TM4665	2011	3 count	N/A*
	Sizewell	Sizewell Marshes SSSI	TM4563	2011	14 count	N/A*
	Sizewell	Sizewell South Marsh	TM4663	2011	6 count	N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
Common grasshopper warbler (<i>Locustella naevia</i>)	Sizewell		TM4664	1993	1 count of pair; 1 count of breeding confirmed	N/A*
Bearded tit (<i>Panurus biarmicus</i>)	Sizewell	Sizewell Marshes SSSI	TM4563	2007		N/A*
Dartford warbler (<i>Sylvia undata</i>)	Sizewell		TM4664	1994	1 count of male	N/A*
Winter wren (<i>Troglodytes troglodytes</i>)	Sizewell	Sizewell Marshes SSSI	TM4563	2011	92 count	N/A*
	Kenton Hills	Kenton Hills / Sizewell Marshes SSSI	TM4564	2010	4 count	N/A*
	Sizewell		TM4664	1993	163 count of pair	N/A*
Redwing (<i>Turdus iliacus</i>)	Kenton Hills	Kenton Hills / Sizewell Marshes SSSI	TM4564	2010	5 count	N/A*
Song thrush (<i>Turdus philomelos</i>)	Sizewell	Sizewell South Marsh	TM4663	2011	1 count	N/A*
	Sizewell	Sizewell Marshes SSSI	TM4563	2011	5 count	N/A*
	East Suffolk	East Suffolk	TM4464	2002	4 count	N/A*
	East Suffolk	East Suffolk	TM4564	2002	1 count	N/A*
	Sizewell		TM4664	1993	12 count of pair	N/A*
Fieldfare (<i>Turdus pilaris</i>)	Leiston	Leiston (north)	TM4463	2010	1 count	N/A*
	Sizewell		TM4664	1993	2 count of present	N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
Ring ouzel (<i>Turdus torquatus</i>)	Sizewell	Sizewell Goose Hill	TM4664	2011	1 count	N/A*
Great spotted woodpecker (<i>Dendrocopos major</i>)	Sizewell	Sizewell Marshes SSSI	TM4563	2011	6 count	N/A*
	Kenton Hills	Kenton Hills / Sizewell Marshes SSSI	TM4564	2010	1 count	N/A*
	Sizewell		TM4664	1995		N/A*
Lesser spotted woodpecker (<i>Dendrocopos minor</i>)	Sizewell		TM4664	1994		N/A*
Eurasian wryneck (<i>Jynx torquilla</i>)	Sizewell	dunes	TM4664	1994		N/A*
Green woodpecker (<i>Picus viridis</i>)	Sizewell	Sizewell Marshes SSSI	TM4563	2011	8 count	N/A*
	Lower Abbey Farm Marshes	Lower Abbey Marshes	TM4665	2010	1 count	N/A*
	Sizewell	Sizewell Reckham Pits Wood	TM4663	2010	1 count	N/A*
	Sizewell	Sizewell Black Walks	TM4565	2010	2 count	N/A*
	Sizewell		TM4664	1995		N/A*
Sooty shearwater (<i>Puffinus griseus</i>)	Sizewell		TM4664	1993	1 count of flying north	N/A*
Manx shearwater (<i>Puffinus puffinus</i>)	Sizewell		TM4664	1995	1 count of flying south	N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
Short-eared owl (<i>Asio flammeus</i>)	Sizewell Levels and Associated Areas	Goose Hill	TM464645	1995		2.0km north-east
Little owl (<i>Athene noctua</i>)	Sizewell	Sizewell Marshes SSSI	TM4563	2010	1 count	N/A*
	Theberton		TM4365	2007	1 count	N/A*
	Buckles Wood	Buckles Wood, Leiston	TM428634	1997		350m north-west
	Leiston	B1122, Sizewell Road	TM445638	1997		Within site boundary
	Buckles Wood	Buckle's Wood, Leiston	TM428633	1996		270m north-west
	Theberton	Level Crossing	TM427632	1996		280m north-west
	Buckle's Wood CWS	Buckle's Wood CWS	TM430637	1996		480m north-west
	Leiston	Leiston	TM453645	1996		1.0km north-east
	Leiston	Upper Abbey Farm	TM454645	1996		1.1km north-east
	Sizewell		TM4664	1995		N/A*
	Leiston		TM430635	1995		340m north-west
Tawny owl (<i>Strix aluco</i>)	Sizewell	Sizewell Marshes SSSI	TM4563	2010	2 count	N/A*
	Buckle's Wood CWS	Buckle's Wood CWS	TM433636	1996		270m north-west
	East Suffolk	East Suffolk	TM425641	1995		1.1km north-west
	East Suffolk	East Suffolk	TM4162	1997		N/A*

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Year	Abundance	Approximate distance from the site boundary
	Minsmere B. R.	Minsmere	TM46M	1997		N/A*
	Theberton	Clay Hills	TM4365	1995		N/A*
	Sizewell		TM4664	1993	5 count of pair	N/A*
Barn owl (<i>Tyto alba</i>)	Sizewell	Sizewell Marshes SSSI	TM4563	2011	1 count	N/A*
	Knodishall		TM4262	2010	1 count	N/A*
	Leiston	Leiston Wood Farm	TM4363	2009	1 count	N/A*
	Sizewell Levels and Associated Areas	Sizewell Marshes SSSI	TM4663	1996		N/A*
	Leiston	Upper Abbey Farm, Leiston	TM454645	1996		1.1km north-east
	Theberton	Theberton	TM4365	2004		N/A*
	Sizewell Levels and Associated Areas	Sizewell Marshes SSSI	TM4664	1999	1 count	N/A*
	Leiston	Leiston Old Abbey	TM449640	1995		430m north-east
	Leiston	Leiston	TM430635	1995		340m north-west
	Suffolk		TM46H	1993		N/A*

*Distance from the site boundary can only be calculated where the grid reference has been received in full.

b) Proposed rail improvement works - Bratt's Black House

1.6.2. **Table 1.10** below summarises the desk-study results for birds recorded within 2km Zol of the site.

Table 1.10: Proposed rail improvement works (Bratt's Black House) desk-study results for birds

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
Barn owl (<i>Tyto alba</i>)	Saxmundham	Street Farm, Saxmundham	TM390632	52.21467888	1.499035736	2013		1.14km south-west
	Theberton		TM46C	52.22142387	1.514213599	2011	1 Count	0.15km north-east
	Kelsale-cum-Carlton	Carlton (east)	TM3964	52.22185858	1.499600698	2011	1 Count	0.85km west
	Kelsale-cum-Carlton	A12 - near Kelsale	TM36X	52.22229148	1.484987427	2009	1 Count	1.85km west
	Saxmundham		TM386629	52.2121598	1.492979963	2009		1.64km south-west
Blue tit (<i>Cyanistes caeruleus</i>)	Saxmundham		TM38686322	52.21499706	1.494374383	2013		1.39km south-west
	Kelsale-cum-Carlton	Kelsale	TM36X	52.22229148	1.484987427	2011		1.85km west
	Saxmundham		TM385635	52.21758791	1.491941713	2010	9 Count	1.34km south-west
	Saxmundham		TM382636	52.21861515	1.487628539	2009		1.69km west
	Saxmundham		TM383636	52.21857191	1.489089758	2009		1.59km west
	Saxmundham		TM386635	52.21754462	1.493402892	2009		1.50km west
	Saxmundham		TM384636	52.21852865	1.490550974	2009		1.49km south-west
	Saxmundham		TM384631	52.2140413	1.490198799	2009		1.70km south-west
	Knodishall		TM46B	52.20347487	1.512795771	2009	1 Probable Count of Breeding confirmed	1.96km south
	Kelsale-cum-Carlton	Kelsale cum Carlton	TM46C	52.22142387	1.514213599	2009	5 Count	0.15km north-east

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
Blue tit (<i>Cyanistes caeruleus</i>)	Saxmundham		TM384637	52.21942613	1.49062142	2009		1.47km south-west
	Saxmundham		TM385633	52.21579297	1.491800781	2009		1.50km south-west
	Saxmundham		TM388634	52.21656051	1.496254682	2009		1.19km south-west
	Saxmundham		TM386632	52.21485221	1.493191411	2009		1.46km south-west
	Saxmundham		TM386629	52.2121598	1.492979963	2009		1.65km south-west
Bullfinch (<i>Pyrrhula pyrrhula</i>)	Kelsale-cum-Carlton	Kelsale cum Carlton	TM46C	52.22142387	1.514213599	2009	1 Probable Count of Breeding confirmed	0.15km north-east
Coal tit (<i>Periparus ater</i>)	Saxmundham		TM385635	52.21758791	1.491941713	2010	1 Count	1.42km south-west
	Kelsale-cum-Carlton	East Green Kelsale	TM46C	52.22142387	1.514213599	2009	1 Count	0.15km north-east
Cuckoo (<i>Cuculus canorus</i>)	Saxmundham		TM385635	52.21758791	1.491941713	2010	1 Count	1.43km south-west
Dunnock (<i>Prunella modularis</i>)	Saxmundham		TM38686322	52.21499706	1.494374383	2013		1.39km south-west
	Kelsale-cum-Carlton	Kelsale	TM36X	52.22229148	1.484987427	2011		1.85km west
	Saxmundham		TM385635	52.21758791	1.491941713	2010	1 Count	1.43km south-west
	Knodishall		TM46B	52.20347487	1.512795771	2009	1 Probable Count of Breeding confirmed	1.96km south
	Kelsale-cum-Carlton	Kelsale cum Carlton	TM46C	52.22142387	1.514213599	2009	1 Possible Count of Breeding confirmed	0.15km north-east
	Saxmundham		TM388634	52.21656051	1.496254682	2009		1.18km south-west

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
	Saxmundham		TM386635	52.21754462	1.493402892	2009		1.34km south-west
	Saxmundham		TM386632	52.21485221	1.493191411	2009		1.46km south-west
	Saxmundham		TM384631	52.2140413	1.490198799	2009		1.69km south-west
	Saxmundham		TM383636	52.21857191	1.489089758	2009		1.59km west
	Saxmundham		TM385633	52.21579297	1.491800781	2009		1.51km south-west
Fieldfare (<i>Turdus pilaris</i>)	Knodishall	Meadow Mink Farm Knodishall	TM46B	52.20347487	1.512795771	2011	30 Count	1.96km south
	Kelsale-cum-Carlton	Kelsale East Green	TM46C	52.22142387	1.514213599	2009	110 Count	0.15km north-east
	Kelsale-cum-Carlton	East Green Kelsale	TM46C	52.22142387	1.514213599	2009	3 Count	0.15km north-east
Goldfinch (<i>Carduelis carduelis</i>)	Kelsale-cum-Carlton	Kelsale	TM36X	52.22229148	1.484987427	2010	2 Possible Count of Breeding confirmed	1.85km west
	Saxmundham		TM385635	52.21758791	1.491941713	2010	2 Count	1.42km south-west
	Kelsale-cum-Carlton	Kelsale cum Carlton	TM46C	52.22142387	1.514213599	2009	6 Count	0.15km north-east
	Knodishall		TM46B	52.20347487	1.512795771	2009	1 Confirmed Count of Breeding confirmed	1.96km south
	Saxmundham		TM383636	52.21857191	1.489089758	2009		1.59km west
	Saxmundham		TM385633	52.21579297	1.491800781	2009		1.50km south-west
	Saxmundham		TM386635	52.21754462	1.493402892	2009		1.50km south-west
	Saxmundham		TM384631	52.2140413	1.490198799	2009		1.34km south-west
Great spotted woodpecker	Saxmundham		TM385635	52.21758791	1.491941713	2010	3 Count	1.43km south-west
	Knodishall		TM46B	52.20347487	1.512795771	2009	2 Count	1.96km south

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
<i>(Dendrocopos major)</i>	Kelsale-cum-Carlton	Kelsale cum Carlton	TM46C	52.22142387	1.514213599	2009	1 Probable Count of Breeding confirmed	0.15km north-east
Great tit <i>(Parus major)</i>	Saxmundham		TM38686322	52.21499706	1.494374383	2013		1.38km south-west
	Kelsale-cum-Carlton	Kelsale	TM36X	52.22229148	1.484987427	2011		1.85km west
	Saxmundham		TM385635	52.21758791	1.491941713	2010	15 Count	1.43km south-west
	Saxmundham		TM383636	52.21857191	1.489089758	2009		1.60km south-west
	Knodishall		TM46B	52.20347487	1.512795771	2009	1 Count	1.96km south
	Kelsale-cum-Carlton	Kelsale cum Carlton	TM46C	52.22142387	1.514213599	2009	1 Probable Count of Breeding confirmed	0.15km north-east
	Saxmundham		TM384637	52.21942613	1.49062142	2009		1.47km west
	Saxmundham		TM386629	52.2121598	1.492979963	2009		1.64km south-west
	Saxmundham		TM386632	52.21485221	1.493191411	2009		1.46km south-west
	Saxmundham		TM386635	52.21754462	1.493402892	2009		1.33km south-west
	Saxmundham		TM385633	52.21579297	1.491800781	2009		1.50km south-west
	Saxmundham		TM384631	52.2140413	1.490198799	2009		1.69km south-west
Green woodpecker <i>(Picus viridis)</i>	Kelsale-cum-Carlton	Kelsale	TM36X	52.22229148	1.484987427	2011		1.85km west
	Knodishall		TM46B	52.20347487	1.512795771	2009	1 Possible Count of Breeding confirmed	1.96km south
	Kelsale-cum-Carlton	Kelsale cum Carlton	TM46C	52.22142387	1.514213599	2009	1 Probable Count of Breeding confirmed	0.15km north-east
Greenfinch <i>(Chloris chloris)</i>	Kelsale-cum-Carlton	Kelsale	TM36X	52.22229148	1.484987427	2011		1.85km west
	Saxmundham		TM385635	52.21758791	1.491941713	2010	1 Count	1.43km south-west

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
	Knodishall		TM46B	52.20347487	1.512795771	2009	1 Count	1.96km south
	Kelsale-cum-Carlton	Kelsale cum Carlton	TM46C	52.22142387	1.514213599	2009	1 Probable Count of Breeding confirmed	0.15km north-east
	Saxmundham		TM386635	52.21754462	1.493402892	2009		1.34km south-west
	Saxmundham		TM385633	52.21579297	1.491800781	2009		1.50km south-west
	Saxmundham		TM383636	52.21857191	1.489089758	2009		1.59km west
	Knodishall		TM46B	52.20347487	1.512795771	2009	4 Count	1.96km south
	Kelsale-cum-Carlton	Kelsale cum Carlton	TM46C	52.22142387	1.514213599	2009	2 Count	0.15km north-east
Hobby (<i>Falco subbuteo</i>)	Knodishall	Meadow Mink Farm Knodishall	TM46B	52.20347487	1.512795771	2009	2 Confirmed Count of Breeding confirmed	1.96km south
House Martin (<i>Delichon urbicum</i>)	Knodishall		TM46B	52.20347487	1.512795771	2009	1 Confirmed Count of Breeding confirmed	1.96km south
House sparrow (<i>Passer domesticus</i>)	Saxmundham		TM38686322	52.21499706	1.494374383	2013		1.38km south-west
	Kelsale-cum-Carlton	Kelsale	TM36X	52.22229148	1.484987427	2011		1.85km west
	Saxmundham		TM385635	52.21758791	1.491941713	2010	4 Count	1.43km south-west
	Saxmundham		TM384631	52.2140413	1.490198799	2009		1.68km south-west
	Saxmundham		TM382636	52.21861515	1.487628539	2009		1.69km south-west
	Saxmundham		TM386632	52.21485221	1.493191411	2009		1.46km south-west
	Kelsale-cum-Carlton	Kelsale cum Carlton	TM46C	52.22142387	1.514213599	2009	33 Count	0.15km north-east

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
	Knodishall		TM46B	52.20347487	1.512795771	2009	1 Confirmed Count of Breeding confirmed	1.69km south
	Knodishall	Meadow Mink Farm Knodishall	TM46B	52.20347487	1.512795771	2009	2 Count	1.69km south
	Kelsale-cum-Carlton	Kelsale cum Carlton	TM46C	52.22142387	1.514213599	2009	1 Count	0.15km north-east
Lapwing (<i>Vanellus vanellus</i>)	Knodishall		TM46B	52.20347487	1.512795771	2009	100 Count	1.69km south
	Kelsale-cum-Carlton	East Green Kelsale	TM46C	52.22142387	1.514213599	2009	100 Count	0.15km north-east
Linnet (<i>Linaria cannabina</i>)	Kelsale-cum-Carlton	Kelsale	TM36X	52.22229148	1.484987427	2010	1 Possible Count of Breeding confirmed	1.85km west
	Kelsale-cum-Carlton	Kelsale cum Carlton	TM46C	52.22142387	1.514213599	2009	1 Probable Count of Breeding confirmed	0.15km north-east
	Knodishall	Meadow Mink Farm Knodishall	TM46B	52.20347487	1.512795771	2009	60 Count	1.96km south
Marsh tit (<i>Poecile palustris</i>)	Kelsale-cum-Carlton	East Green Kelsale	TM46C	52.22142387	1.514213599	2009	1 Probable Count of Breeding confirmed	0.15km north-east
Pied wagtail (<i>Motacilla alba</i>)	Kelsale-cum-Carlton	Kelsale cum Carlton	TM46C	52.22142387	1.514213599	2009	1 Possible Count of Breeding confirmed	0.15km north-east
	Knodishall		TM46B	52.20347487	1.512795771	2009	1 Confirmed Count of Breeding confirmed	1.96km south
	Saxmundham		TM385633	52.21579297	1.491800781	2009		1.51km south-west
Red kite (<i>Milvus milvus</i>)	Saxmundham		TM385635	52.21758791	1.491941713	2010	1 Count	1.43km south-west

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
Redwing (<i>Turdus iliacus</i>)	Kelsale-cum-Carlton	Kelsale East Green	TM46C	52.22142387	1.514213599	2009	100 Count	0.15km north-east
Reed bunting (<i>Emberiza schoeniclus</i>)	Kelsale-cum-Carlton	Kelsale cum Carlton	TM46C	52.22142387	1.514213599	2009	1 Count	0.15km north-east
Robin (<i>Erithacus rubecula</i>)	Saxmundham		TM38686322	52.21499706	1.494374383	2013		1.38km south-west
	Kelsale-cum-Carlton	Kelsale	TM36X	52.22229148	1.484987427	2011		1.85km west
	Saxmundham		TM385635	52.21758791	1.491941713	2010	9 Count	1.34km south-west
	Saxmundham		TM386635	52.21754462	1.493402892	2009		1.34km south-west
	Saxmundham		TM386632	52.21485221	1.493191411	2009		1.46km south-west
	Saxmundham		TM383636	52.21857191	1.489089758	2009		1.59km west
	Saxmundham		TM383631	52.21408455	1.48873773	2009		1.77km south-west
	Saxmundham		TM382636	52.21861515	1.487628539	2009		1.69km south-west
	Knodishall		TM46B	52.20347487	1.512795771	2009	1 Probable Count of Breeding confirmed	1.96km south
	Saxmundham		TM382633	52.21592273	1.487417399	2009		1.78km south-west
	Saxmundham		TM384637	52.21942613	1.49062142	2009		1.47km west
	Kelsale-cum-Carlton	Kelsale cum Carlton	TM46C	52.22142387	1.514213599	2009	8 Count	0.15km north-east
	Saxmundham		TM384636	52.21852865	1.490550974	2009		1.49km south-west
	Saxmundham		TM384631	52.2140413	1.490198799	2009		1.69km south-west
	Saxmundham		TM386629	52.2121598	1.492979963	2009		1.64km south-west
Saxmundham		TM388634	52.21656051	1.496254682	2009		1.19km south-west	

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
Skylark (<i>Alda arvensis</i>)	Kelsale-cum-Carlton	Kelsale	TM36X	52.22229148	1.484987427	2011		1.85km west
	Theberton		TM46C	52.22142387	1.514213599	2009	1 Possible Count of Breeding confirmed	0.15km north-east
	Knodishall		TM46B	52.20347487	1.512795771	2009	1 Probable Count of Breeding confirmed	1.96km south
	Kelsale-cum-Carlton	Kelsale	TM36X	52.22229148	1.484987427	2010	2 Possible Count of Breeding confirmed	1.85km west
	Saxmundham		TM385635	52.21758791	1.491941713	2010	1 Count	1.34km south-west
	Knodishall		TM46B	52.20347487	1.512795771	2009	1 Count	1.96km south
	Theberton		TM46C	52.22142387	1.514213599	2009	1 Possible Count of Breeding confirmed	0.15km north-east
Starling (<i>Sturnus vulgaris</i>)	Saxmundham		TM38686322	52.21499706	1.494374383	2013		1.38km south-west
	Kelsale-cum-Carlton	Kelsale	TM36X	52.22229148	1.484987427	2011		1.85km west
	Saxmundham		TM384637	52.21942613	1.49062142	2009		1.47km west
	Saxmundham		TM385634	52.21669044	1.491871245	2009		1.46km south-west
	Saxmundham		TM382633	52.21592273	1.487417399	2009		1.78km south-west
	Saxmundham		TM383631	52.21408455	1.48873773	2009		1.77km south-west
	Saxmundham		TM386632	52.21485221	1.493191411	2009		1.46km south-west
	Knodishall		TM46B	52.20347487	1.512795771	2009	57 Count	1.96km south
	Kelsale-cum-Carlton	Kelsale cum Carlton	TM46C	52.22142387	1.514213599	2009	37 Count	0.15km north-east
	Saxmundham		TM385633	52.21579297	1.491800781	2009		1.51km south-west
	Saxmundham		TM383636	52.21857191	1.489089758	2009		1.59km west

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
	Saxmundham		TM384631	52.2140413	1.490198799	2009		1.69km south-west
Swallow (<i>Hirundo rustica</i>)	Kelsale-cum-Carlton	Kelsale	TM36X	52.22229148	1.484987427	2010	5 Possible Count of Breeding confirmed	1.85km west
	Knodishall		TM46B	52.20347487	1.512795771	2009	1 Confirmed Count of Breeding confirmed	1.96km south
	Kelsale-cum-Carlton	Kelsale cum Carlton	TM46C	52.22142387	1.514213599	2009	1 Probable Count of Breeding confirmed	0.15km north-east
Swift (<i>Apus apus</i>)	Saxmundham	Saxmundam	TM38226330	52.21591408	1.487709626	2017		1.76km south-west
	Saxmundham	Saxmundham High Street	TM38656321	52.21492031	1.493929005	2017		1.42km south-west
	Saxmundham	Market Place. Martin's Newsagents.	TM38646319	52.21474514	1.493768796	2014	1 Count	1.44km south-west
	Saxmundham		TM386631	52.21395474	1.493120925	2014		1.52km south-west
	Saxmundham		TM384633	52.21583624	1.490339658	2012		1.60km south-west
	Saxmundham		TM383631	52.21408455	1.48873773	2012		1.77km south-west
	Saxmundham		TM38456332	52.2159941	1.491084309	2012	3 Count	1.54km south-west
	Saxmundham		TM38326311	52.21416565	1.489036984	2012	2 Count	1.75km south-west
	Saxmundham	Saxmo	TM38666311	52.21401851	1.49400461	2011	12 Count	1.47km south-west
	Saxmundham	IP17 1BP	TM38406339	52.21664396	1.490403049	2010	10 Count	1.58km south-west
	Saxmundham	Saxmundham	TM38416315	52.21448571	1.49038012	2010	12 Count	1.65km south-west
Saxmundham		TM384631	52.2140413	1.490198799	2010		1.69km south-west	

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
	Knodishall		TM46B	52.20347487	1.512795771	2009	1 Possible Count of Breeding confirmed	1.96km south
Tawny owl (<i>Strix aluco</i>)	Kelsale-cum-Carlton	Kelsale	TM46C	52.22142387	1.514213599	2011	2 Confirmed Count of Breeding confirmed	0.15km north-east
Treetreeper (<i>Certhia familiaris</i>)	Saxmundham		TM385635	52.21758791	1.491941713	2010	1 Count	1.34km south-west
	Kelsale-cum-Carlton	East Green Kelsale	TM46C	52.22142387	1.514213599	2009	1 Count	0.15km north-east
	Kelsale-cum-Carlton	East Green Kelsale	TM46C	52.22142387	1.514213599	2009	1 Possible Count of Breeding confirmed	0.15km north-east
	Saxmundham		TM385635	52.21758791	1.491941713	2013	19 Count	1.34km south-west
	Kelsale-cum-Carlton	Kelsale cum Carlton	TM3864	52.22229148	1.484987427	2010	3 Count	1.85km west
Wheatear (<i>Oenanthe oenanthe</i>)	Saxmundham	Saxmundham (east)	TM3963	52.21288395	1.498894533	2011	2 Count	1.29km south-west
Wren (<i>Troglodytes troglodytes</i>)	Kelsale-cum-Carlton	Kelsale	TM36X	52.22229148	1.484987427	2010	6 Possible Count of Breeding confirmed	1.85km west
	Saxmundham		TM385635	52.21758791	1.491941713	2010	12 Count	1.34km south-west
	Knodishall		TM46B	52.20347487	1.512795771	2009	1 Possible Count of Breeding confirmed	1.96km south
	Saxmundham		TM386635	52.21754462	1.493402892	2009		1.34km south-west
	Kelsale-cum-Carlton	Kelsale cum Carlton	TM46C	52.22142387	1.514213599	2009	1 Count of Breeding confirmed	0.15km north-east
Yellow-hammer (<i>Emberiza citrinella</i>)	Kelsale-cum-Carlton	Kelsale	TM36X	52.22229148	1.484987427	2011		1.85km west
	Saxmundham		TM385635	52.21758791	1.491941713	2010	2 Count	1.34km south-west

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
	Kelsale-cum-Carlton	East Green Kelsale	TM46C	52.22142387	1.514213599	2009	1 Probable Count of Breeding confirmed	0.15km north-east
	Knodishall	Knodishall Burrell's Farm	TM46B	52.20347487	1.512795771	2009	55 Count	1.96km south

1.7 Bats

1.7.1. As detailed in **section 3** of **Appendix 7A**, the Zol for individual bat species has been identified based on the recommended Core Sustenance Zones (CSZ) identified by the Bat Conservation Trust (BCT)¹. The sole exception to this is for barbastelle (*Barbastella barbastellus*) for which the Zol has been extended to 10km based on radio-tracking information gathered on the Sizewell C main development site.

b) Proposed rail extension route

1.7.2. **Table 1.11** below summarises the desk-study results for bats.

Table 1.11: Proposed rail extension route desk-study results for bats

Species (Zol)	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary
Barbastelle	Leiston	Barn at Upper Abbey Farm	TM454646	1.59355194	52.22442946	2004		1.2km north-east

¹ J. Collins (ed.) Bat Surveys for Professional Ecologists: Good Practice Guidelines. 3rd edition. London: The Bat Conservation Trust, 2016.

NOT PROTECTIVELY MARKED

Species (Zol)	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary
(10km)	Leiston	Upper Abbey Farm.	TM453646	1.592090693	52.22447399	1997		1.1km north-east
Serotine (<i>Eptesicus serotinus</i>) (4km)	Leiston	Upper Abbey Farmhouse	TM4532764539	1.592440997	52.22391457	2013		1.0km north-east
Daubenton's bat (<i>Myotis daubentonii</i>) (2km)	Leiston	Upper Abbey Farmhouse	TM4532764539	1.592440997	52.22391457	2012		1.0km north-east
Natterer's bat (<i>Myotis nattereri</i>) (4km)	Leiston	Upper Abbey Farmhouse	TM4532764539	1.592440997	52.22391457	2013	2 count of present	1.0km north-east
	Kenton Hills	Kenton Hills Sizewell	TM457638	1.597354788	52.2171168	2012	21 count	1.3km north-east
	Kenton Hills	Kenton Hills Sizewell	TM4563	1.586548725	52.21024945	2012	21 count	610m north-west
	Sizewell	Kenton Hills, Sizewell	TM456640	1.596038923	52.21895612	2011	8 count	1.2km east
	Leiston	Barn at Upper Abbey Farm	TM454646	1.59355194	52.22442946	2004		1.2km north-east
	Leiston		TM453645	1.592018189	52.22357662	1996		1.0km north-east
	Leiston		TM459658	1.601730576	52.23497484	1997		2.3km north-east
Leiston		TM459657	1.601657850	52.23407748	1996		2.2km north-east	

NOT PROTECTIVELY MARKED

Species (Zol)	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary
	Leiston	Kenton Hills Leiston	TM460642	1.602028521	52.22057241	2014		1.6km north-east
	Leiston	Upper Abbey Farm Barn Leiston	TM454656	1.59427748670344	52.2334031463787	2012		1.9km north-east
Noctule bat <i>Nyctalus noctula</i> (4km)	Kenton Hills	Kenton Hills Sizewell	TM457638	1.597354788	52.2171168	2012	3 count	1.3km north-east
	Sizewell	Kenton Hills, Sizewell	TM456640	1.596038923	52.21895612	2011	2 count	1.2km east
	Kenton Hills	Kenton Hills Sizewell	TM4563	1.586548725	52.21024945	2012	2 count	610m north-west
	Kenton Hills	Kenton Hills Sizewell	TM4564	1.58727249	52.21922323	2012	1 count	570m north-east
	Leiston	Kenton Hills Leiston	TM460642	1.602028521	52.22057241	2004	10 count	1.6km north-east
Pipistrelle bat species <i>(Pipistrellus spp.)</i>	Kenton Hills	Kenton Hills Sizewell	TM4563	1.586548725	52.21024945	2012	3 count	610m north-west
	Leiston	Upper Abbey Farm	TM454646	1.59355194	52.22442946	2000		1.2km north-east
	Sizewell		TM455638	1.594432784	52.21720594	1993		1.1km east
	Leiston		TM448644	1.584639694	52.22290164	1993		610m north-east

NOT PROTECTIVELY MARKED

Species (Zol)	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary
Common pipistrelle (<i>Pipistrellus pipistrellus</i>)	Leiston	Upper Abbey Farmhouse	TM4532764539	1.592440997	52.22391457	2013		1.0km north-east
	Leiston	St Margaret's Church	TM438625	1.568658987	52.20629456	1999		520km south
	Leiston		TM440625	1.571580358	52.20620607	1997		650 south-east
Soprano pipistrelle (<i>Pipistrellus pygmaeus</i>)	Leiston	Upper Abbey Farmhouse	TM4532764539	1.592440997	52.22391457	2013		1.0km north-east
	Kenton Hills	Kenton Hills Sizewell	TM457638	1.597354788	52.2171168	2012	2 count	1.3km north-east
	Leiston	Kenton Hills Leiston	TM460642	1.602028521	52.22057241	2004		1.6km north-east
	Leiston	Barn at Upper Abbey Farm	TM454646	1.59355194	52.22442946	2004		1.2km north-east
	Kenton Hills	Kenton Hills	TM465643	1.609406839	52.2212463	2001		2.1km east
	Theberton	School House	TM437659	1.569647035	52.23685022	2012		1.9km north-west
Brown long-eared bat (<i>Plecotus auritus</i>) (3km)	Westleton	Everest, Blythburgh Rd., Westleton, Saxmundham, IP17 3AS	TM445645	1.580328317	52.22393225	2012		600m north
	Leiston	Upper Abbey Farmhouse	TM4532764539	1.592440997	52.22391457	2013		1.0km north-east

NOT PROTECTIVELY MARKED

Species (Zol)	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary
	Leiston		TM459650	1.601148874	52.22779595	2010		1.8km north-east
	Eastbridge	No 6 Ashwood Cottages, Eastbridge IP16 4SR	TM461650	1.604071552	52.22770664	2010		2.0km north-east
	Leiston	5&6 Ashwood Cottages, Abbey Farm, Leiston	TM461649	1.603998797	52.22680928	1998		1.9km north-east
	Leiston	Upper Abbey Farm	TM454646	1.59355194	52.22442946	2000		1.2km north-east
	Leiston		TM453645	1.592018189	52.22357662	1996		1.0km north-east
	Theberton	The Barn, Theberton House, Theberton	TM446652	1.582295737	52.23016952	2006		1.3km north

c) Proposed rail improvement works - Bratt's Black House

1.7.3. Table 1.12 below summarises the desk-study results for bats.

Table 1.12: Proposed rail improvement works (Bratt's Black House) desk-study results for bats

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
Brown long-eared bat (<i>Plecotus auritus</i>)	Saxmundham	Brook Farm Estate Saxmundham Suffolk	TM384635	52.21763118	1.490480531	2013		1.52km south-west
Pipistrelle species (<i>Pipistrellus</i>)	Kelsale-cum-Carlton	Kelsale Primary School	TM3864	52.22229148	1.484987427	2014		1.85km west

1.8 Terrestrial mammals

a) Proposed rail extension route

1.8.1. Table 1.13 below summarises the desk-study results for terrestrial mammals recorded within 2km Zol of the site.

Table 1.13: Proposed rail extension route desk-study for terrestrial mammals

Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary
European otter	Leiston	Thorpness Hundred	TM422634	1.545931291	52.21507665	2008		710m west

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid Reference	Longitude	Latitude	Year	Abundance	Approximate distance from the site boundary
<i>(Lutra lutra)</i>	Theberton	Theberton	TM4365	1.558768339	52.22908295	2001		1.3km north-west
Eurasian badger <i>(Meles meles)</i>	Leiston	Leiston	TM459652	1.601294277	52.22959068	2003		1.9km north-east
West European hedgehog <i>(Erinaceus europaeus)</i>	Leiston		TM453645	1.592018189	52.22357662	1995		1.0km north-east
Eurasian water shrew <i>(Neomys fodiens)</i>	Buckles Wood		TM433634	1.56200221	52.2145921	1995		50m north
Brown hare <i>(Lepus europaeus)</i>	Leiston		TM451649	1.58938555	52.22725513	1993		1.2km north-east
European water vole <i>(Arvicola terrestris)</i>	Leiston	Thorpness 100 Westhouse Fm Leiston	TM4197263164	1.542431478	52.21305889	2007	2 count	1.0km west
	Sizewell Marshes	Sizewell Belts	TM4547063493	1.593771846	52.21446438	2005		970m east
	Sizewell Marshes	Sizewell Belts	TM4563063648	1.596221782	52.21578401	2005		1.1km east
	Leiston	Goose Hill marshes	TM465645	1.609552541	52.22304101	1996	1 count of feeding	2.1km north-east
Harvest mouse <i>(Micromys minutus)</i>	Eastbridge	Upper Abbey Farm, Eastbridge	TM4520064600	1.590629443	52.22451851	2009		970m north-east

b) Proposed rail improvement works - Bratt's Black House

1.8.2. **Table 1.14** below summarises the desk-study results for terrestrial mammals recorded within 2km Zol of the site.

Table 1.14: Proposed rail improvement works (Bratt's Black House) desk-study results for terrestrial mammals

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
West European hedgehog (<i>Erinaceus europaeus</i>)	Kelsale-cum-Carlton	Main Road, Carlton	TM3870863834	52.22049538	1.495216555	2016	1 Count	1.15km west
	Saxmundham	Brook Farm Road, Saxmundham	TM3838563674	52.21919927	1.490383918	2016	1 Count	1.49km west
	Saxmundham	Chapel Road, Saxmundham	TM3827463245	52.21539713	1.488459919	2016	1 Count	1.74km south-west
	Saxmundham	Saint John's Road	TM3831563092	52.21400626	1.488951258	2015		1.77km south-west
	Saxmundham	Fairfield Road	TM3848263369	52.21642001	1.491586395	2015		1.49km south-west
	Saxmundham	Harpers Lane	TM3837563386	52.21661888	1.490034944	2015		1.58km south-west
	Kelsale-cum-Carlton	Main Road	TM3868864137	52.22322337	1.495138046	2015		1.17km west
	Saxmundham	Chantry Road, Saxmundham	TM3855563027	52.21331907	1.492412005	2014	1 Count of dead	1.59km south-west
	Kelsale-cum-Carlton	Main Road, Carlton	TM3869264182	52.22362549	1.495228248	2014	1 Count	1.17km west
	Saxmundham	Orwell Avenue, Saxmundham	TM3830363661	52.21911807	1.489176549	2014	1 Count	1.57km west

NOT PROTECTIVELY MARKED

Species	Location	Site Detail	Grid reference	Latitude	Longitude	Year	Abundance	Approximate distance from the site boundary
	Saxmundham	Church Hill, Saxmundham	TM3893063001	52.21292328	1.497872527	2014	1 Count of dead	1.39km south-west
	Saxmundham	High Street, Saxmundham	TM3866463233	52.21512066	1.494149774	2014	1 Count	2.03km south-west
	Saxmundham		TM3863	52.21331671	1.484284196	2013	1 Count of dead	1.59km south-west
	Saxmundham		TM383636	52.21857191	1.489089758	2012	1 Count of alive	1.33km south-west

VOLUME 9, CHAPTER 7, APPENDIX 7A:
ANNEX 7A.2: DESK-STUDY, ANNEX 7A.2A DESIGNATED
SITES CITATIONS

County Wildlife Site Citations

Ramsar Citation

Special Areas of Conservation:

- Citation
- Conservation Objectives
- Natura 2000 Data Forms

Special Protection Areas:

- Citation
- Conservation Objectives
- Natura 2000 Data Forms

Sites of Special Scientific Interest Citations

County Wildlife Site Citations

CWS Number Suffolk Coastal

104

Site Name BUCKLES WOOD

Parish LEISTON

District Suffolk Coastal

NGR TM431635

Description

Buckle's Wood has a good coppice with standards structure, several rides and a track for vehicular access. The coppice stools are old, mainly hazel, with ash, field maple and hornbeam also present. The standards are oak and even-aged. The wood appears to be managed at present, with a large new pond under excavation and game bird rearing pens and beehives are also present. There is a good ditch and bank boundary with a mixed species hedge, which together with the old coppice stools, indicates a woodland of some considerable age.

RNR Number 0

Area 4.62

County Wildlife Site Citations

CWS Number Suffolk Coastal 105

Site Name LEISTON COMMON

Parish LEISTON

District Suffolk Coastal

NGR TM458633

Description

Leiston Common is a small but important site for wildlife conservation in Suffolk. It was the site of extensive studies of heathland ecology carried out by Lee Chadwick, which were later published. Bell heather, a rare plant in Suffolk, grows on Leiston Common together with more widespread plants for example harebell, heath bedstraw and tormentil. Another notable and uncommon feature of the site is the presence of an extensive and diverse lichen flora

RNR Number 0

Area 1.37

County Wildlife Site Citations

CWS Number	Suffolk Coastal 106
Site Name	SIZEWELL LEVELS & ASSOCIATED AREAS
Parish	LEISTON
District	Suffolk Coastal
NGR	TM463640
Description	<p>A large area of land, consisting of woodland, plantation, wet meadow, osier beds and scrub situated behind Sizewell power station is considered to be of both regional and national importance for wildlife conservation. The area not within the Site of Special Scientific Interest (SSSI) boundary, which comprises wet meadow, sallow scrub and birch/alder woodland is of conservation importance. The flora of the marshes includes a number of uncommon plants, for example ragged robin and purple loosestrife. A recent survey however, has shown that the main importance of the grazing marshes lies in the diversity and abundance of the birds which inhabit the area. The ground remains waterlogged through the winter and numerous dykes provide good cover for high numbers of swan, teal, mallard and moorhen. Also of ornithological importance are the plantations situated to the north of Sizewell Belts; Goose Hill, Nursery Covert and Kenton Hills. The areas support breeding populations of a number of nationally rare birds which are specially protected (Schedule 1 of Wildlife and Countryside Act). Good numbers of migrant birds also frequent the area. The whole site therefore, with its diversity of habitats, is considered to be one of the most important County Wildlife Sites in the county. In 1994 the area designated as a Site of Special Scientific Interest was extended to include a large proportion of this County Wildlife Site.</p>
RNR Number	0
Area	105.35

County Wildlife Site Citations

CWS Number Suffolk Coastal 164

Site Name LEISTON AIRFIELD

Parish THEBERTON

District Suffolk Coastal

NGR TM424651

Description

This site consists of a mosaic of species-rich grassland and scrub. It is situated on the site of Leiston disused airfield. Although a small area, it supports many plants characteristic of unimproved grassland, for example pepper saxifrage, common centaury, primrose, bugle and common spotted orchid. Of particular interest is a population of yellow-wort which grows on the public footpath which runs along the western edge of the site. Maintenance of the right of way keeps some of the grassland open along the right of way, but the remaining grassland glades are vulnerable to scrub encroachment.

RNR Number 0

Area 0.52

County Wildlife Site Citations

CWS Number Suffolk Coastal 218
Site Name THEBERTON WOODS
Parish Theberton
District Suffolk Coastal
NGR TM42246551

Description

Theberton Woods is an important example of a semi-natural boulder clay woodland that supports a diverse woodland flora including butterfly and bird's nest orchids. Although the woodland is not included in the ancient woodland inventory, it is shown on the 1st series O.S. maps and there are some earthworks that suggest it may be ancient.

Parts of the wood have previously been planted with conifers, but these are now being removed as part of restoration management by the Forestry Commission and the flora is responding and recovering well.

The woodland contains a large number of ponds supporting a significant population of great crested newt (Biodiversity Priority species and protected species). Since 2000 a small, introduced population of Purple Emperor butterfly has been established, feeding on the abundant Sallows.

The site includes an arable reversion field which has developed a flora typical of wet chalky boulder clay including southern marsh orchid, common spotted orchid and yellow-wort. This flora is similar to that of the existing and adjacent CWSs of Leiston Airfield and Kiln Meadow. The willow scrub around the edges of this area is important for the Purple Emperor butterfly and the dense boundary hedges provide important habitat for farmland bird species such as bullfinch, yellowhammer and linnet (all biodiversity priority species).

RNR Number 0

Area 33.08

County Wildlife Site Citations

CWS Number	Suffolk Coastal 127
Site Name	MINSMERE VALLEY;EASTBRIDGE to RECKFORD BRIDGE
Parish	WESTLETON
District	Suffolk Coastal
NGR	TM446673
Description	<p>This area of marshland is situated in the central portion of the Minsmere Valley. The entire valley is of extreme importance for wildlife, forming the last unspoilt and least improved of Suffolk's larger marshland river valleys. Part of the valley forms the internationally important Minsmere/Walberswick SSSI. The marshes which form the central portion of the valley are botanically the richest marshes of the whole of the valley. Most of the area consists of herb rich, unimproved marshes which are becoming increasingly rare in Suffolk. Those which are managed either by grazing or cutting or both, maintain conditions suitable for typical plants such as southern marsh orchid, ragged robin and bog stitchwort, whilst rarities such as bogbean, early marsh orchid and water violet are also present. Other areas which have not been grazed for many years are slowly turning into reed fen, sedge swamp and carr woodland. Here the flora has declined. However as an alternative habitat, they provide valuable areas for breeding birds and invertebrates. Part of this site is owned by RSPB and is part of their Minsmere reserve. Otters are known to use the valley. In 1994 the majority of this County Wildlife Site was confirmed as part of the Minsmere-Walberswick SSSI.</p>
RNR Number	0
Area	24.92

County Wildlife Site Citations

CWS Number	Suffolk Coastal 97
Site Name	KELSALE MORIO MEADOW
Parish	KELSALE CUM CARLTON
District	Suffolk Coastal
NGR	TM399643
Description	<p>An unimproved neutral meadow with one of the finest populations of green-winged orchids of any meadow in Suffolk. In 1985 more than 1000 flowering spikes were recorded, mostly concentrated in the north east corner of the meadow. There is a full range of flora characteristic of such meadows, including field wood-rush, sorrel, ox-eye daisy, black knapweed and glaucous sedge. As is typical of such meadows, there is a wide range of grasses. The meadow is colourful from early spring, when the abundant cowslips flower, to late summer when the knapweed is at its peak. It is managed traditionally with a late summer hay cut.</p>
RNR Number	0
Area	1.04

Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.
2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.
3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

Joint Nature Conservation Committee

Monkstone House

City Road

Peterborough

Cambridgeshire PE1 1JY

UK

Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948

Email: RIS@JNCC.gov.uk

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DD MM YY

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Designation date

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Site Reference Number

2. Date this sheet was completed/updated:

Designated: 04 October 1996

3. Country:

UK (England)

4. Name of the Ramsar site:

Alde–Ore Estuary

5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

- i) **hard copy** (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* ☐;
- ii) **an electronic format** (e.g. a JPEG or ArcView image) *Yes*
- iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** *yes* ✓ -or- *no* ☐;

b) **Describe briefly the type of boundary delineation applied:**

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

52 04 58 N 01 33 03 E

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Woodbridge

Alde-Ore Estuary is located on the east coast of Suffolk, east of Woodbridge, stretching between Aldeburgh to the north and Bawdsey to the south.

Administrative region: Suffolk

10. Elevation (average and/or max. & min.) (metres): **11. Area** (hectares): 2546.99

Min.	-1
Max.	5
Mean	1

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The site comprises the estuary complex of the rivers Alde, Butley and Ore, including Havergate Island and Orfordness. There are a variety of habitats including, intertidal mudflats, saltmarsh, vegetated shingle (including the second-largest and best-preserved area in Britain at Orfordness), saline lagoons and grazing marsh. The Orfordness/Shingle Street landform is unique within Britain in combining a shingle spit with a cusped foreland. The site supports nationally-scarce plants, British Red Data Book invertebrates, and notable assemblages of breeding and wintering wetland birds.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

2, 3, 6

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 2

The site supports a number of nationally-scarce plant species and British Red Data Book invertebrates.

Ramsar criterion 3

The site supports a notable assemblage of breeding and wintering wetland birds.

Ramsar criterion 6 – species/populations occurring at levels of international importance.

Qualifying Species/populations (as identified at designation):

Species regularly supported during the breeding season:

Lesser black-backed gull , *Larus fuscus graellsii*, 5790 apparently occupied nests, representing an average of 3.9% of the breeding population
W Europe/Mediterranean/W Africa (Seabird 2000 Census)

Species with peak counts in winter:

Pied avocet , *Recurvirostra avosetta*, 1187 individuals, representing an average of 1.6% of the population (5 year peak mean 1998/9-2002/3)
Europe/Northwest Africa

Common redshank , *Tringa totanus totanus*, 2368 individuals, representing an average of 2% of the GB population (5 year peak mean 1998/9-2002/3)

Contemporary data and information on waterbird trends at this site and their regional (sub-national) and national contexts can be found in the Wetland Bird Survey report, which is updated annually. See www.bto.org/survey/webs/webs-alerts-index.htm.

See Sections 21/22 for details of noteworthy species

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	shingle, mud, nutrient-rich, sedimentary
Geomorphology and landscape	lowland, coastal, shingle bar, intertidal sediments (including sandflat/mudflat), estuary, lagoon
Nutrient status	mesotrophic
pH	no information
Salinity	saline / euhaline
Soil	mainly mineral
Water permanence	usually permanent

Summary of main climatic features	Annual averages (Lowestoft, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/lowestoft.html) Max. daily temperature: 13.0° C Min. daily temperature: 7.0° C Days of air frost: 27.8 Rainfall: 576.3 mm Hrs. of sunshine: 1535.5
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General description of the Physical Features:

This estuary is the only bar-built estuary in the UK with a shingle bar. This bar has been extending rapidly along the coast since 1530, pushing the mouth of the estuary progressively south-westwards. The eastwards-running Alde River originally entered the sea at Aldeburgh, but now turns south along the inner side of the Orfordness shingle spit. It is relatively wide and shallow, with extensive intertidal mudflats on both sides of the channel in its upper reaches and saltmarsh accreting along its fringes. The Alde subsequently becomes the south-west flowing River Ore, which is narrower and deeper with stronger currents. The smaller Butley River, which has extensive areas of saltmarsh and a reedbed community bordering intertidal mudflats, flows into the Ore shortly after the latter divides around Havergate Island. The mouth of the River Ore is still moving south as the Orfordness shingle spit continues to grow through longshore drift from the north.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

The Alde-Ore Estuary comprises the estuarine complex of the rivers Alde, Butley and Ore, including Havergate Island and Orfordness.

This estuary is the only bar-built estuary in the UK with a shingle bar. This bar has been extending rapidly along the coast since 1530, pushing the mouth of the estuary progressively south-westwards. The eastwards-running Alde River originally entered the sea at Aldeburgh, but now turns south along the inner side of the Orfordness shingle spit. It is relatively wide and shallow, with extensive intertidal mudflats on both sides of the channel in its upper reaches and saltmarsh accreting along its fringes. The Alde subsequently becomes the south-west flowing River Ore, which is narrower and deeper with stronger currents. The smaller Butley River, which has extensive areas of saltmarsh and a reedbed community bordering intertidal mudflats, flows into the Ore shortly after the latter divides around Havergate Island. The mouth of the River Ore is still moving south as the Orfordness shingle spit continues to grow through longshore drift from the north.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

Shoreline stabilisation and dissipation of erosive forces

19. Wetland types:

Inland wetland, Marine/coastal wetland

Code	Name	% Area
E	Sand / shingle shores (including dune systems)	33.3
H	Salt marshes	23.6
G	Tidal flats	17.7
M	Rivers / streams / creeks: permanent	9.8
Sp	Saline / brackish marshes: permanent	5.9

Tp	Freshwater marshes / pools: permanent	3.9
U	Peatlands (including peat bogs swamps, fens)	3.8
J	Coastal brackish / saline lagoons	2

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The main habitat types of the Alde-Ore Estuary are: intertidal mudflats, saltmarsh, reedswamp, coastal freshwater, brackish lagoons, semi-improved grazing marsh, brackish ditches and vegetated shingle, the second-largest and best-preserved example in Britain.

A unique feature for East Anglian beaches is the abundance on the ground of normally epiphytic lichens.

There is a zonation of shingle vegetation from shifting to more stable areas of grassland and lichen communities.

Areas of saltmarsh succeed to higher saltmarsh and neutral grassland with ditches.

There is a series of brackish lagoons and ditches; and borrow pits.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site.

Higher Plants.

A range of nationally scarce plant species characteristic of freshwater, estuarine, and shingle habitats, and their transitions are present. These include: *Althaea officinalis*, *Frankenia laevis*, *Lathyrus japonicus*, *Lepidium latifolium*, *Medicago minima*, *Parapholis incurva*, *Puccinellia fasciculata*, *Ruppia cirrhosa*, *Sarcocornia perennis*, *Sonchus palustris*, *Trifolium suffocatum*, *Vicia lutea* and *Zostera angustifolia*.

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species currently occurring at levels of national importance:

Species regularly supported during the breeding season:

Eurasian marsh harrier , <i>Circus aeruginosus</i> , Europe	3 pairs, representing an average of 1.9% of the GB population (5 year mean 1993-1997)
Mediterranean gull , <i>Larus melanocephalus</i> , Europe	6 apparently occupied nests, representing an average of 5.5% of the GB population (Seabird 2000 Census)
Sandwich tern , <i>Sterna</i> <i>(Thalasseus) sandvicensis sandvicensis</i> , W Europe	169 pairs, representing an average of 1.6% of the GB population (5 year mean 1991-1995)

Little tern , <i>Sterna albifrons albifrons</i> , W Europe	88 apparently occupied nests, representing an average of 4.5% of the GB population (Seabird 2000 Census)
Species with peak counts in spring/autumn:	
Black-tailed godwit , <i>Limosa limosa islandica</i> , Iceland/W Europe	283 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)
Spotted redshank , <i>Tringa erythropus</i> , Europe/W Africa	44 individuals, representing an average of 32.3% of the GB population (5 year peak mean 1998/9-2002/3)
Common greenshank , <i>Tringa nebularia</i> , Europe/W Africa	29 individuals, representing an average of 4.8% of the GB population (5 year peak mean 1998/9-2002/3)
Species with peak counts in winter:	
Greater white-fronted goose , <i>Anser albifrons albifrons</i> , NW Europe	186 individuals, representing an average of 3.2% of the GB population (5 year peak mean for 1996/7-2000/01)
Common shelduck , <i>Tadorna tadorna</i> , NW Europe	1398 individuals, representing an average of 1.7% of the GB population (5 year peak mean 1998/9-2002/3)
Eurasian wigeon , <i>Anas penelope</i> , NW Europe	6851 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)
Eurasian teal , <i>Anas crecca</i> , NW Europe	2447 individuals, representing an average of 1.2% of the GB population (5 year peak mean 1998/9-2002/3)
Northern pintail , <i>Anas acuta</i> , NW Europe	556 individuals, representing an average of 1.9% of the GB population (5 year peak mean 1998/9-2002/3)
Northern shoveler , <i>Anas clypeata</i> , NW & C Europe	224 individuals, representing an average of 1.5% of the GB population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site.

Invertebrates.

The highly specialised invertebrate fauna of the saline lagoons includes *Nematostella vectensis*, and *Gammarus insensibilis*, both species protected under Schedules 5 and 8 of the Wildlife and Countryside Act 1981 (as amended).

Other notable invertebrates on the site include: *Malacosoma castrensis*, *Campsicnemus magius*, *Cheilosia velutina*, *Empis prodomus*, *Dixella attica*, *Hylaeus euryscapus*, *Pseudamnicola confusa*, *Euophrys browni*, *Baryphyma duffeyi*, *Haplodrassus minor*, *Trichoncus affinis*.

23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

- Aesthetic
- Aquatic vegetation (e.g. reeds, willows, seaweed)
- Archaeological/historical site
- Environmental education/ interpretation
- Fisheries production
- Livestock grazing
- Non-consumptive recreation

Scientific research
 Sport fishing
 Sport hunting
 Tourism
 Transportation/navigation

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? **No**

If Yes, describe this importance under one or more of the following categories:

- i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:
- ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:
- iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:
- iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site
Non-governmental organisation (NGO)	+	+
National/Crown Estate	+	
Private	+	+
Public/communal	+	

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	+
Tourism	+	+
Recreation	+	+
Current scientific research	+	
Collection of non-timber natural products: commercial	+	
Fishing: recreational/sport	+	
Marine/saltwater aquaculture	+	
Gathering of shellfish	+	
Permanent arable agriculture		+
Grazing (unspecified)	+	+
Hunting: recreational/sport	+	
Harbour/port		+
Flood control		+
Irrigation (incl. agricultural water supply)		+
Non-urbanised settlements		+

26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Erosion	2		+		+

For category 2 factors only.

What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
 Erosion - English Nature provides advice to the Environment Agency and coastal local authorities in relation to flood and coastal protection management. This will inform the development of the Suffolk Estuaries strategies and the second generation shoreline management plan.

A Management Scheme is required, taking into account the effects of erosion. A Coastal Habitat Management Plan will be produced for this site.

Is the site subject to adverse ecological change? YES

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	
National Nature Reserve (NNR)	+	
Special Protection Area (SPA)	+	
Land owned by a non-governmental organisation for nature conservation	+	+
Site management statement/plan implemented	+	
Other	+	
Area of Outstanding National Beauty (AONB)	+	
Environmentally Sensitive Area (ESA)	+	
Special Area of Conservation (SAC)	+	
Management plan in preparation	+	

b) Describe any other current management practices:

The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Fauna.

Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.

Environment.

Monitoring estuarine processes.

Saline lagoon survey.

Study on the effects of guano-fication on shingle flora.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

None reported

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities.

The site is used informally for walking, boating and angling.

Facilities provided.

River moorings.

Seasonality.

Walking and boating activities are predominantly in spring and summer. Seasonal (winter) wildfowling occurs on the estuary.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs,

European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6EB

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

Site-relevant references

Anon. (1995) *Biodiversity: The UK Steering Group Report. Volume 2: Action plans*. HMSO, London

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Information Sheet on Ramsar Wetlands (RIS)

Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8th Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX. 22 of the 9th Conference of the Contracting Parties (2005).

Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.
2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 7, 2nd edition, as amended by COP9 Resolution IX.1 Annex B). A 3rd edition of the Handbook, incorporating these amendments, is in preparation and will be available in 2006.
3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

1. Name and address of the compiler of this form:

Joint Nature Conservation Committee

Monkstone House

City Road

Peterborough

Cambridgeshire PE1 1JY

UK

Telephone/Fax: +44 (0)1733 – 562 626 / +44 (0)1733 – 555 948

Email: RIS@JNCC.gov.uk

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DD MM YY

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Designation date

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Site Reference Number

2. Date this sheet was completed/updated:

Designated: 05 January 1976

3. Country:

UK (England)

4. Name of the Ramsar site:

Minsmere–Walberswick

5. Designation of new Ramsar site or update of existing site:

This RIS is for: Updated information on an existing Ramsar site

6. For RIS updates only, changes to the site since its designation or earlier update:

a) Site boundary and area:

** Important note: If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:

7. Map of site included:

Refer to Annex III of the *Explanatory Notes and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

a) A map of the site, with clearly delineated boundaries, is included as:

- i) **hard copy** (required for inclusion of site in the Ramsar List): *yes* ✓ -or- *no* ☐;
- ii) **an electronic format** (e.g. a JPEG or ArcView image) *Yes*
- iii) **a GIS file providing geo-referenced site boundary vectors and attribute tables** *yes* ✓ -or- *no* ☐;

b) Describe briefly the type of boundary delineation applied:

e.g. the boundary is the same as an existing protected area (nature reserve, national park etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The site boundary is the same as, or falls within, an existing protected area.

For precise boundary details, please refer to paper map provided at designation

8. Geographical coordinates (latitude/longitude):

52 18 55 N 01 38 02 E

9. General location:

Include in which part of the country and which large administrative region(s), and the location of the nearest large town.

Nearest town/city: Southwold

Composite site situated on the coast of Suffolk, between Southwold in the north and Sizewell in the south.

Administrative region: Suffolk

10. Elevation (average and/or max. & min.) (metres): **11. Area** (hectares): 2018.92

Min.	-1
Max.	24
Mean	9

12. General overview of the site:

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

This composite, Suffolk coastal site contains a complex mosaic of habitats, notably, areas of marsh with dykes, extensive reedbeds, mudflats, lagoons, shingle and driftline, woodland and areas of lowland heath. The site supports the largest continuous stand of reed in England and Wales and demonstrates the nationally rare transition in grazing marsh ditch plants from brackish to fresh water. The combination of habitats create an exceptional area of scientific interest supporting nationally scarce plants, British Red Data Book invertebrates and nationally important numbers of breeding and wintering birds.

13. Ramsar Criteria:

Circle or underline each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11).

1, 2

14. Justification for the application of each Criterion listed in 13 above:

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

Ramsar criterion 1

The site contains a mosaic of marine, freshwater, marshland and associated habitats, complete with transition areas in between. Contains the largest continuous stand of reedbeds in England and Wales and rare transition in grazing marsh ditch plants from brackish to fresh water.

Ramsar criterion 2

This site supports nine nationally scarce plants and at least 26 red data book invertebrates.

Supports a population of the mollusc *Vertigo angustior* (Habitats Directive Annex II; British Red Data Book Endangered), recently discovered on the Blyth estuary river walls.

An important assemblage of rare breeding birds associated with marshland and reedbeds including: *Botaurus stellaris*, *Anas strepera*, *Anas crecca*, *Anas clypeata*, *Circus aeruginosus*, *Recurvirostra avosetta*, *Panurus biarmicus*

15. Biogeography (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

a) biogeographic region:

Atlantic

b) biogeographic regionalisation scheme (include reference citation):

Council Directive 92/43/EEC

16. Physical features of the site:

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

Soil & geology	acidic, neutral, shingle, sand, peat, nutrient-poor, mud, alluvium
Geomorphology and landscape	lowland, coastal, valley, floodplain, shingle bar, intertidal sediments (including sandflat/mudflat), open coast (including bay), estuary, lagoon
Nutrient status	mesotrophic
pH	circumneutral
Salinity	brackish / mixosaline, fresh, saline / euhaline
Soil	no information
Water permanence	usually permanent
Summary of main climatic features	Annual averages (Lowestoft, 1971–2000) (www.metoffice.com/climate/uk/averages/19712000/sites/lowestoft.html) Max. daily temperature: 13.0° C Min. daily temperature: 7.0° C Days of air frost: 27.8 Rainfall: 576.3 mm Hrs. of sunshine: 1535.5

General description of the Physical Features:

Minsmere – Walberswick comprises two large marshes, the tidal Blyth estuary and associated habitats. This composite coastal site contains a complex mosaic of habitats, notably areas of marsh with dykes, extensive reedbeds, mudflats, lagoons, shingle, woodland and areas of lowland heath. It supports the largest continuous stand of common reed *Phragmites australis* in England and Wales, and demonstrates the nationally rare transition in grazing marsh ditch plants from brackish to fresh water.

17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, general land use, and climate (including climate type).

Minsmere – Walberswick comprises two large marshes, the tidal Blyth estuary and associated habitats. This composite coastal site contains a complex mosaic of habitats, notably areas of marsh with dykes, extensive reedbeds, mudflats, lagoons, shingle, woodland and areas of lowland heath.

18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

No special values known

19. Wetland types:

Marine/coastal wetland

Code	Name	% Area
Other	Other	30
U	Peatlands (including peat bogs swamps, fens)	30
G	Tidal flats	12.9
E	Sand / shingle shores (including dune systems)	12.4
H	Salt marshes	7.2
M	Rivers / streams / creeks: permanent	4
F	Estuarine waters	2.5
J	Coastal brackish / saline lagoons	1

20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

This composite Suffolk coastal site contains a complex mosaic of habitats notably, areas of marsh with dykes, extensive reedbeds, mud flats, lagoons, shingle, woodland and areas of lowland heath. The site supports the largest continuous stand of reed *Phragmites australis* in England and Wales and nationally rare transition in grazing marsh ditch plants from brackish to fresh water. The combination of habitats create an exceptional area of scientific interest supporting nationally scarce plants, RDB invertebrates and nationally important numbers of breeding and wintering birds.

Ecosystem services

21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Nationally important species occurring on the site.

Higher Plants.

This is one of few sites nationally for red-tipped cudweed *Filago lutescens* (RDB2) which occurs on light, sandy soils.

The nationally rare species *Corynephorus canescens* (RDB3) occurs on coastal dune habitat.

The site supports a range of nationally scarce plant species characteristic of heathland, wetland and coastal habitats, and the transitions between them. *Althaea officinalis*, *Myriophyllum verticillatum*, *Ruppia cirrhosa*, *Sium latifolium*, *Sonchus palustris*, *Ceratophyllum submersum*, *Ranunculus baudotii*, and *Carex divisa* (all nationally scarce) are associated with reedbeds, grazing marsh or ditches. *Hordeum marinum* occurs on sea-walls, *Lathyrus japonicus* on coastal shingle, and *Crassula tillaea* on heathland.

22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g. which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Birds

Species currently occurring at levels of national importance:

Species regularly supported during the breeding season:

Eurasian marsh harrier , <i>Circus aeruginosus</i> , Europe	16 pairs, representing an average of 10.5% of the GB population (5 year mean 1993-1997)
Mediterranean gull , <i>Larus melanocephalus</i> , Europe	2 apparently occupied nests, representing an average of 1.8% of the GB population (Seabird 2000 Census)
Black-headed gull , <i>Larus ridibundus</i> , N & C Europe	2558 apparently occupied nests, representing an average of 1.9% of the GB population (Seabird 2000 Census)
Little tern , <i>Sterna albifrons albifrons</i> , W Europe	20 apparently occupied nests, representing an average of 1% of the GB population (Seabird 2000 Census)

Species with peak counts in spring/autumn:

Great bittern , <i>Botaurus stellaris stellaris</i> , W Europe, NW Africa	3 individuals, representing an average of 3% of the GB population (5 year peak mean 1998/9-2002/3 - spring peak)
Eurasian teal , <i>Anas crecca</i> , NW Europe	3083 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)
Ruff , <i>Philomachus pugnax</i> , Europe/W Africa	10 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)
Black-tailed godwit , <i>Limosa limosa islandica</i> , Iceland/W Europe	846 individuals, representing an average of 5.4% of the GB population (5 year peak mean 1998/9-2002/3 - spring peak)
Spotted redshank , <i>Tringa erythropus</i> , Europe/W Africa	15 individuals, representing an average of 11% of the GB population (5 year peak mean 1998/9-2002/3)
Common greenshank , <i>Tringa nebularia</i> , Europe/W Africa	9 individuals, representing an average of 1.5% of the GB population (5 year peak mean 1998/9-2002/3)

Species with peak counts in winter:

Greater white-fronted goose , <i>Anser albifrons albifrons</i> , NW Europe	212 individuals, representing an average of 3.6% of the GB population (5 year peak mean for 1996/7-2000/01)
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Gadwall , <i>Anas strepera strepera</i> , NW Europe	261 individuals, representing an average of 1.5% of the GB population (5 year peak mean 1998/9-2002/3)
Northern shoveler , <i>Anas clypeata</i> , NW & C Europe	238 individuals, representing an average of 1.6% of the GB population (5 year peak mean 1998/9-2002/3)
Hen harrier, <i>Circus cyaneus</i> , Europe	15 individuals, representing an average of 2% of the GB population (5 year peak mean 1985/6-1989/90)
Water rail , <i>Rallus aquaticus</i> , Europe	5 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1998/9-2002/3)
Pied avocet , <i>Recurvirostra avosetta</i> , Europe/Northwest Africa	329 individuals, representing an average of 9.6% of the GB population (5 year peak mean 1998/9-2002/3)
European golden plover , <i>Pluvialis apricaria apricaria</i> , P. a. altifrons Iceland & Faroes/E Atlantic	4503 individuals, representing an average of 1.8% of the GB population (5 year peak mean 1998/9-2002/3)
Common redshank , <i>Tringa totanus totanus</i> ,	1386 individuals, representing an average of 1.1% of the GB population (5 year peak mean 1998/9-2002/3)
Lesser black-backed gull , <i>Larus fuscus graellsii</i> ,	905 individuals, representing an average of 1.4% of the GB population (5 year peak mean 1998/9-2002/3)

Species Information

Nationally important species occurring on the site.

Invertebrates.

Ethmia bipunctella, *Aleochara inconspicua*, *Philonthus dimidiatipennis*, *Deltote bankiana*, *Cephalops perspicuus*, *Erioptera bivittata*, *E. meijerei*, *Gymnancycla canella*, *Pisidium pseudosphaerium*, *Archanara neurica*, *Heliothis viriplaca*, *Pelosia muscerda*, *Photodes brevilinea*, *Senta flammea*, *Herminea tarsicrinalis*, *Haematopota grandis*, *Tipula marginata*, *Podalonia affinis*, *Arctosa fulvolineata*, *Eucosma catroptana*, *E.maritima*, *Melissoblaptres zelleri*, *Pima boisduvaliella*, *Acrotophthalmus bicolor*, *Limonia danica*, *Telmaturus tumidulus*, *Vertigo angustior* (a Habitats Directive Annex II species (S1014)).

23. Social and cultural values:

Describe if the site has any general social and/or cultural values e.g. fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values.

- Aesthetic
- Aquatic vegetation (e.g. reeds, willows, seaweed)
- Environmental education/ interpretation
- Livestock grazing
- Non-consumptive recreation
- Scientific research
- Tourism

b) Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning? No

If Yes, describe this importance under one or more of the following categories:

- i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland:
- ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:
- iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:
- iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

24. Land tenure/ownership:

Ownership category	On-site	Off-site
Non-governmental organisation (NGO)	+	+
Local authority, municipality etc.	+	
National/Crown Estate	+	
Private	+	+
Other	+	

25. Current land (including water) use:

Activity	On-site	Off-site
Nature conservation	+	+
Tourism	+	+
Recreation	+	+
Current scientific research	+	
Cutting of vegetation (small-scale/subsistence)	+	
Permanent arable agriculture		+
Grazing (unspecified)	+	
Flood control	+	
Transport route	+	+
Non-urbanised settlements	+	+

26. Factors (past, present or potential) adversely affecting the site’s ecological character, including changes in land (including water) use and development projects:

Explanation of reporting category:

1. *Those factors that are still operating, but it is unclear if they are under control, as there is a lag in showing the management or regulatory regime to be successful.*
2. *Those factors that are not currently being managed, or where the regulatory regime appears to have been ineffective so far.*

NA = Not Applicable because no factors have been reported.

Adverse Factor Category	Reporting Category	Description of the problem (Newly reported Factors only)	On-Site	Off-Site	Major Impact?
Erosion	2	Coastal squeeze within the Blyth Estuary	+		+
Recreational/tourism disturbance (unspecified)	2	Trampling damage to vegetated shingle and driftline communities, and disturbance of little tern nesting habitat	+		+

For category 2 factors only.

What measures have been taken / are planned / regulatory processes invoked, to mitigate the effect of these factors?
 Erosion - English Nature provides advice to the Environment Agency and coastal local authorities in relation to flood and coastal protection management. This will inform the development of the Suffolk Estuaries strategies and the second generation shoreline management plan.

Recreational/tourism disturbance (unspecified) - English Nature to work with owners/occupiers and regulatory authorities to develop a strategy to manage visitor pressure on Suffolk vegetated shingle. These measures are likely to include temporary fencing and provision of boardwalks as well as measures to increase visitor awareness about the sensitivity of the shingle habitat, for example by interpretation, wardening.

Is the site subject to adverse ecological change? YES

27. Conservation measures taken:

List national category and legal status of protected areas, including boundary relationships with the Ramsar site; management practices; whether an officially approved management plan exists and whether it is being implemented.

Conservation measure	On-site	Off-site
Site/ Area of Special Scientific Interest (SSSI/ASSI)	+	
National Nature Reserve (NNR)	+	
Special Protection Area (SPA)	+	
Land owned by a non-governmental organisation for nature conservation	+	
Management agreement	+	
Site management statement/plan implemented	+	

Area of Outstanding National Beauty (AONB)	+	+
Environmentally Sensitive Area (ESA)	+	+
Special Area of Conservation (SAC)	+	

b) Describe any other current management practices:

The management of Ramsar sites in the UK is determined by either a formal management plan or through other management planning processes, and is overseen by the relevant statutory conservation agency. Details of the precise management practises are given in these documents.

28. Conservation measures proposed but not yet implemented:

e.g. management plan in preparation; official proposal as a legally protected area, etc.

No information available

29. Current scientific research and facilities:

e.g. details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Fauna.

Numbers of migratory and wintering wildfowl and waders are monitored annually as part of the national Wetland Birds Survey (WeBS) organised by the British Trust for Ornithology, Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds and the Joint Nature Conservation Committee.

Flora.

NVC and vegetation monitoring, bird and invertebrate surveys/monitoring carried out on EN's NNRs, NT, SWT, RSPB reserves.

30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:

e.g. visitor centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

Facilities at National Trust and Royal Society for the Protection of Birds reserves.

31. Current recreation and tourism:

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

Activities, Facilities provided and Seasonality.

A popular area for tourists as it is an AONB and contains Minsmere bird reserve and Dunwich heath, both with toilets/shop/cafe. There are more visitors in the summer, however it well used throughout the year by walkers and bird watchers.

32. Jurisdiction:

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept. of Agriculture/Dept. of Environment, etc.

Head, Natura 2000 and Ramsar Team, Department for Environment, Food and Rural Affairs,

European Wildlife Division, Zone 1/07, Temple Quay House, 2 The Square, Temple Quay, Bristol, BS1 6EB

33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Site Designations Manager, English Nature, Sites and Surveillance Team, Northminster House, Northminster Road, Peterborough, PE1 1UA, UK

34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

Site-relevant references

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- Royal Society for the Protection of Birds (1994) *Minsmere management plan*. Royal Society for the Protection of Birds
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Wiggington, M (1999) *British Red Data Books. 1. Vascular plants*. 3rd edn. Joint Nature Conservation Committee, Peterborough

Please return to: **Ramsar Secretariat, Rue Mauverney 28, CH-1196 Gland, Switzerland**
Telephone: **+41 22 999 0170** • Fax: **+41 22 999 0169** • email: **ramsar@ramsar.org**

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name: Alde, Ore and Butley Estuaries

Unitary Authority/County: Suffolk

SAC status: Designated on 1 April 2005

Grid reference: TM444509

SAC EU code: UK0030076

Area (ha): 1561.53

Component SSSI: Alde-Ore Estuary SSSI

Site description:

This estuary, made up of three rivers, is the only bar-built estuary in the UK with a shingle bar. This bar has been extending rapidly along the coast since 1530, pushing the mouth of the estuary progressively south-westwards. The eastwards-running Alde River originally entered the sea at Aldeburgh, but now turns south along the inner side of the Orfordness shingle spit. It is relatively wide and shallow, with extensive intertidal mudflats on both sides of the channel in its upper reaches and saltmarsh accreting along its fringes. The Alde subsequently becomes the south-west flowing River Ore, which is narrower and deeper with stronger currents.

The smaller Butley River has extensive areas of saltmarsh and a reedbed community bordering intertidal mudflats. It flows into the Ore shortly after the latter divides around Havergate Island. The mouth of the River Ore is still moving south as the Orfordness shingle spit continues to grow through longshore drift from the north. There is a range of littoral sediment and rock biotopes (the latter on sea defences) that are of high diversity and species richness for estuaries in eastern England. Water quality is excellent throughout. The area is relatively natural, being largely undeveloped by man and with very limited industrial activity. The estuary contains large areas of shallow water over subtidal sediments, and extensive mudflats and saltmarshes exposed at low water. Its diverse and species-rich intertidal sand and mudflat biotopes grade naturally along many lengths of the shore into vegetated or dynamic shingle habitat, saltmarsh, grassland and reedbed.

The adjacent shingle and lagoon habitats are designated separately as the Orfordness-Shingle Street SAC.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Estuaries
- Mudflats and sandflats not covered by seawater at low tide. (Intertidal mudflats and sandflats)

This citation relates to a site entered in the Register of European Sites for Great Britain.

Register reference number: UK0030076

Date of registration: 14 June 2005

Signed: [REDACTED]

On behalf of the Secretary of State for Environment, Food and Rural Affairs

EC Directive 92/43 on the Conservation of Natural Habitats and of Wild Fauna and Flora

Citation for Special Area of Conservation (SAC)

Name: Minsmere to Walberswick Heaths and Marshes
Unitary Authority/County: Suffolk
SAC status: Designated on 1 April 2005
Grid reference: TM468682
SAC EU code: UK0012809
Area (ha): 1265.52
Component SSSI: Minsmere to Walberswick Heaths and Marshes SSSI

Site description:

Lowland dry heaths occupy an extensive area of this site on the east coast of England, which is at the extreme easterly range of heath development in the UK. The heathland is predominantly heather – western gorse (*Calluna vulgaris* – *Ulex gallii*) heath, usually more characteristic of western parts of the UK. This type is dominated by heather, western gorse and bell heather *Erica cinerea*.

Shingle beach forms the coastline at Walberswick and Minsmere. It supports a variety of scarce shingle plants including sea pea *Lathyrus japonicus*, sea campion *Silene maritima* and small populations of sea kale *Crambe maritima*, grey hair-grass *Corynephorus canescens* and yellow horned-poppy *Glaucium flavum*. A well-developed beach strandline of mixed sand and shingle supports annual vegetation. Species include those typical of sandy shores, such as sea sandwort *Honckenya peploides* and shingle plants such as sea beet *Beta vulgaris* ssp. *maritima*.

Qualifying habitats: The site is designated under **article 4(4)** of the Directive (92/43/EEC) as it hosts the following habitats listed in Annex I:

- Annual vegetation of drift lines
- European dry heaths
- Perennial vegetation of stony banks. (Coastal shingle vegetation outside the reach of waves)

This citation relates to a site entered in the Register of European Sites for Great Britain.
Register reference number: UK0012809
Date of [REDACTED] 2005
Signed [REDACTED]
On behalf of the Secretary of State for Environment,
Food and Rural Affairs

European Site Conservation Objectives for Alde, Ore and Butley Estuaries Special Area of Conservation Site Code: UK0030076



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

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

- **The extent and distribution of qualifying natural habitats**
- **The structure and function (including typical species) of qualifying natural habitats, and**
- **The supporting processes on which qualifying natural habitats rely**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H1130. Estuaries

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

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

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 as amended from time to time (the “Habitats Regulations”). They must be considered when a competent authority is required to make a ‘Habitats Regulations Assessment’, including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features.

These Conservation Objectives are set for each habitat or species of a [Special Area of Conservation \(SAC\)](#). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term ‘favourable conservation status’ is defined in regulation 3 of the Habitats Regulations.

Publication date: 27 November 2018 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.



European Site Conservation Objectives for Minsmere to Walberswick Heaths and Marshes Special Area of Conservation Site Code: UK0012809

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

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

- **The extent and distribution of qualifying natural habitats and habitats**
- **The structure and function (including typical species) of qualifying natural habitats, and**
- **The supporting processes on which qualifying natural habitats rely**

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

H1210. Annual vegetation of drift lines

H1220. Perennial vegetation of stony banks; Coastal shingle vegetation outside the reach of waves

H4030. European dry heaths

This is a European Marine Site

This site is a part of the Minsmere–Walberswick European Marine Site. These conservation objectives should be used in conjunction with the Regulation 35 Conservation Advice Package, for further details please contact Natural England's enquiry service at enquiries@naturalengland.org.uk, or by phone on 0845 600 3078, or visit the Natural England website at:

<http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/europeansites.aspx>

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the "Habitats Regulations") and Article 6(3) of the Habitats Directive. They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment', including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where available) will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its qualifying features as required by the provisions of Article 6(1) and 6(2) of the Directive.

These Conservation Objectives are set for each habitat or species of a [Special Area of Conservation \(SAC\)](#). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving Favourable Conservation Status for that species or habitat type at a UK level. The term 'favourable conservation status' is defined in Article 1 of the Habitats Directive.

Publication date: 30 June 2014 – version 2. This document updates and replaces an earlier version dated 29 May 2012 to reflect Natural England's Strategic Standard on European Site Conservation Objectives 2014.

NATURA 2000 – STANDARD DATA FORM

Special Areas of Conservation under the EC Habitats Directive (includes candidate SACs, Sites of Community Importance and designated SACs).

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the [Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011](#) (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Areas of Conservation (SACs) in the United Kingdom is available from the [SAC home page on the JNCC website](#). This webpage also provides links to Standard Data Forms for all SACs in the UK.

Date form generated by the Joint Nature Conservation Committee
25 January 2016.



NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE UK0030076
SITENAME Alde, Ore and Butley Estuaries

TABLE OF CONTENTS

- [1. SITE IDENTIFICATION](#)
- [2. SITE LOCATION](#)
- [3. ECOLOGICAL INFORMATION](#)
- [4. SITE DESCRIPTION](#)
- [5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES](#)
- [6. SITE MANAGEMENT](#)

1. SITE IDENTIFICATION

1.1 Type B	1.2 Site code UK0030076	Back to top
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1.3 Site name

Alde, Ore and Butley Estuaries

1.4 First Compilation date 2001-01	1.5 Update date 2015-12
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1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough
PE1 1JY

Email:

Date site proposed as SCI: 2001-01
Date site confirmed as SCI: 2004-12
Date site designated as SAC: 2005-04

National legal reference of SAC designation:

Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010
(<http://www.legislation.gov.uk/uksi/2010/490/contents/made>).

2. SITE LOCATION

[Back to top](#)

2.1 Site-centre location [decimal degrees]:

Longitude
1.568888889

Latitude
52.10166667

2.2 Area [ha]:

1632.63

2.3 Marine area [%]

68.9

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name

NUTS level 2 code **Region Name**

UKH1	East Anglia
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2.6 Biogeographical Region(s)

Atlantic (100.0
%)

3. ECOLOGICAL INFORMATION

3.1 Habitat types present on the site and assessment for them

[Back to top](#)

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A B C D	A B C		
						Representativity	Relative Surface	Conservation	Global
1110			32.65		M	D			
1130			1142.84		G	B	C	C	B
1140			653.05		G	B	C	B	C
1330			408.16		G	C	C	C	C

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- **Cover:** decimal values can be entered
- **Caves:** for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

4. SITE DESCRIPTION

[Back to top](#)

4.1 General site character

Habitat class	% Cover
N02	70.0
N03	25.0
N05	5.0
Total Habitat Cover	100

Other Site Characteristics

2 Terrestrial: Geomorphology and landscape: coastal 3 Marine: Geology: mud,shingle,sand 4 Marine: Geomorphology: enclosed coast (including embayment),lagoon,estuary,islands,intertidal sediments (including sandflat/mudflat),open coast (including bay),subtidal sediments (including sandbank/mudbank)

4.2 Quality and importance

Estuaries for which this is considered to be one of the best areas in the United Kingdom. Mudflats and sandflats not covered by seawater at low tide for which the area is considered to support a significant presence. Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) for which the area is considered to support a significant presence.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i o b]
H	M01		B
H	M02		B
H	J02		B
H	G01		I

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i o b]
H	D05		I
H	A02		I
H	A06		I
H	A04		I
H	G03		I

Rank: H = high, M = medium, L = low

Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,

T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions

i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): <http://publications.naturalengland.org.uk/category/3212324>

http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

<http://publications.naturalengland.org.uk/category/6490068894089216>

5. SITE PROTECTION STATUS (optional)

5.1 Designation types at national and regional level:

[Back to top](#)

Code **Cover [%]**

UK04	100.0
------	-------

Code **Cover [%]**

Code **Cover [%]**

6. SITE MANAGEMENT

6.1 Body(ies) responsible for the site management:

[Back to top](#)

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

<input type="checkbox"/>	Yes
<input type="checkbox"/>	No, but in preparation
<input checked="" type="checkbox"/>	No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the [official European Union guidelines for the Standard Data Form](#). The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
B	SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC)	53
C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (<i>Spartinion maritimae</i>)	57
1330	Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (<i>Sarcocornetea fruticosi</i>)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with <i>Empetrum nigrum</i>	57
2150	Atlantic decalcified fixed dunes (<i>Calluno-Ulicetea</i>)	57
2160	Dunes with <i>Hippophila rhamnoides</i>	57
2170	Dunes with <i>Salix repens</i> ssp. <i>argentea</i> (<i>Salicion arenariae</i>)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with <i>Juniperus</i> spp.	57
2330	Inland dunes with open <i>Corynephorus</i> and <i>Agrostis</i> grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the <i>Littorelletea uniflorae</i> and/or of the <i>Isoëto-Nanojuncetea</i>	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp.	57
3150	Natural eutrophic lakes with <i>Magnopotamion</i> or <i>Hydrocharition</i> - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic resources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

NATURA 2000 – STANDARD DATA FORM

Special Areas of Conservation under the EC Habitats Directive (includes candidate SACs, Sites of Community Importance and designated SACs).

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the [Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011](#) (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Areas of Conservation (SACs) in the United Kingdom is available from the [SAC home page on the JNCC website](#). This webpage also provides links to Standard Data Forms for all SACs in the UK.

Date form generated by the Joint Nature Conservation Committee
25 January 2016.



NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE UK0012809
SITENAME Minsmere to Walberswick Heaths and Marshes

TABLE OF CONTENTS

- [1. SITE IDENTIFICATION](#)
- [2. SITE LOCATION](#)
- [3. ECOLOGICAL INFORMATION](#)
- [4. SITE DESCRIPTION](#)
- [5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES](#)
- [6. SITE MANAGEMENT](#)
- [7. MAP OF THE SITE](#)

1. SITE IDENTIFICATION

1.1 Type B	1.2 Site code UK0012809	Back to top
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1.3 Site name

Minsmere to Walberswick Heaths and Marshes

1.4 First Compilation date 1995-06	1.5 Update date 2015-12
--	-----------------------------------

1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee
Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough
PE1 1JY
Email:

Date site proposed as SCI:	1995-06
Date site confirmed as SCI:	2004-12
Date site designated as SAC:	2005-04
National legal reference of SAC designation:	Regulations 11 and 13-15 of the Conservation of Habitats and Species Regulations 2010 (http://www.legislation.gov.uk/uksi/2010/490/contents/made).

2. SITE LOCATION

2.1 Site-centre location [decimal degrees]:**Longitude**

1.6172

Latitude

52.2561

2.2 Area [ha]:

1256.57

2.3 Marine area [%]

0.0

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name**NUTS level 2 code****Region Name**

UKH1

East Anglia

2.6 Biogeographical Region(s)Atlantic (100.0
%)**3. ECOLOGICAL INFORMATION****3.1 Habitat types present on the site and assessment for them**

Annex I Habitat types						Site assessment			
Code	PF	NP	Cover [ha]	Cave [number]	Data quality	A B C D	A B C		
						Representativity	Relative Surface	Conservation	Global
1150	X		1.26		G	D			
1210			5.03		G	A	B	A	A
1220			3.77		G	C	C	C	C
4030			502.63		M	B	C	A	B

- **PF:** for the habitat types that can have a non-priority as well as a priority form (6210, 7130, 9430) enter "X" in the column PF to indicate the priority form.
- **NP:** in case that a habitat type no longer exists in the site enter: x (optional)
- **Cover:** decimal values can be entered
- **Caves:** for habitat types 8310, 8330 (caves) enter the number of caves if estimated surface is not available.
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation)

3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive

92/43/EEC and site evaluation for them

Species					Population in the site						Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A B C D	A B C		
						Min	Max				Pop.	Con.	Iso.	Glo.
A	1166	Triturus cristatus			p				P	DD	D			

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles
- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see [reference portal](#))
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

4.1 General site character

[Back to top](#)

Habitat class	% Cover
N04	5.0
N08	40.0
N05	15.0
N19	20.0
N07	20.0
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: acidic,sand,shingle 2 Terrestrial: Geomorphology and landscape: coastal,lowland 4 Marine: Geomorphology: lagoon

4.2 Quality and importance

Annual vegetation of drift lines for which this is one of only four known outstanding localities in the United Kingdom. which is considered to be rare as its total extent in the United Kingdom is estimated to be less than 100 hectares. Perennial vegetation of stony banks for which the area is considered to support a significant presence. European dry heaths for which this is considered to be one of the best areas in the United Kingdom.

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
	Threats and	Pollution (optional)	inside/outside

Positive Impacts			
Rank	Activities, management	Pollution (optional)	inside/outside

Rank	pressures [code]	[code]	[i o b]
H	M01		B
H	I01		B
H	H02		B
H	I02		B
H	G01		I

	[code]	[code]	[i o b]
H	A04		I
H	D05		I
H	D05		I
H	B02		I
H	G03		I
H	A02		I

Rank: H = high, M = medium, L = low

Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,

T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions

i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

<http://publications.naturalengland.org.uk/category/3212324>

<http://publications.naturalengland.org.uk/category/6490068894089216>

5. SITE PROTECTION STATUS (optional)

5.1 Designation types at national and regional level:

[Back to top](#)

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK01	24.0	UK04	100.0		

6. SITE MANAGEMENT

6.1 Body(ies) responsible for the site management:

[Back to top](#)

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

<input type="checkbox"/>	Yes
<input type="checkbox"/>	No, but in preparation
<input checked="" type="checkbox"/>	No

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

7. MAP OF THE SITES

INSPIRE ID:

Map delivered as PDF in electronic format (optional)

Yes No

Reference(s) to the original map used for the digitalisation of the electronic boundaries (optional).

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the [official European Union guidelines for the Standard Data Form](#). The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
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C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
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1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippophila rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Screes, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic resources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc.), trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

EC Directive 79/409 on the Conservation of Wild Birds:
Special Protection Areas

Alde-Ore Estuary (Suffolk)

The Alde-Ore Estuary proposed Special Protection Area (pSPA) is situated on the east coast of Suffolk between Aldeburgh in the north and Bawdsey in the south. The site comprises the estuary complex of the rivers Alde, Butley and Ore, including Havergate Island and Orfordness. The variety of habitats important for breeding and wintering birds includes vegetated shingle, intertidal mudflats, semi-improved grazing marsh, saltmarsh and saline lagoons.

The site includes the entire Alde-Ore Estuary SSSI, notified in 1985 (revised in 1992 under the Wildlife and Countryside Act, 1981). The Alde-Ore Estuary SSSI includes the Orfordness-Havergate NNR, the English Nature owned part of which has already been designated as Orfordness-Havergate SPA.

The site qualifies under Article 4.1 of the EC Birds Directive by sustaining nationally important numbers of the following Annex 1 species, marsh harrier *Circus aeruginosus* (breeding), avocet *Recurvirostra avosetta* (wintering and breeding) ruff *Philomachus pugnax* (wintering), sandwich tern *Sterna sandvicensis* (breeding) and little tern *Sterna albifrons* (breeding). Further Annex 1 species winter on site, including, bittern *Botaurus stellaris*, Bewick's Swan *Cygnus columbianus*, hen harrier *Circus cyaneus*, golden plover *Pluvialis apricaria*, and short-eared owl *Asio flammeus*. Mediterranean gull *Larus melanocephalus*, common tern *Sterna hirundo* and Arctic tern *Sterna paradisaea* breed on Havergate Island.

The site qualifies under Article 4.2 of the Directive by regularly supporting internationally important numbers of two migratory species. The Orfordness colony of breeding lesser black-backed gull *Larus fuscus graellsii*, represented in 1995, 12% of the British population and 8% of the world population of the *graellsii* race. The five year wintering peak mean 1989/90 to 1993/94 for redshank *Tringa totanus*, was 1,662 birds, representing 1.5 % of the British population and 1.1% of the east Atlantic flyway population.

The site supports over 1% of the British wintering population of the following (calculated from five year winter peak means 1989/90 to 1993/94), shelduck *Tadorna tadorna*, wigeon *Anas penelope*, teal *Anas crecca*, black-tailed godwit *Limosa limosa*. In addition, the site supports over 1% of the British breeding population of, Gadwall *Anas strepera*, shoveler *Anas clypeata* and herring gull *Larus argentatus*.

The site also supports a notable assemblage of breeding and wintering wetland birds, in addition to the species mentioned above. Breeding species include, oystercatcher *Haematopus ostralegus*, ringed plover *Charadrius hiaticula*, lapwing *Vanellus vanellus* (also winter) black headed gull *Larus ridibundus* and barn owl *Tyto alba*. Wintering species include, cormorant *Phalacrocorax carbo*, European white-fronted goose *Anser abifrons albifrons*, brent goose *Branta bernicla*, pintail *Anas acuta*, grey plover *Pluvialis squatarola*, dunlin *Calidris alpina* and curlew *Numenius arquata*.

This citation / map relates to a site entered in
the Register of European sites for Great Britain:
Register # [REDACTED]
Date of registration [REDACTED] 1998

Signed [REDACTED]
on behalf of the Secretary of State for the Environment

SPA Citation
January 1996

EC Directive 2009/147/EC on the Conservation of Wild Birds

Special Protection Area (SPA)

Name: *Outer Thames Estuary SPA*

Counties/Unitary Authorities: Norfolk, Suffolk, Essex, Kent

Boundary of the SPA:

The seaward and alongshore extent of the Outer Thames Estuary SPA is defined according to the distribution of non-breeding red-throated divers (O'Brien *et al.* 2012). The site includes coastal areas up to Mean High Water up the coast (to Caister-on-Sea) to provide coverage for little terns from Great Yarmouth North Denes foraging from this SPA, and common terns foraging from Breydon Water SPA. The inclusion of the River Yare channel, to abut the eastern boundary of the existing Breydon Water SPA, and the lower River Bure (to approximately Runham village south of Filby), to provide continuous SPA coverage for common terns foraging from this SPA. The inclusion of coastal areas up to Mean High Water down the coast (to just south of Corton), providing coverage for common terns from Breydon Water foraging from this SPA. The inclusion of the River Blyth to encompass Blythburgh Water, a tidal lagoon directly adjacent to the northern parts of Minsmere-Walberswick SPA in addition to the inclusion of Mean High Water areas up the coast (to Southwold) and down the coast (to Leiston) to provide continuous coverage for little terns foraging from this SPA. The inclusion of the estuarine areas up to Mean High Water within the Crouch and Roach Estuaries, overlapping the existing Crouch and Roach Estuaries SPA in the intertidal area and the inclusion of a small marine area along the south Essex coast and overlapping part of the Foulness SPA for foraging common terns.

Size of SPA: The SPA covers an area of 392,451.66 ha.

Site description:

The Outer Thames Estuary SPA is located on the east coast of England between the counties of Norfolk (on the north side) and Kent (on the south side) and extends into the North Sea. The site comprises areas of shallow and deeper water, high tidal current streams and a range of mobile mud, sand, silt and gravely sediments extending into the marine environment, incorporating areas of sand banks often exposed at low tide. Intertidal mud and sand flats are found further towards the coast and within creeks and inlets inland down the Blyth estuary and the Crouch and Roach estuaries. The diversity of marine habitats and associated species is reflected in existing statutory protected area designations, some of which overlap or abut the SPA.

Qualifying species:

SPA site selection guidelines have been applied to the most up to date information for the site.

The site qualifies under **article 4.1** of the Directive (2009/147/EC) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season:

Species	Season	Count (Period)	% of population
Red-throated diver <i>Gavia stellata</i>	Non-breeding	6,466 individuals (1989 – 2006/07) ¹	38.0% of GB population
Little tern <i>Sternula albifrons</i>	Breeding	746 individuals (2011 – 2015)	19.64% of GB population
Common tern <i>Sterna hirundo</i>	Breeding	532 individuals (2011 – 2015)	2.66% of GB population

Assemblage qualification:

The site does not qualify under SPA selection stage 1.3.

Principal bird data sources:

Colony counts from JNCC Seabird Monitoring Programme, Norfolk Bird & Mammal Reports, Foulness Area Bird Survey Group and contributed by colony managers from RSPB.

Data on ringed common terns from national bird ringing scheme.

Red-throated diver data from aerial surveys 1989 - 2006/07: Natural England (2010): Departmental Brief: Outer Thames Estuary Special Protection Area. *Available at:* <http://publications.naturalengland.org.uk/publication/3233957>

Red-throated diver data from aerial surveys 1989 - 2006/07: O'Brien, S.H., Webb, A., Brewer, M. J. & Reid, J. B. (2012). Use of kernel density estimation and maximum curvature to set Marine Protected Area boundaries: Identifying a Special Protection Area for wintering red-throated divers in the UK. *Biological Conservation*, 156, 15–21.

¹ Value retained from original Outer Thames Estuary SPA standard data form (<http://publications.naturalengland.org.uk/publication/3233957>)

**EC Directive 79/409 on the Conservation of Wild Birds:
Special Protection Area**

MINSMERE-WALBERSWICK (SUFFOLK)

The Minsmere-Walberswick proposed SPA contains areas of grazing marsh, extensive reedbeds, the estuary of the River Blyth, and areas of lowland heath and woodland. The boundaries of the site follows those of the Minsmere-Walberswick Heath and Marshes.SSSI.

Minsmere-Walberswick qualifies under Article 4.1, by supporting, in summer, nationally important breeding populations of the following Annex 1 species: 5 booming male bitterns *Botaurus stellaris* (presumed to represent 5 breeding pairs; 22% of the British breeding population) ; 15 breeding female marsh harriers *Circus aeruginosus* (20% of British) ; 47 pairs of avocet *Recurvirostra avosetta* (12% of British) ; 32 pairs of little tern *Sterna albifrons* (1% of British): and 24 pairs of nightjar *Caprimulgus europaeus* (1% of British).

The site qualifies also under Article 4.1 by regularly supporting, in winter, a nationally important wintering population of hen harrier *Circus cyaneus* (15 individuals, 2% of the British wintering population).

Minsmere-Walberswick qualifies under article 4.2 by supporting, in summer, in recent years, nationally important breeding populations of three regularly occurring migratory species: 24 pairs of gadwall *Anas strepera* (4% of British); 73 pairs of teal *A. crecca* (1% of British): and 23 pairs of shoveler *A. clypeata* (2% of British) . Also notable is a nationally important breeding population of bearded tit *Panurus biarmicus* (50 pairs, 8% of British).

The site qualifies also under Article 4.2 by supporting nationally important wintering populations of three migratory waterfowl. (average peak counts for the five year period 1985/86 to 1989/90): 100 European white-fronted geese *Anser albifrons albifrons* (2% of the British wintering population); 90 gadwall *Anas strepera* (1% of British) , and 100 shoveler *Anas clypeata* (1% of British).

Minsmere-Walberswick is also of importance for an outstandingly diverse assemblage of breeding birds of marshland and reedbed habitats, including bittern, garganey *Anas querquedula*, marsh harrier, water rail *Rallus aquaticus*, Cetti's warbler *Cettia cetti* and Savi's warbler *Locustella lusciniodes*. Also notable is an assemblage of wintering waterfowl including, in addition to species listed above, Bewick's swan *Cygnus columbianus*, wigeon *Anas penelope*, teal *Anas crecca*, avocet; spotted redshank *Tringa erythropus*; and redshank *Tringa totanus*.

During severe winter weather Minsmere-Walberswick can assume even greater national and international importance as wildfowl and waders from many other areas arrive, attracted by relatively mild climate, compared with continental areas, and the abundant food resources available.

SPA Citation
HTR December 1991

This citation / map relates to a site entered in
the Register of European sites for Great Britain.
Registered on 11/01/1998
Date of registration 1998
Signed [redacted]
on behalf of the Secretary of State for the Environment

EC Directive 79/409 on the Conservation of Wild Birds

Citation for Special Protection Area (SPA)

Name: Sandlings

Unitary Authority/County: Suffolk

Consultation proposal: All or parts of Blaxhall Heath Site of Special Scientific Interest (SSSI), Leiston - Aldeburgh SSSI, Sandlings Forest SSSI, Snape Warren SSSI, Sutton & Hollesley Heaths SSSI and Tunstall Common SSSI have been recommended as a Special Protection Area because of their European ornithological importance. In particular, for their breeding populations of Nightjars *Caprimulgus europaeus* and Woodlarks *Lullula arborea*.

Site description: The Sandlings SPA lies near the Suffolk Coast between the Deben Estuary and Leiston. In the 19th century, the area was dominated by heathland developed on glacial sandy soils. During the 20th century, large areas of heath were planted with blocks of commercial conifer forest and others were converted to arable agriculture. Lack of traditional management has resulted in the remnant areas of heath being subject to successional changes, with the consequent spread of bracken, shrubs and trees, although recent conservation management work is resulting in their restoration. The heaths support both acid grassland and heather-dominated plant communities, with dependant invertebrate and bird communities of conservation value. Woodlark *Lullula arborea* and Nightjar *Caprimulgus europaeus* have also adapted to breeding in the large conifer forest blocks, using areas that have recently been felled and recent plantation, as well as areas managed as open ground.

Size of SPA: The SPA covers an area of 3,391.80 ha.

Qualifying species:

The site qualifies under **article 4.1** of the Directive (79/409/EEC) as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season:

Annex 1 species	Count and Season	Period	% of GB population
Nightjar <i>Caprimulgus europaeus</i>	109 males - breeding	Count as a 1992	3.2% GB
Woodlark <i>Lullula arborea</i>	154 pairs - breeding	Count as at 1997	10.3% GB

Bird figures from:

Morris, A., Burges, D., Fuller, R.J., Evans, A.D. & Smith, K.W. 1994. The status and distribution of nightjars *Caprimulgus europaeus* in Britain in 1992. A report to the British Trust for Ornithology. *Bird Study* **41**: 181-191.

Wotton, S.R. & Gillings, S. 2000. The status of breeding woodlarks in Britain in 1997. *Bird Study* **47**: 212-224.

Status of SPA

Sandlings was classified as a Special Protection Area on 10 August 2001.

European Site Conservation Objectives for Alde–Ore Estuary Special Protection Area Site Code: UK9009112



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

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

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

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

- A081 *Circus aeruginosus*; Eurasian marsh harrier (Breeding)
- A132 *Recurvirostra avosetta*; Pied avocet (Non-breeding)
- A132 *Recurvirostra avosetta*; Pied avocet (Breeding)
- A151 *Philomachus pugnax*; Ruff (Non-breeding)
- A162 *Tringa totanus*; Common redshank (Non-breeding)
- A183 *Larus fuscus*; Lesser black-backed gull (Breeding)
- A191 *Sterna sandvicensis*; Sandwich tern (Breeding)
- A195 *Sterna albifrons*; Little tern (Breeding)

This is a European Marine Site

This SPA is a part of the Alde Ore & Butley European Marine Site (EMS). These Conservation Objectives should be used in conjunction with the Conservation Advice document for the EMS. Natural England's formal Conservation Advice for European Marine Sites can be found via [GOV.UK](https://www.gov.uk).

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 (as amended) ('the Habitats Regulations'). They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment' including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives, and the accompanying Supplementary Advice (where this is available), will also provide a framework to inform the management of the European Site and the prevention of deterioration of habitats and significant disturbance of its qualifying features

These Conservation Objectives are set for each bird feature for a [Special Protection Area \(SPA\)](#).

Where these objectives are being met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving the aims of the Wild Birds Directive.

Publication date: 21 February 2019 (version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017.



European Site Conservation Objectives for Minsmere–Walberswick Special Protection Area Site Code: UK9009101

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

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

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

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

- A021 *Botaurus stellaris*; Great bittern (Breeding)
- A051 *Anas strepera*; Gadwall (Non-breeding)
- A051 *Anas strepera*; Gadwall (Breeding)
- A052 *Anas crecca*; Eurasian teal (Breeding)
- A056 *Anas clypeata*; Northern shoveler (Breeding)
- A056 *Anas clypeata*; Northern shoveler (Non-breeding)
- A081 *Circus aeruginosus*; Eurasian marsh harrier (Breeding)
- A082 *Circus cyaneus*; Hen harrier (Non-breeding)
- A132 *Recurvirostra avosetta*; Pied avocet (Breeding)
- A195 *Sterna albifrons*; Little tern (Breeding)
- A224 *Caprimulgus europaeus*; European nightjar (Breeding)
- A394 *Anser albifrons albifrons*; Greater white-fronted goose (Non-breeding)

This is a European Marine Site

This SPA is a part of the Minsmere–Walberswick European Marine Site (EMS). These Conservation Objectives should be used in conjunction with the Regulation 35 Conservation Advice document for the EMS. For further details about this please visit the Natural England website at <http://www.naturalengland.org.uk/ourwork/marine/protectandmanage/mpa/europeansites.aspx> or contact Natural England's enquiry service at enquiries@naturalengland.org.uk or by phone on 0845 600 3078.

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the "Habitats Regulations") and Article 6(3) of the Habitats Directive. They must be considered when a competent authority is required to make a 'Habitats Regulations Assessment' including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where this is available) will also provide a framework to inform the management of the European Site under the provisions of Articles 4(1) and 4(2) of the Wild Birds Directive, and the prevention of deterioration of habitats and significant disturbance of its qualifying features required under Article 6(2) of the Habitats Directive.

These Conservation Objectives are set for each bird feature for a [Special Protection Area \(SPA\)](#). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving the aims of the Wild Birds Directive.

Publication date: 30 June 2014 (Version 2). This document updates and replaces an earlier version dated 29 May 2012 to reflect Natural England's Strategic Standard on European Site Conservation Objectives 2014. Previous references to additional features identified in the 2001 UK SPA Review have also been removed.

**Outer Thames Estuary
Special Protection Area**

**Draft advice under Regulation 35(3) of The
Conservation of Habitats and Species
Regulations 2010 (as amended) and Regulation
18 of The Offshore Marine Conservation (Natural
Habitats, & c.) Regulations 2007 (as amended)**



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Cover photograph illustrates red-throated diver in winter.

Version 3.7 (March 2013)

Document version control

Version and date	Amendments made	Issued to and date
Thames SPA Cons Obs AOO 190509 .doc	Changes to tables 2.1 and 2.4; additions of Bas-corbriere ruling; changes to sensitivity assessment section; changes to physical loss and physical damage sections; changes to toxic contamination and biological disturbance sections	Internal draft for comment July 3 rd 2009
Thames SPA Cons Obs AOO 080709	RTD data collection footnote added; changes to physical damage and non-selective extraction sections; additional references	Internal draft for comment 8 th July 2009
Thames SPA Cons Obs AOO 130709	Changes to section 2.2; addition to table 2.2; changes to table 3.1; changes to selective and non-selective extraction; additions to appendix B	JNCC Comments incorporated on 13 th July
Thames SPA Cons Obs AOO170709	Changes to Cons Obj table: added habitats and species; added terms used section; changes to sensitivity assessment section; format of advice section changes; physical loss and damage changes; added non-toxic contamination; divided selective and non-selective extraction	Internal draft for comment 17 th July 2009
Thames SPA Cons Obs AOO 300709	Added species and habitats to section 2.2.1; example added to 3.4.1; physical damage and loss related to habitat; biological disturbance related to RTD; changes to toxic and non-toxic contamination section and selective and non-selective extraction sections.	JNCC returned 30 th July 2009
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Thames SPA Cons Obs AOO 050809	All changes and version for proof reading	Internal draft for comment August 5 th
Thames SPA Cons Obs AOO 090909	Final (draft) version 2009	Issued for consultation September 2009
Thames SPA Cons Obs CWversion forRAs	Draft version 2011 for QA from Evidence Team, stakeholders comments not included as comments within the text	Final draft version 2011
Thames SPA Cons Obs CWMARCH2011	Final revision post workshop, standardised approach which mirrors Liverpool Bay SPA COs, following discussions with R Caldow and JNCC	Final version March 2011
ThamesSPAConsObsVersion 3.1	Following discussions re FCT and thresholds with RC & JNCC	Final version August 2011
ThamesSPAConsObsVersion 3.2 FINAL	Final version for circulation to relevant authorities	Final version August 2011
TamesSPAConsObsVersion 3.3	Further amendments following JNCC discussions and internal advice. Removal of section 3.2.1 and re-ordering of pagination following this – M	Final Version April 2012

	Knollys	
ThamesSPAC onsObsVersio n 3.4 FINAL FOR RAs	Final amendments before submitting to technical review panel	August 2012
ThamesSPAC onsObsVersio n 3.5 FINAL FOR RAs	Final with panel comment amendments	Nov 2012
ThamesSPAC onsObsVersio n 3.6 FINAL FOR WEB	Final draft document incorporating all comments	Jan 2013
ThamesSPAC onsObsVersio n 3.7 FINAL FOR WEB	Final document for NE and JNCC website	March 2013

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Summary of draft Conservation Objectives and Advice on Operations for the Outer Thames Estuary Special Protection Area (SPA)

This advice is based on information on the Special Protection Area (SPA) presented in Natural England's and the Joint Nature Conservation Committee's (JNCC) 'Departmental Brief: Outer Thames Estuary SPA document (Version May 2010)¹. Natural England and JNCC's conservation objectives and advice on operations is site and feature specific, and has been developed using the best available scientific information and expert interpretation as at July 2012. The advice is generated through a coarse grading of sensitivity and exposure of the site's interest feature and its supporting habitat to physical, chemical and biological pressures associated with human activity. Sensitivity and exposure have been combined to provide a measure of the vulnerability of the interest feature to operations which may cause damage or deterioration, and therefore may require management.

The exact impact of any operation will be dependent upon the nature, scale, location and timing of events. This advice on operations for the Outer Thames Estuary SPA site will be kept under review and will be periodically updated to reflect changes in both sensitivity and exposure.

The conservation objective for the Outer Thames Estuary Special Protection Area is, subject to natural change², maintain³ or enhance the red-throated diver population (*Gavia stellata*) and its supporting habitats in favourable condition⁴

The interest feature red-throated diver will be considered to be in favourable condition only when both of the following two conditions are met:

(i) The size of the red-throated diver population is at, or shows only non-significant fluctuation around the mean population at the time of designation of the SPA to account for natural change;

(ii) The extent of the supporting habitat within the site is maintained. Management actions should enable the **Annex I feature *Gavia stellata* (wintering red-throated diver) and its supporting habitat in the Outer Thames Estuary to**

¹ http://www.naturalengland.org.uk/Images/Thames-brief_tcm6-21728.pdf

² Natural change" means changes in the species or habitat which are not a result of human influences. Human influence on the red-throated diver population is acceptable provided that it is proved to be/can be established to be compatible with the achievement of the conditions set out under the definition of favourable condition. A failure to meet these conditions, which is entirely a result of natural process will not constitute unfavourable condition, but may trigger a review of the definition of favourable condition.

³ Maintain" is used here because existing evidence suggests the feature to be in favourable condition, and the objective is for it to remain so. Existing activities are deemed to be compatible with the conservation objectives if current practices are continued at current levels and in the absence of evidence that current activities are significantly affecting the red-throated diver population or its habitat. However, it must be borne in mind that gradually damaging activities can take time to show their effects. If evidence later shows an activity to be undermining the achievement of the conservation objectives, then the red-throated diver population will be deemed to be in unfavourable condition.

⁴ Favourable Condition – Relates to the maintenance of the structure, function, and typical species for that feature within the site.

maintain or enhance its population and extent of supporting habitat for the foreseeable future. This will require assessment and management of human activities likely to affect these adversely, and of activities likely to impact the functioning of natural processes upon which the feature is dependent.

To fulfil the conservation objectives for the **Annex I feature *Gavia stellata* and its supporting habitat**, the relevant and competent authorities for this area are advised to manage human activities within their remit such that they do not result in deterioration or disturbance, or impede the restoration of this feature through any of the following:

- i) **Physical loss** of habitat by removal (e.g. capital dredging, harvesting, coastal and marine development)
- ii) **Physical damage** by physical disturbance or abrasion of habitat (e.g. extraction)
- iii) **Non-physical disturbance** through noise or visual disturbance (e.g. shipping, wind turbines)
- iv) **Toxic contamination** by introduction of synthetic and/or non-synthetic compounds (e.g. polychlorinated biphenyls (PCBs), pollution from oil and gas industry, shipping);
- v) **Non-toxic contamination** to prey species only by changes in e.g. turbidity (e.g. capital and maintenance dredging);
- vi) **Biological disturbance** by selective extraction of species (e.g. commercial fisheries) and non selective extraction (eg entanglement with netting and wind turbine strike)

The advice describes the above impacts and activities for both the habitat and prey species of the red-throated divers and on the red-throated divers themselves.

During 2011/12 Government instigated a review of the implementation of the Habitats and Wild Birds Directive. The review concluded that all conservation objectives (marine and terrestrial) should be up-to date, accessible and allow applicants to assess the impact of their proposed development against them. The report⁵ requested Natural England with JNCC to develop a new approach to improve the information contained in conservation objectives. Natural England and JNCC published their intended approach in June 2012. Natural England has committed to review and update its conservation objectives for all European Marine Sites to make them more definitive and explicit from 2013 onwards, on a prioritised basis. We will use this review to update the advice contained within this document, to take account of new evidence that subsequently becomes available, and improved scientific understanding.

⁵ <http://www.defra.gov.uk/publications/2012/03/22/pb13724-habitats-wild-birds-directives/>

Outer Thames Estuary Special Protection Area

Draft advice under Regulation 35(3) of The Conservation of Habitats and Species Regulations 2010 and Regulation 18 of The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended)

Contents	Page Number
1. Introduction	p.1
2. Roles and responsibilities	p.2
2.1 The role of Natural England and JNCC	
2.2 The role of relevant and competent authorities	
2.3 The role of conservation objectives	
2.4 The role of advice on operations	
2.5 Precautionary principle	
3. Conservation objectives	p.5
3.1 Background to conservation objectives	
3.2 Outer Thames Estuary SPA conservation objectives	
3.2.1 Red-throated diver – <i>Gavia stellata</i>	
3.2.2 Explanatory information for red-throated diver conservation objectives	
3.3 Background to favourable condition tables	
4. Advice on operations	p.11
4.1 Background	
4.2 Purpose of advice	
4.3 Methods for assessment	
4.3.1 Sensitivity assessment	
4.3.2 Exposure assessment	
4.3.3 Vulnerability assessment	
4.4 Format of advice	
4.5 Update and review of advice	
5. Specific advice on operations for the Outer Thames Estuary SPA	p.14
5.1 Detailed advice for the Outer Thames Estuary SPA features	
5.1.1 Physical loss	
5.1.2 Physical damage	
5.1.3 Non-physical disturbance	
5.1.4 Toxic contamination	
5.1.5 Non-toxic contamination	
5.1.6 Biological disturbance	
6. Risk Assessment	p.22
7. References	p.23

Appendix A Favourable Condition Table

Appendix B Map showing known location of interest features

Appendix C Methods deriving vulnerability

Appendix D Summary of operations which may cause deterioration or disturbance

Appendix E Assessment of the relative vulnerability of interest features

DRAFT

1. Introduction

The Outer Thames Estuary has been classified by the UK Government as a Special Protection Area (SPA) and the European Commission has been notified. The site now forms part of the Natura 2000⁶ network. The Outer Thames Estuary SPA lies across both English territorial waters and UK offshore waters.

The Outer Thames Estuary SPA is subject to full protection under the Habitats and Birds Directive⁷ (transposed through The Conservation of Habitats and Species Regulations 2010 (as amended)⁸ and The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007 (as amended)⁹ (referred to in this document respectively as the 'Habitats Regulations' and the 'Offshore Regulations'). Amongst other things, the Habitats Regulations and the Offshore Regulations place an obligation on relevant authorities and competent authorities respectively to put in place measures to protect the sites from damage or deterioration.

This advice is given in fulfilment of the duty of Natural England and JNCC under Regulations 35(3)¹⁰, and 18¹¹ of the respective Habitats Regulations (referred to in this document as "Regulation 35/18 advice"), to provide relevant and competent authorities as to (a) the conservation objectives for the Outer Thames Estuary SPA; and (b) any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which the Outer Thames Estuary SPA has been designated.

This advice constitutes one element of NE's/JNCC's advisory role in relation to this site. The current information must be used by relevant authorities¹² to explore and put in place management measures (if required), and by competent authorities¹³ to fulfil their duties under the Habitats Regulations in making the necessary determinations on the impact of activities on the site. Developers may also use this advice when operating within a site, and when providing information to relevant/competent authorities as part of an application for new plans and projects. However, should relevant or competent authorities or others require any further advice, they are not limited to taking account of the conservation advice contained here, and would be expected to make further enquiries as required in order to make determinations or implement management measures. Further information/reference should be made to the Departmental Brief for the Outer Thames Special Protection Area¹⁴.

An independent review of Natural England's marine SAC selection process carried out in 2011 made a number of recommendations as to how Defra and Natural England should modify their approach to future evidence based work¹⁵. This resulted

⁶ [as defined under Regulation 3 of The Conservation of Habitats and Species Regulations 2010](#)

⁷ [Council Directive 79/409/EEC on the conservation of wild birds](#)

⁸ <http://www.legislation.gov.uk/ukxi/2010/490/contents/made>

⁹ <http://www.legislation.gov.uk/ukxi/2010/491/contents/made>

¹⁰ <http://www.legislation.gov.uk/ukxi/2010/490/regulation/35/made>

¹¹ <http://www.legislation.gov.uk/ukxi/2007/1842/regulation/18/made>

¹² as defined under Regulation 7 of The Conservation of Habitats and Species Regulations 2010

¹³ <http://www.legislation.gov.uk/ukxi/2007/1842/regulation/23/made>

¹⁴ http://www.naturalengland.org.uk/Images/Thames-brief_tcm6-21728.pdf

¹⁵ <http://www.defra.gov.uk/publications/files/pb13598-graham-bryce-independent-review-marine-sacs-110713.pdf>

in Natural England adopting the Government Chief Scientific Adviser's (GCSA) guidelines on using evidence¹⁶ through the development of a suite of Evidence Standards¹⁷. Implementation of these standards has included Natural England working with JNCC to develop a protocol¹⁸, which has been subject to independent expert review, setting out the processes and requirements for the development of conservation advice packages, to ensure that these fully comply with the GCSA's guidelines. Whilst the conservation advice provided here was developed prior to the finalisation of the protocol, it has been assessed for compliance with the protocol and a detailed report can be found on the Natural England website¹⁹

During 2011/12 Government instigated a review of the implementation of the Habitats and Wild Birds Directive. The review concluded that all conservation objectives (marine and terrestrial) should be up-to date, accessible and allow applicants to assess the impact of their proposed development against them. The report²⁰ requested Natural England with JNCC to develop a new approach to improve the information contained in conservation objectives. Natural England and JNCC published their intended approach in June 2012, with Natural England committing to review and update its conservation objectives for all European Marine Sites to make them more definitive and explicit. We will be consulting with stakeholders on the approach, as well as how we can make our Regulation 35/18 advice more accessible and easier to use. The review of conservation advice will then begin in 2013 on a prioritised basis. We will use this review to update the advice contained within this document, to take account of new evidence that subsequently becomes available, and improved scientific understanding.

2. Roles and Responsibilities

2.1 The role of Natural England and JNCC

The Conservation of Habitats and Species Regulations 2010 (as amended) transpose the Habitats Directive into law on land and in territorial waters of Great Britain (out to 12 nautical miles from the baseline). The Regulations give Natural England a statutory responsibility to advise relevant and competent authorities on the conservation objectives and operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species for which the sites have been designated, for European marine sites in England.

The Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007 (as amended) transpose the Habitats Directive into law for UK offshore waters (from 12 nautical miles from the coast out to 200 nm or the UK Continental Shelf). These Regulations give JNCC a statutory responsibility to advise competent authorities of the conservation objectives for offshore Special Areas of Conservation and to advise them of operations which may adversely affect the integrity of the site.

¹⁶ <http://www.bis.gov.uk/assets/goscience/docs/g/10-669-gcsa-guidelines-scientific-engineering-advice-policy-making.pdf>

¹⁷ <http://www.naturalengland.org.uk/ourwork/research/default.aspx>

¹⁸ <http://www.naturalengland.org.uk/ourwork/marine/sacconsultation/default.aspx>

¹⁹ <http://publications.naturalengland.org.uk/publication/3233957?category=3212324>

This advice is also required under the Offshore Petroleum Activities 2001 (Conservation of Habitats) Regulations (as amended); and the Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended).

Natural England and JNCC will provide additional advice for each site to Relevant and competent authorities in order for them to fulfil their duties under the Habitats Regulations, for example when a Competent Authority wishes to assess the implications of any plans or projects on a candidate Special Area of Conservation (cSAC), Special Area of Conservation (SAC), or Special Protection Area (SPA).

2.2 The role of relevant and competent authorities

2.2.1 Inshore (0 – 12 nautical miles):

The Habitats Regulations require relevant and competent authorities to exercise their functions so as to secure compliance with the Habitats Directive. Under Regulation 36²¹ of the Habitats Regulations relevant authorities may use this advice to draw up a management scheme for the SPA relevant authorities must, within their areas of competence, have regard to both direct and indirect effects on interest features of the site. This may include consideration of issues outside the boundary of the site.

2.2.2 Offshore (12 – 200 nautical miles):

Regulations 22, 23, 25 and 27²² of the Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007 (as amended) outline the responsibilities of competent authorities to ensure compliance with the Habitats Directive. Regulation 22 requires competent authorities to consider appropriate conservation measures for Annex I habitats and Annex II species present within the SAC. Regulation 23 requires competent authorities to take appropriate steps to avoid the deterioration or disturbance of interest features for which the Offshore SAC is designated. Regulation 25 requires competent authorities to consider if a plan or project could be likely to have a significant effect on a European Offshore Marine Site and, if necessary, undertake an appropriate assessment for the plan or project. Regulation 27 requires competent authorities to review existing consents, permissions or authorisations and if necessary, affirm, modify or revoke them, undertaking an appropriate assessment where necessary. Competent authorities must, within their areas of competence, have regard to both direct and indirect effects on interest features of the site. This may include consideration of issues outside the boundary of the SAC.

2.2.3 Activity outside the control of relevant/competent authorities

Nothing within Regulation 35/18 advice will require relevant authorities to undertake any actions or ameliorate changes in the condition of interest features if it is shown that the changes result wholly from natural causes. Having issued Regulation 35/18 advice for this site, Natural England and JNCC will work with relevant and competent authorities and others to agree, within a defined time frame, a protocol for evaluating observed changes in the site's condition and to develop an understanding of natural change and provide further guidance as appropriate and possible. This does not, however, preclude relevant and competent authorities from taking any appropriate action to prevent deterioration to the interest features, and indeed such actions should be undertaken when required.

²¹ <http://www.legislation.gov.uk/ukxi/2010/490/regulation/36/made>

²² <http://www.legislation.gov.uk/ukxi/2007/1842/contents/made>

2.3 The role of conservation objectives

The conservation objectives set out what needs to be achieved for the site to make the appropriate contribution to the conservation status of the features for which the site is designated and thus deliver the aims of the Habitats and Birds Directives.

Conservation objectives are the starting point from which management schemes and monitoring programmes may be developed as they provide the basis for determining what is currently or may cause a significant effect, and they inform the scope of appropriate assessments.

In addition to providing such advice, this advice will inform the scope and nature of any 'appropriate assessment' which the Directive requires to be undertaken for plans and projects (Regulations 61 and 63 and by Natural England under Regulation 21 of the Habitats Regulations).

2.4 The role of advice on operations

The advice on operations set out in Section 4 of this document provides the basis for discussion about the nature and extent of the operations taking place within or sufficiently close to have an impact on the site and which may have an impact on its interest features. The advice should also be used to help identify the extent to which existing measures of control, management and forms of use are, or can be made, consistent with the conservation objectives, and thereby focus the attention of relevant authorities and surveillance to areas that may need management measures.

This advice on operations may need to be supplemented through further discussions with the relevant authorities and any advisory groups formed for the site.

2.5 Precautionary principle

All forms of environmental risk should be tested against the precautionary principle which means that where there are real risks to the site, lack of full scientific certainty should not be used as a reason for postponing measures that are likely to be cost effective in preventing such damage. It does not however imply that the suggested cause of such damage must be eradicated unless proved to be harmless and it cannot be used as a licence to invent hypothetical consequences. Moreover, it is important, when considering whether the information available is sufficient, to take account of the associated balance of likely costs, including environmental costs, and benefits (DETR & the Welsh Office, 1998).

3. Conservation objectives

3.1 Background to conservation objectives

The conservation objectives and definitions of favourable condition for features on the site may inform the scope and nature of any 'appropriate assessment' under the Habitats Regulations^{23,24}. An appropriate assessment will also require consideration of issues specific to the individual plan or project.

The scope and content of an appropriate assessment will depend upon the location, size and significance of the proposed project. Natural England and JNCC will advise on a case by case basis.

Following an appropriate assessment, competent authorities are required to ascertain the effect on the integrity of the site. The integrity of the site is defined in paragraph 20 of ODPM (Office of the Deputy Prime Minister) Circular 06/2005 (DEFRA Circular 01/2005)²⁵ as the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitats and/or the levels of populations of the species for which it was classified. The determination of favourable condition is separate from the judgement of effect upon integrity. For example, there may be a time-lag between a plan or project being initiated and a consequent adverse effect upon integrity becoming manifest in the condition assessment. In such cases, a plan or project may have an adverse effect upon integrity even though the site remains in favourable condition, at least in the short term.

The conservation objectives for this site are provided in accordance with paragraph 17 of ODPM Circular 06/2005 (DEFRA Circular 01/2005) which outlines the appropriate assessment process. The entry on the Register of European Sites gives the reasons for which a site was classified or designated.

The target for population size is set to take account of the way in which populations fluctuate naturally and the degree of uncertainty in estimating population size. This is done so that in future condition monitoring, a population size estimate that falls within the known natural fluctuations in population size, or has a degree of uncertainty around it that renders it indistinct from the estimate of population size at the time of classification (i.e. the baseline population), can be distinguished from one that does not. This distinction serves to identify those circumstances in which the evidence is consistent with an interpretation that any apparent decline in a population below that at classification is simply a reflection of margins of error in measurement and/or due to a natural fluctuation which is part of a normal and established pattern which can be attributed to natural phenomena such as food availability, weather conditions etc.. In such circumstances it would be inappropriate to trigger further investigation into the causes of the apparent decline or the implementation of remedial actions to reverse it. In contrast, where the decline is of a magnitude that takes it beyond these limits then it is quite possible that, being beyond "expected variation", there is a non-natural cause. Classification of the feature as being in unfavourable condition would then trigger investigation of the cause of the population decline and perhaps trigger

²³ The Conservation of Habitats and Species Regulations 2010: Regulation 61 and 63 by a competent authority and Regulation 21 by Natural England.

²⁴ Offshore Marine Conservation (Natural Habitats &c.) Regulations 2007 (as amended): Regulation 25 and 27 by a competent authority.

²⁵ <http://www.communities.gov.uk/documents/planningandbuilding/pdf/147570.pdf>

remedial management actions if the decline can be attributed to a particular cause (or causes) that can be managed so as to reduce their impact in the future.

This assessment is distinct from that carried out when considering the significance of a specific anthropogenic impact which can be shown to (or is predicted to) reduce a population from its baseline value to a new lower level.

3.2 Outer Thames Estuary SPA conservation objectives

The formal conservation objectives (as at July 2011) for Outer Thames Estuary SPA interest features are provided below. These are high-level objectives for the site features, and Natural England and JNCC may refine them in the future as our understanding of the features improves and further information becomes available, such as survey work.

They should be read in the context of other advice given, particularly:

- (i) the Departmental Brief²⁶ which provides more detailed information about the site and evaluates its interest features according to the Birds Directives selection criteria and guiding principles;
- (ii) the favourable condition table (Appendix A) providing information on how to recognise favourable condition for each of the features and which will act as a basis from which the monitoring programme will be developed; and
- (iii) the attached maps (Appendix B) which show the known locations of the interest features

3.2.1 Red-throated diver – *Gavia stellata*

Red-throated diver is listed in Annex I to the Birds Directive and is assessed against stage 1(1) of the SPA selection guidelines (Stroud *et al.* 2001)²⁷; using the relevant national population estimate the wintering population of red-throated divers in Great Britain is estimated to be 17,116 individuals (O'Brien *et al.* 2008), representing between 10-19% (depending on the areas included) of the NW Europe non-breeding population. The Great Britain population estimate is derived from shore-based observations together with more specific aerial surveys. Surveys from aeroplanes (and boats) have been responsible for identifying much larger numbers wintering in British coastal waters than previously known (O'Brien *et al.* 2008). Recent evolution of aerial survey methods, using both High Resolution still photography and High Definition video, has revealed that previous estimates of red-throated diver numbers are likely to be under-estimates (APEM 2010).

In the UK, wintering red-throated divers are associated with inshore waters, often occurring within sandy bays, firths and sea lochs, although open coastline is also frequently used (Skov *et al.*, 1995; Stone *et al.*, 1995). Knowledge of red-throated diver distribution in the UK was transformed during the 2000s following the advent of aerial and boat surveys for offshore development, particularly renewables development (e.g. Percival *et al.*, 2004; O'Brien *et al.* 2008). The bulk of the UK distribution is in east England, the area between Kent and North Yorkshire supporting 59% of the UK total estimate; 44% of the UK total is in the Greater Thames alone (O'Brien *et al.* 2008), with variable distribution between surveyed sites (APEM 2011).

²⁶ <http://publications.naturalengland.org.uk/file/3264082>

²⁷ <http://jncc.defra.gov.uk/page-1405>

Liverpool Bay is currently the only other marine area in the UK classified as a SPA for red-throated divers.

Red-throated divers use the Outer Thames Estuary SPA in wintering numbers of European importance (6,466 individuals, 38% of the GB population, 1989 – 2006/07).

Table 3.1 The conservation objectives for the Outer Thames Estuary SPA interest feature: internationally important population of the regularly occurring Birds Directive Annex I species: red-throated diver (*Gavia stellata*)

Subject to natural change²⁸, maintain²⁹ or enhance the red-throated diver population and its supporting habitats in favourable condition³⁰

Relevant habitats include shallow coastal waters and areas in the vicinity of sub-tidal sandbanks

The number of red-throated diver using these habitats is given in Table 3.2 below.

The interest feature red-throated diver will be considered to be in favourable condition only when both of the following two conditions are met:

- (i) The size of the red-throated diver population is at, or shows only non-significant fluctuation around the mean population at the time of designation of the SPA to account for natural change;
- (ii) The extent of the supporting habitat within the site is maintained.

The favourable condition table (Appendix A) further defines favourable condition for the interest features of the site.

²⁸ Natural change" means changes in the species or habitat which are not a result of human influences. Human influence on the red-throated diver population is acceptable provided that it is proved to be/can be established to be compatible with the achievement of the conditions set out under the definition of favourable condition. A failure to meet these conditions, which is entirely a result of natural process will not constitute unfavourable condition, but may trigger a review of the definition of favourable condition.

²⁹ Maintain" is used here because existing evidence suggests the feature to be in favourable condition, and the objective is for it to remain so. Existing activities are deemed to be compatible with the conservation objectives if current practices are continued at current levels and in the absence of evidence that current activities are significantly affecting the red-throated diver population or its habitat. However, it must be borne in mind that gradually damaging activities can take time to show their effects. If evidence later shows an activity to be undermining the achievement of the conservation objectives, then the red-throated diver population will be deemed to be in unfavourable condition.

³⁰ Favourable Condition – Relates to the maintenance of the structure, function, and typical species for that feature within the site.

Table 3.2 Information on the population of red-throated diver that qualifies the Outer Thames Estuary as an SPA under the Birds Directive.

Internationally important populations of regularly occurring Birds Directive Annex 1 species	
Species	Wintering population
Red-throated diver <i>Gavia stellata</i>	6,466 individuals ³¹

3.2.2 Explanatory information for the red-throated diver conservation objectives

Key supporting habitats and distribution

In the UK, wintering red-throated divers are associated with shallow inshore waters (between 0-20m deep and less frequently in depths of around 30m), often occurring within sandy bays, firths and sea lochs, although open coastline is also frequently used (Skov *et al.*, 1995; Stone *et al.*, 1995). There is some evidence of association with areas of salinity change (e.g. where low salinity river water meets higher salinity sea water: Skov & Prins 2001; Skov *et al.* 2011). Such areas tend to fluctuate with state of tide, volume of river flow and wind conditions.

Other physical and hydrographic factors determining the distribution of red-throated divers have been established for part of the Outer Thames Estuary SPA (Skov *et al.* 2011). This modelling work identified different areas of high habitat quality at different tidal flow phases with variables including current velocity, water levels, eddies, upwellings and shipping found to be important at different tidal stages. As an active fish-feeder (Guse *et al.* 2009 and references therein), the distribution and concentrations of red-throated divers will at least partly be determined by the presence, abundance, and availability of their prey species, which is likely to be linked to at least some of the environmental parameters tested by Skov *et al.* (2011).

Key food

The red-throated diver is considered to be an opportunistic feeder and dietary studies have revealed several different fish species are consumed depending upon the area studied, including members of the cod family, herring, gobies and sand eels (Guse *et al.* 2009 and references therein). The sandbanks of the Outer Thames Estuary

³¹ The wintering population estimate was generated from aerial survey data, collected mainly by WWT (Wildfowl and Wetlands Trust) Consulting, commissioned by a number of organisations including UK Government and a consortium of wind energy companies. Other data were collected by the JNCC Marine SPA Team, and by the Natural Environmental Research Institute, Denmark. Data were collected between the months of October to March in 1988/89, and 2002-2007. **JNCC has absolute confidence in the integrity of the data provided.** Population estimates within the boundary are calculated using spatial analysis to estimate RTD density in 1km grid squares. This is the revised figure following the re-drawing (shrinking) of the boundary as a result of the public consultation.

support the nursery and feeding grounds for many fish species, including the small fish that red-throated divers feed on.

Behaviour and Impacts

In a review of the sensitivity of 26 species of 'seabird' to the development of offshore windfarms, Garthe & Huppopp (2004) found that red-throated divers had the second highest species sensitivity index score. Furness & Wade (2012) similarly ranked the species of primary concern with regard to disturbance /displacement from offshore wind farms. There is evidence that red-throated divers are displaced from the footprint of offshore windfarms and surrounding sea areas up to 2km distant from the outermost turbines due most likely to the presence of the turbines and the activities of maintenance vessels. Petersen *et al.* (2006) showed a marked post construction avoidance of the Horns Rev offshore windfarm, including also the 2km and 4km zones around it. A similar, though less pronounced avoidance response to the Nysted offshore windfarm by red-throated divers was also recorded (Petersen *et al.* 2006), and emerging data from Kentish Flats offshore wind farm suggest a decreasing displacement effect with distance from the turbine footprints (Percival 2010). Inappropriately sited developments could displace significant numbers of the GB wintering population. Other forms of renewable energy, such as tidal barrages, could also impact on the species' wintering numbers and distribution for disturbance and habitat loss reasons.

Red-throated divers are especially sensitive to disturbance at sea (Garthe & Huppopp 2004; Furness & Wade 2012) and usually avoid boats (Schwemmer *et al.* 2011).

Red-throated divers are highly sensitive to the effects of disturbance associated both directly with marine aggregate extraction, and also the resultant increases in shipping activity. As Red-throated divers are highly exposed to marine aggregate extraction areas, they have been assessed as being highly vulnerable to changes to turbidity, sedimentation and impacts to the benthos or associated fish communities (Cook & Burton 2010).

Red-throated divers moult their flight feathers during September and October when they may become flightless for a short period and are vulnerable to oil pollution at this time (Camphuysen, C.J. 1989, Williams *et al.* 1994).

Red-throated diver populations are vulnerable to increased adult mortality as it is a long-lived species with low breeding productivity. Studies have shown entanglement in various types of static fishing gear, netting and marine litter as one of the most frequently identified causes of death in NW European and GB waters (Okill 2002, Erdmann *et al.* 2005, Weston & Caldow 2010). However early indications from a 2011/12 study by Natural England and the Kent and Essex IFCA in the Outer Thames Estuary SPA suggest that occurrence of red-throated diver entanglement in fishing gear is low. Further data is being collected over the 2012/13 winter. At a broader geographic scale, bycatch of red-throated divers in the Baltic Sea and North Sea is estimated to be of the order of 'hundreds' from a population of >100,000 (Zydalis *et al.* 2009).

Herring are key prey species for the red-throated diver (Guse *et al.* 2009). The species may thus also be sensitive to aspects of dredging activity that negatively impact on herring populations, such as increases in sediment deposition (Cook & Burton 2010).

Commercial extraction of the red-throated diver's main fish prey species, as target and/or bycatch species, could impact the birds, but again the extent of this in the Outer Thames Estuary SPA is not well understood.

3.3 Background to favourable condition table

The favourable condition table is the principle source of information that Natural England and JNCC will use to monitor and assess the condition of an interest feature and as such comprises indicators of condition. The favourable condition table can be found at Appendix A.

On many terrestrial European sites, we know sufficient information about the required condition of qualifying habitats to be able to define favourable condition with confidence. In contrast, understanding the functioning of large, varied, dynamic marine and estuarine sites, which experience a variety of pressures resulting from historic and current activities, is much more difficult, consequently it is much harder to define favourable condition so precisely in such sites. In general the conservation objectives provided are based on a *working* assumption that the *current* condition of the features is favourable for most attributes.

Where there are more than one year's observations on the condition of marine features, all available information will need to be analysed to determine, where possible, any natural environmental trends at the site. This will provide the basis for judgements of favourable condition to be determined in the context of natural change. Where it becomes clear that certain attributes may indicate a cause for concern, and if further investigation indicates this is justified, restorative management actions will need to be taken. The aim of such action would be to return the interest feature to favourable condition from any unfavourable state. Future editions of the advice within this document will revise the current assumptions about feature condition in light of ongoing and future monitoring. This will be linked with any developments in our understanding of the structure and functioning of features and the pressures they are exposed to.

This advice also provides the basis for discussions with relevant authorities, and as such the attributes and associated measures and targets may be modified over time. The aim is to have a single agreed set of attributes that will be used as a basis for monitoring in order to report on the condition of features. Condition monitoring of the attributes may be of fairly coarse methodology, underpinned by more rigorous methods on specific areas within the site. Common Standards Monitoring (JNCC 2004) requires mandatory monitoring of some attributes of a designated feature, while other attributes are considered discretionary (or site-specific) and are incorporated to highlight local distinctiveness. Monitoring of both bird populations and the extent of habitats are fundamental to assessing the condition of bird features (JNCC 2004), and are therefore identified as "**mandatory attributes**" in the Favourable Condition Tables (Appendix A). It is not possible to make a robust assessment of the condition of a feature without assessing the mandatory attributes. **For bird features the general rule is that all mandatory attributes must meet their targets for the feature to be in favourable condition.** Priority will be given to measuring attributes that are at risk from anthropogenic pressure and for which changes in management may be necessary. This information may be generated by Natural England/JNCC or collected by other organisations through agreements.

The condition monitoring programme will be developed through discussion with the relevant / competent authorities and other interested parties, ideally as part of the management scheme process. Natural England and JNCC will be responsible for collating the information required to assess condition, and will form a judgement on the condition of each feature within the site.

Targeted monitoring of the attributes identified in the favourable condition table will be an important, but not the only, basis for assessing the condition of the features. Additional sources of information may also be selected to inform our view about the integrity and condition of the site. For example, a part of risk based monitoring activity data (as collected by the relevant/competent authorities and their statutory advisers) could give an indication as to the levels of pressure that may impact on the site features. Any other relevant data, such as data on site integrity, results from compliance monitoring, (for example assessing the conduct of activities in relation to regulations and licence conditions), together with data obtained to inform appropriate assessments, licence applications etc. will also have an important role in informing assessments of feature condition.

Information about the size of the red-throated diver population on the site will also need to be interpreted in the context of any wider changes in the population of this species at a national or biogeographic region level.

4. Advice on operations

4.1 Background

Natural England and JNCC have a duty under Regulation 35(3)(b) of the Habitats Regulations and 18 of the Offshore Marine Conservation Regulations to advise other relevant authorities as to any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which the site has been designated.

The process of deriving and scoring relative vulnerability is provided at Appendix C. A summary of the operations which may cause deterioration or disturbance is given at Appendix D, and detailed in Appendix E. Further explanation of the sensitivity of the interest features follows with examples of their exposure and therefore their vulnerability to damage or disturbance from the listed categories of operations. This enables links to be made between the categories of operation and the ecological requirements of the features.

4.2 Purpose of advice

The aim of this advice is to enable all relevant authorities to direct and prioritise their work on the management of activities that pose the greatest potential threat to the favourable condition of interest features at Outer Thames Estuary SPA. The advice is linked to the conservation objectives for interest features and will help provide the basis for detailed discussions between relevant authorities enabling them to formulate and agree a management scheme for the site should one be deemed necessary.

The advice given here will inform, but is given without prejudice to, any advice provided under Regulation 61 or Regulation 63 on operations that qualify as plans or projects within the meaning of Article 6 of the Habitats Directive.

4.3 Methods for assessment

To develop this advice on operations Natural England has used a three step process involving:

- an assessment of the **sensitivity** of the interest features or their component sub-features to operations;
- an assessment of the **exposure** of each interest feature or their component sub-features to operations; and
- a final assessment of **current vulnerability** of interest features or their component sub-features to operations.

This three step process builds up a level of information necessary to manage activities in and around the site in an effective manner. Through a consistent approach, this process enables Natural England to both explain the reasoning behind our advice and identify to competent and relevant authorities those operations which pose the most current threats to the favourable condition of the interest features on the site.

All the scores of relative sensitivity, exposure and vulnerability are derived using best available scientific information and informed scientific interpretation and judgement. The process uses sufficiently coarse categorisation to minimise uncertainty in information, reflecting the current state of our knowledge and understanding of the marine environment.

Six broad Pressure 'Categories of Operation' which may cause i) deterioration of natural habitats or the habitats of species, or ii) disturbance of species, (either alone or in-combination), are considered in this document:

- Physical Loss
- Physical Damage
- Non-physical disturbance
- Toxic contamination
- Non-toxic contamination
- Biological disturbance

Example sources of pressures are provided (Appendix D), although these examples are not inclusive of all potentially detrimental activities.

4.3.1. Sensitivity assessment

The sensitivity assessment used is an assessment of the relative sensitivity of the interest features and their supporting habitat in the Outer Thames Estuary SPA to the effects of six broad categories of human activities.

In relation to this assessment, sensitivity has been defined as the "intolerance of a habitat, community or individual (or individual colony) of a species to damage, or death, from an external factor and the time taken for its subsequent recovery" (Hiscock 1996, MarLIN, 2003). For example, a very sensitive species or habitat is

one that is very adversely affected by an external factor arising from human activities or natural events (killed/destroyed, 'high' intolerance) and is expected to recover only over a very long period of time, i.e. >10 or up to 25 years ('low' recoverability). In the case of the SPA, this assessment considers the sensitivity of the red-throated diver population as well as the species and habitats on which that population depends. This includes its prey species and supporting habitats e.g. the condition of the sandbanks is important because they support the food chain on which the divers depend.

The sensitivity assessments are based on current information but may develop with improvements in scientific knowledge and understanding. The sensitivity of interest features or sub-features (and scientific understanding of sensitivity) may change over time; hence an operation that is not currently considered to have a negative effect may be identified as having one in the future. For example the dependence on a particular prey species may change if that species' abundance declines and the birds switch prey species. The subsequent shift may mean dependence on another prey species not previously assessed.

4.3.2. Exposure assessment

This has been undertaken for the Outer Thames Estuary SPA by assessing the relative exposure of the interest features and their supporting habitat on the site to the effects of broad categories of human activities currently occurring on the site (as at July 2012). These assessments were made on the best available information and advice but should be reviewed in light of additional information on activities in the area.

4.3.3. Vulnerability assessment

The third step in the process is to determine the vulnerability of interest features or their component sub-features to operations. This is an integration of sensitivity and exposure. Only if a feature is both sensitive *and* exposed to a human activity is it considered vulnerable (see Appendix C). In this context, therefore, 'vulnerability' has been defined as the exposure of the habitat, community or individual (or individual colony) of a species to an external factor to which it is sensitive (Hiscock, 1996). An assessment of the interest feature's vulnerability (Appendix E) helps to guide site management decisions by highlighting potentially detrimental activities that may need to be managed (or continue to be managed) by the competent authorities.

The vulnerability of the SPA Annex I feature to climate change is not considered in the annexes below, given the uncertainties surrounding the effects of global change on the oceans.

4.4 Format of advice

The advice is provided within six broad categories of operations that may cause deterioration of natural habitats or the habitats of species, or disturbance of species. This approach therefore:

- enables links to be made between human activities and the ecological requirements of the habitats or species, as required under Article 6 of the Habitats Directive;³²

³² For full a background summary to the Natura 2000 see <http://necmsstage/ourwork/marine/sacconsultation/default.aspx> and

- provides a consistent framework to enable relevant authorities to assess the effects of activities and identify priorities for management within their areas of responsibility; and
- is appropriately robust to take into account the development of novel activities or operations which may cause deterioration or disturbance to the interest features of the site and should have sufficient stability to need only infrequent review and updating by Natural England and JNCC.

These broad categories provide a clear framework against which relevant and competent authorities can assess activities under their responsibility.

4.5 Update and review of advice

Information as to the operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, for which the site has been designated, is provided in light of what Natural England knows about current and recent activities and patterns of usage at Outer Thames Estuary SPA. Natural England and JNCC expects that the information on activities and patterns of usage will be refined as part of the process of developing the management scheme and through discussion with the relevant and competent authorities. As part of this process the option of identifying a number of spatial zones with different activity levels may be appropriate. It is important that future consideration of this advice by relevant authorities and others takes account of changes in the usage patterns that have occurred at the site, over the intervening period, since the information was gathered. In contrast, the information provided in this advice on the sensitivity of interest features or sub-features is relatively stable and will only change as a result of an improvement in our scientific knowledge, which will be a relatively long term process. Advice for sites will be kept under review and will be periodically updated through discussions with relevant and competent authorities and others to reflect significant changes in our understanding of sensitivity together with the potential effects of plans and projects on the marine environment.

5. Specific advice on operations for the Outer Thames Estuary SPA

The following sections provide information to help relate general advice regarding the sensitivity and exposure of the specific interest feature (the overwintering population of red-throated diver, *Gavia stellata*) and its supporting habitat to operations and activities within and adjacent to the Outer Thames Estuary SPA.

This advice relates to the vulnerability of the interest features and sub-features of the Outer Thames SPA to current levels of human usage, as summarised in Appendix D and detailed in Appendix E.

Further explanation of the sensitivity of the interest feature and supporting habitats follows, with examples of its exposure and therefore its vulnerability to damage or disturbance from the listed categories of pressures. This enables links to be made between the categories of operation and the ecological requirements of the features.

the Departmental brief: http://www.naturalengland.org.uk/Images/Thames-brief_tcm6-11044.pdf

Information regarding the current commercial activities in and around the SPA can be found in the Departmental Brief³³ for the Outer Thames Estuary SPA.

5.1. Detailed advice for the Outer Thames Estuary SPA features

5.1.1. Physical loss of supporting habitat

In the UK, wintering red-throated divers are associated with shallow (between 0-20m deep (less frequently in depths of around 30m)) inshore waters, often occurring within sandy bays, firths and sea lochs, although open coastline is also frequently used (Skov *et al.*, 1995; Stone *et al.*, 1995). Red-throated divers are known to be associated with sandbank features, although the exact use of different habitats within the Outer Thames Estuary is complex, and related to both physical and hydrographic variables (Skov *et al.* 2011).

The link between the birds and benthic habitats is not well understood but it probably reflects the association between some of their prey species (small fish such as gadoids, sprat, herring and sandeel between approximately 10 and 25 cm in length; Guse *et al* 2009., and references therein) and sandbanks (Kaiser *et al.* 2004). Sandbanks may have a functional role (as nursery, spawning, or feeding grounds or in providing shelter) in supporting these fish species. Eddies and upwellings, perhaps reflecting biologically productive components of the marine environment and thus attractive to fish, have been shown to be important on certain tidal phases for explaining red-throated diver distribution in the Outer Thames Estuary (Skov *et al.* 2011).

Physical loss by removal or by smothering of any of the habitats on which red-throated divers depend may result in the loss of foraging sites and therefore the reduction of the food resource for the overwintering population. This would consequently be detrimental to the favourable condition of the interest feature. **Thus the overwintering population is considered to be highly sensitive to physical removal of habitat and moderately sensitive to smothering.** The sensitivity for smothering is considered moderate rather than high because habitats can recover after time with smothering whereas physical removal is likely to destroy the habitat.

Offshore development construction, marine aggregates extraction, capital and maintenance dredging of shipping channels all undertake physical removal of sand from within the SPA boundary. The northernmost extent of the SPA boundary (Norfolk) crosses the 12nm zone and contains some aggregates licences (from 2008) and prospecting areas. The environmental statement for the London Array Windfarm located in the southern area of the SPA (partially overlapping Margate & Long Sands SAC) considered that the resulting habitat loss from the development is very small, and is not considered significant in the context of habitat availability for divers within the SPA and the Thames Estuary as a whole (RPS Group PLC 2005).

The Round 3 development programme for offshore wind farms includes an area overlapping with the northern extent of the SPA. The Crown Estate has awarded a lease to develop the Norfolk Zone (Zone 5) to a consortium known as East Anglia Offshore Wind. This consortium will be required to undertake a zonal assessment of their combined proposals followed by an environmental impact assessment and make an application through the Planning Inspectorate for each windfarm proposal.

³³ http://www.naturalengland.org.uk/Images/Thames-brief_tcm6-11044.pdf

An approximate calculation of turbine base diameter relative to the entire extent of the SPA, indicates that direct physical loss of habitat due to the footprint of windfarm turbines (taking into account Kentish Flats, Gunfleet Sands, Scroby Sands, London Array and the Round 3 zone off Suffolk) would be substantially less than 0.01% of the total SPA area. Whilst this figure does not take into account habitat loss due to scour protection around the turbines or over inter-array and grid connection cables, in the context of the SPA area the total figure for direct habitat loss due to turbine footprints and scour protection is still likely to fall below 1% of the total SPA area (the total area of the Outer Thames Estuary SPA is 379,268.14 ha). Direct loss due to the turbine footprint must be considered alongside 'effective' or indirect loss of habitat (which could be temporary), due to divers avoiding the windfarm area. This is addressed under non physical disturbance in section 5.1.3.

Furthermore, although net habitat loss may be small, it is important to recognise that some habitat areas will be of more importance to red-throated divers than others. Within the Outer Thames Estuary area, Kentish Flats and London Array offshore wind farms are situated in habitat typically described as being of 'high' or 'very high' quality (Skov *et al.* 2011). Displacement from such habitat may lead to density-dependent effects (e.g. increased feeding competition) elsewhere within the SPA.

Black Deep and Fisherman's Gat have never been dredged; the Princes Channel was dredged in 2008 for the first time in 40 years and there will be an ongoing maintenance dredging requirement. Maintenance and / or capital dredging is likely to increase if shipping activity and ship sizes increases. Capital dredging within the site is planned for Shellhaven, a new container port that is being developed on the site of a former oil refinery. In addition planned capital dredging of the Medway Approach Channel will fall partly within the site.

Based on the overall extent of supporting sandbank habitat and the distribution and extent of activities the overall exposure to physical loss due to removal can be considered to be low. This is because although the impacts described above may be relatively geographically dispersed, when considered cumulatively they represent only a small area of the SPA habitat. However, the quality of supporting habitat, as determined by modelling of environmental predictor variables against known diver distributions, is a key consideration in the ultimate effect of such habitat removal (Skov *et al.* 2011). The existing and prospective aggregate extraction areas within the site as well as ongoing maintenance dredging requirements of shipping lanes and potential future capital dredging means that **exposure to physical loss due to smothering can be considered to be moderate.**

Overall the **vulnerability of the Annex I species** within the Outer Thames Estuary SPA and associated habitats to **physical loss** due to both physical removal and smothering is considered to be **low to moderate.**

5.1.2. Physical damage to their supporting habitat

Benthic sandbank communities are in general relatively resilient to physical damage. However, repeated damage to the habitats (through changes in suspended sediment or physical disturbance caused by selective extraction, anchoring or bottom-towed fishing gear) could adversely affect the ability of the habitats to recover, leading to permanent damage and ultimately to loss of prey species. This may result in a reduction in the value of sandbank habitats as foraging sites for the overwintering population of red-throated diver. Therefore, **the overall sensitivity of the red-throated divers to damage to their supporting habitat is considered to be moderate.**

Few ships anchor in the Outer Thames. Marine aggregate extraction activities are mostly in the northern extent of the SPA with some new licence areas in the northerly part of the southern section. Activities are not expected to significantly reduce habitat availability for divers as the areas worked are typically limited spatially and temporally. Commercial fishing activity within the SPA includes: suction dredging for cockles, set and drift-net trammelling, otter trawling, drift gill netting, potting, long-lining and a limited amount of beam trawling for demersal species. While the capacity for the majority of these gear types to cause physical damage to the seabed habitat is low, the interaction between suction dredging, beam trawling and to a lesser extent demersal otter trawling gear components and the seafloor can result in physical disturbance and potentially damage, depending on the intensity of the activity and sediment composition of the habitat (JNCC and Natural England 2011). Significant long-term changes in bathymetry caused by bottom-towed fishing gear that could render habitat unavailable for foraging divers are not anticipated. **The site is therefore considered to have low exposure to physical damage.**

Overall the **vulnerability of the Annex I species** within the Outer Thames Estuary SPA and associated habitats to physical damage is considered to be **low** for siltation, abrasion and selective extraction.

5.1.3. Non physical disturbance of red-throated diver

Red-throated divers are highly sensitive to non-physical disturbance by noise and visual presence during the winter (Garthe & Huppop 2004). They can be disturbed by wind turbine rotors, boat movements, and general activity. Disturbance can cause birds to reduce or cease feeding in a given area or to fly away from an area (i.e. be displaced). Either response could decrease their energy intake rate at their present (disturbed) feeding site or alternative feeding site, which may be less favoured. The latter response would also increase energy expenditure during flight and perhaps during subsequent foraging in less favourable habitat (or favourable habitat with greater intra-specific competition). Both disturbance and displacement can in principle affect the energy budgets and possibly survival of birds. Stillman *et al.* (2007) note that the impacts of disturbance during the non-breeding season on migratory wildfowl should be measured in terms of its effects on two factors: i) the storage of fat reserves needed to fuel migration in spring and to breed successfully after the birds have reached the breeding grounds; and ii) the number of birds that die during the non-breeding season. Impacts on both factors are likely to be a particular problem for diving birds which engage in an energetically expensive mode of foraging (de Leeuw 1997). **Sensitivity can be considered high.**

Disturbance and displacement of prey species arising from construction noise from wind farms could cause disruption to their lifecycles, as herring and sprat are thought to be a prey resource and are sensitive to noise. Benthopelagic fish species have some sensitivity to both construction and operational noise from windfarms. However, the level of certainty regarding the zone of impact and precise response is limited, with estimates of physiological responses, injury and death reported at varying distances from construction/operation. These appear to be more significant as a result of construction noise than operation, within 150m of the source, although impacts may occur up to 1000m away.³⁴

³⁴ <http://www.offshorewindfarms.co.uk/Assets/BIOLAReport06072006FINAL.pdf>

Locally, significant disturbance and displacement effects are predicted to arise from noise and visual impacts from wind farm construction, maintenance traffic and visually or aurally from the turbines themselves. The calculation for the areas of the consented windfarm footprints relative to the area of the SPA shows that 3.5% of the SPA area could be made unavailable through displacement.³⁵ If the entire consented London Array development is included this increases to 282.5 km² or 7.2% of the SPA area which could potentially be unavailable to red-throated diver. The development of London Array beyond phase 1 is subject to the satisfactory outcome of an ornithological review process demonstrating that there would be no adverse effect on the red-throated diver population from the second phase of the development. Red-throated divers may habituate to wind turbines and therefore any habitat loss due to displacement may diminish over time. However, as yet, survey work has provided little or no evidence of habituation by divers (Petersen & Fox 2007; Percival 2010).

Disturbance and displacement effects may also arise from shipping (including recreational boating) and boat movements associated with marine aggregate and fishing activities (Cook & Burton 2010). Marine aggregate activities tend to be temporary and localised. Dredging and shipping activities are expected to be confined to existing shipping channels, which are already known to be avoided by divers. In the majority of cases it is expected that activity will be lowest during the winter months (when the birds are present) due to the limitations imposed by poor weather conditions (RPS Group PLC 2005). Prince's Channel (which runs through the southern area of the Outer Thames Estuary SPA) carries a significant amount of vessel traffic in and out of ports in the inner Thames Estuary. Fisherman's Gat is also an active commercial shipping channel. In addition, smaller vessels use the shallower inshore channels across the site.

Overall current exposure is considered to be medium.

Overall the **vulnerability of the Annex I species** within the Outer Thames Estuary SPA to **non-physical disturbance** is considered to be **high**.

5.1.4. Toxic contamination of red-throated diver and their supporting habitats

Synthetic compounds such as PCBs can bioaccumulate/ biomagnify through the food chain in the tissues of marine organisms and concentrations could be considerable once they reach the fish on which red-throated divers feed. Thus, **sensitivity to synthetic chemicals such as PCBs is considered moderate**.

Hotspots for synthetic compounds include industrial estuaries and sandy environments offshore, but **as PCBs are currently banned, exposure can be considered low**. If marine pollution were to occur there is the potential for exposure to PCBs to change.

Large oil and chemical spills affecting shallow sandbank habitats can have a detrimental effect on bird populations. Deterioration of invertebrate and small fish populations can have a significant impact on important food sources. Oil on the surface and in the water column would present a direct threat to diving and feeding seabirds particularly during their moulting times, when they are less mobile and

³⁵ Scroby Sands, Kentish Flats, Gunfleet Sands 1 & 2 plus London Array Phase 1 occupy a total area of 137.5 km² equivalent to 3.5% of SPA area

remain at sea. Oil on the feathers of birds could lead to loss of insulation, reduced buoyancy and possible drowning. Consequently red-throated divers may suffer the inability to feed, resulting in starvation and death. Dispersants used to disperse the oil may also be harmful to the species. **Sensitivity to non-synthetic compounds is therefore considered to be high.**

Prince's Channel (which runs through the southern area of the Outer Thames Estuary SPA) carries a significant amount of vessel traffic in and out of ports in the inner Thames Estuary. Fisherman's Gat is also an active commercial shipping channel. In addition, smaller vessels use the shallower inshore channels across the site. This additional small vessel activity means that the risk of contamination by accidental spillages of fuel or cargo is increased, and a small level of contamination will exist as a result of normal shipping activities. Large ports in the area also increase the risk of exposure.

Although the *risk* of a catastrophic event due to vessel traffic (oil tankers, ships with toxic contaminants, etc.) exists, the probability of such an event occurring as a result of "normal" vessel traffic is considered to be very low; in addition the 'background level' of toxic contamination to which the site is exposed in also considered to be low.

However, there are ship-to-ship oil transfers occurring just off Southwold within 12nm. Ship-to-ship (s-t-s) transfers consist of a transfer of a cargo of oil (heavy fuel oil or crude oil, etc.) from one vessel to another. Large tankers are unable to gain access to the Russian/Baltic states and hence smaller tankers bring oil from the region and transfer this oil to larger tankers. From here the large tankers ship the oil internationally. Approximately 15-20 of these s-t-s operations occur annually. Although the Maritime and Coastguard Agency manage the s-t-s operations very well, accidental oil spills can happen at any time and due to the proximity of the s-t-s operations to the SPA it may be considered that there is an elevated risk from an oil spill at this location.

Overall the **vulnerability of the Annex I species (red-throated diver)** within the Outer Thames Estuary SPA to **toxic contamination** is considered to be **low-moderate**.

5.1.5. Non-toxic contamination of red-throated divers and their supporting habitats

Non-toxic contamination through nutrient loading, organic loading and changes to the thermal regime could impact on prey species and distribution. **The sensitivity** of the prey species of red-throated diver, and therefore of the divers themselves, **to non-toxic contamination is considered moderate.**

The dilution effect for this form of contamination (which could also include increased turbidity and changes to the salinity) may reduce the **exposure, which is considered low.**

Overall the **vulnerability** of the prey species and **of the Annex I species (red-throated diver)** within the Outer Thames SPA to non-toxic contamination is considered to be **low**.

5.1.6. Biological disturbance

Introduction of microbial pathogens and non-native species

Sensitivity to the introduction of microbial pathogens and non-native species is considered to be low for red-throated divers, as is their exposure to them in the Outer Thames Estuary SPA. **Vulnerability is therefore low.**

Selective extraction of prey species

Within the site, a variety of fishing gears are used with variable intensity to harvest different quota and non-quota species (CEFAS 2006; des Clers 2010; MMO 2012). Fishing activities include: suction dredging for cockles, set and drift-net trawling, drift gill netting, potting, and a limited amount of beam and otter trawling for demersal species (mainly in troughs). Limited long-lining and pair-trawling also occurs within the site. Removal of fish species and larger molluscs can have significant impacts on the structure and functioning of benthic communities over and above the physical effects of fishing methods on the seabed, particularly as some fish species fill upper roles in the trophic web (Jennings & Kaiser 1998; Kaiser *et al.* 2006). Moreover, certain types of fishing have the potential to directly remove divers' prey species, either as target species or as bycatch. Thus, the mechanisms for these pressures to impact on red-throated divers may be an indirect or direct reduction in food availability for the overwintering population. **Red-throated divers are judged to be moderately sensitive to biological disturbance through selective extraction of prey species**, as they are known to be 'opportunistic feeders' taking a broad range of fish species, and their diet compositions seem to depend on availability rather than on food specialisation (Guse *et al.*, 2009).

The exposure to selective extraction of red-throated divers' prey species by fishing (i.e. the amount of their prey species taken by fishing vessels as target or bycatch) is not clearly understood but **in general is considered low** due to differences in the average size composition of the fish eaten by divers and caught in commercial quantities by fishers, making **vulnerability to selective extraction low.**

Non-selective extraction of red-throated divers

The primary potential causes of non-selective extraction of divers are entanglement in static fishing gear or wind turbine strike.

Entanglement in static nets, fishing lines and general marine litter (of a wide variety) is a major cause of known mortality of red-throated divers (Okill 2002; Schirmeister 2003; Camphuysen 2008). In a study by Okill (2002), the mortality of 35.7% of all recovered ringed red-throated divers could be related to a particular cause of death: 53% of these 'attributable' deaths were caused by accidental capture in fishing nets (fish farms, discarded netting and static nets set for a variety of fish including herring, salmon and skate). It was concluded that 18.9% of all deaths of ringed red-throated divers were attributable to entanglement. Although the sample sizes on which these percentages were based are small, these figures, coupled with the relatively frequent occurrence of red-throated divers amongst netting casualties in other studies (Manville 2005) suggests that their **sensitivity to entanglement can be considered high.**

The three principal fishing methods for the inshore fishery within the SPA are suction dredging, single and multi-rig otter trawling and static netting. Static/passive fishing

gear methods (such as set gill nets and drift netting), which are used throughout the estuary therefore pose the most serious risk to the birds themselves.

Kent and Essex IFCA in partnership with Natural England have been carrying out observations on red-throated diver bycatch within the Outer Thames Estuary SPA. Results from the first winter of monitoring (2011/12) showed that drift netting in the area was not a significant source of mortality for red-throated divers; zero bycatch of the species was recorded. IFCA observations showed that fishing effort for drift netting was low over winter and that fixed netting was not common practice in the area. Further observations are to be carried out over the 2012/13 winter period to increase the evidence base on bycatch and fishing methods within the area.

Information from other sources (e.g. CEFAS 2006; des Clers 2010) indicates that most netting activity, which is widespread across sandbanks, occurs in the summer and autumn, beginning in June and extending into December. In contrast, the wintering red-throated divers are most prevalent from November to March, with peak numbers occurring in January and February³⁶. In light of current evidence, **exposure, and subsequently vulnerability, of red-throated divers within the site to non-selective extraction by fishing gear is therefore considered low**

There are many studies which have documented that birds which collide with rotating wind turbine blades are highly likely to be severely injured or killed (reviewed in Drewitt & Langston 2008). Red-throated diver populations are sensitive to increased adult mortality as it is a long-lived species with relatively low annual adult mortality and low breeding productivity. Thus, **sensitivity to non selective extraction through wind turbine strike can be considered high.**

Impacts to red-throated diver may result from collision with wind turbines, if they fly at a height above 20m. It has been observed, however, that they generally fly below the height at which they would be at risk of colliding with rotating turbine blades (Garthe & Huppopp, 2004; RPS GROUP PLC 2005; Environmentally Sustainable Systems Ltd, 2008). Cook *et al.* (2012) modelled red-throated diver altitudes from 19 study sites, concluding only 2% of birds in flight were at collision risk height, with high confidence in the result.

In addition, exposure to collision risks is likely to be lowered due to the displacement of red-throated divers from windfarm footprints due to non-physical disturbance (section 5.1.3). These studies, coupled with the current size of the windfarm footprint areas in comparison to the area of the SPA, indicate that the **exposure to non-selective extraction through wind turbine strike is currently low. Vulnerability is therefore moderate.** Any habituation of divers to offshore windfarms in the future or further expansion of such developments may alter this assessment.

Overall the **vulnerability of the Annex I species (red-throated diver)** within the Outer Thames Estuary SPA to **biological disturbance** is considered to be **low-moderate**.

³⁶ They can be high in December too but tend to be lower in October and November (see Webb et al 2009, JNCC report on the Outer Thames <http://www.jncc.gov.uk/page-4923>)

6. Risk Assessment

JNCC and Natural England consider 'risk' to be the likelihood of deterioration of the feature due to an activity. It is the vulnerability of the feature to an activity, assessed against the level of management of that activity.

High-risk activities are those to which the feature is highly or moderately vulnerable, and for which there is insufficient management. For example, industries or activities which are not location specific and not subject to prior consent procedures or reliable enforcement are more likely to cause damage/disturbance to the interest feature. These industries include fishing. However, clearly not all activities associated with these industries are detrimental to interest features.

Low-risk activities will be those where there is no feature vulnerability (i.e. the activity does not interact with the feature) or where the moderate or high vulnerability is mitigated by management measures. For example, industries that are location specific are always subject to prior consent (often including explicit environmental impact assessment) and have clear reliable methods of enforcement; there is generally a lower likelihood of causing damage or disturbance to interest features.

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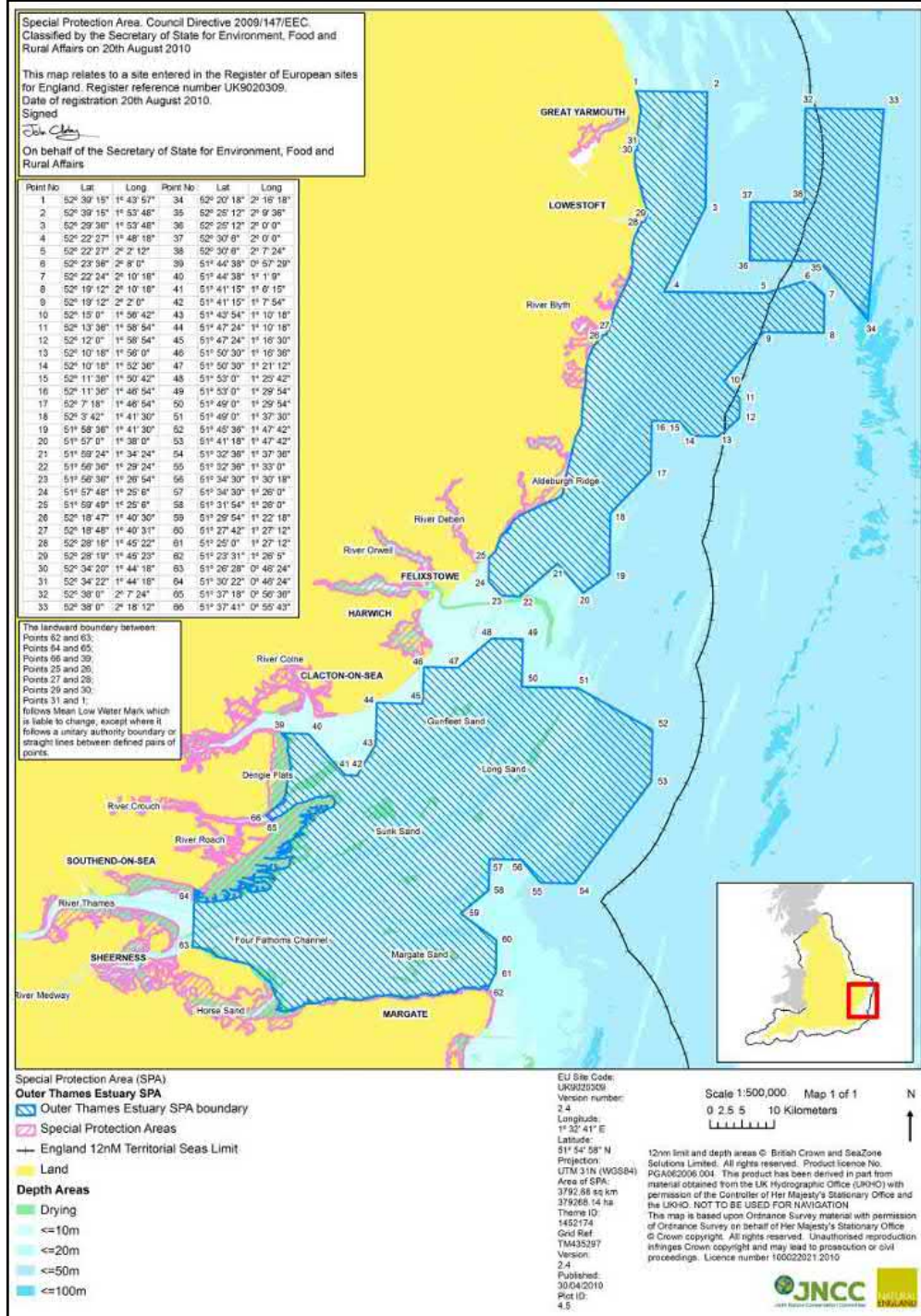
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Appendix A
Favourable Condition Table (FCT) for Outer Thames Estuary SPA

Attributes	Measure	Targets	Comments
Red-throated diver population size (Mandatory attribute)	Estimated population size derived from standardised site condition monitoring programme	Maintain population on the site subject to natural fluctuations. There should be no permanent decline, only non-significant fluctuation around the mean to account for natural change: where the limits of natural fluctuations are not well known maintain the population above 50% of that at designation; loss of 50% or more is unacceptable	Survey data used as the basis for deriving the SPA population comprised many incomplete surveys covering different sections of the final SPA boundary in different winters between the months of October to March in 1988/89, and 2002-2007. Derivation of the SPA population size required these partial datasets to be combined. Accordingly, there is limited understanding of the magnitude of inter-annual natural variation in population size across the entire SPA. In the absence of good knowledge of natural fluctuation in population size, the threshold for favourable condition is set, in line with standard practice, as being a population that exceeds 50% of the designated wintering population size. This target will be used to inform future assessments of favourable condition. Improved understanding of the natural dynamics of this population over time will be used to refine the target population size.
Habitat extent (Mandatory attribute)	Area of supporting habitat	No significant decrease in the extent of supporting habitat available for red-throated diver.	Changes in extent will need to take account of the dynamic nature of the sandbank, but a trend of reduction in extent may indicate long-term changes in the physical conditions influencing the feature, whether it be natural processes or anthropogenically driven. Further studies of diver distribution within the site, building on Skov <i>et al.</i> (2011) will inform understanding of the habitat usage by the species and help refine the measure and target in future.

Appendix B : Maps showing interest features of the Outer Thames Estuary SPA



Appendix C: Methods deriving vulnerability.

Sensitivity		Exposure		Vulnerability	
None	-	None	-	None detectable	
Low	•	Low	+	Low	
Moderate	••	Medium	++	Moderate	
High	•••	High	+++	High	

Additional Category for insufficient information = DD (Data Deficient)

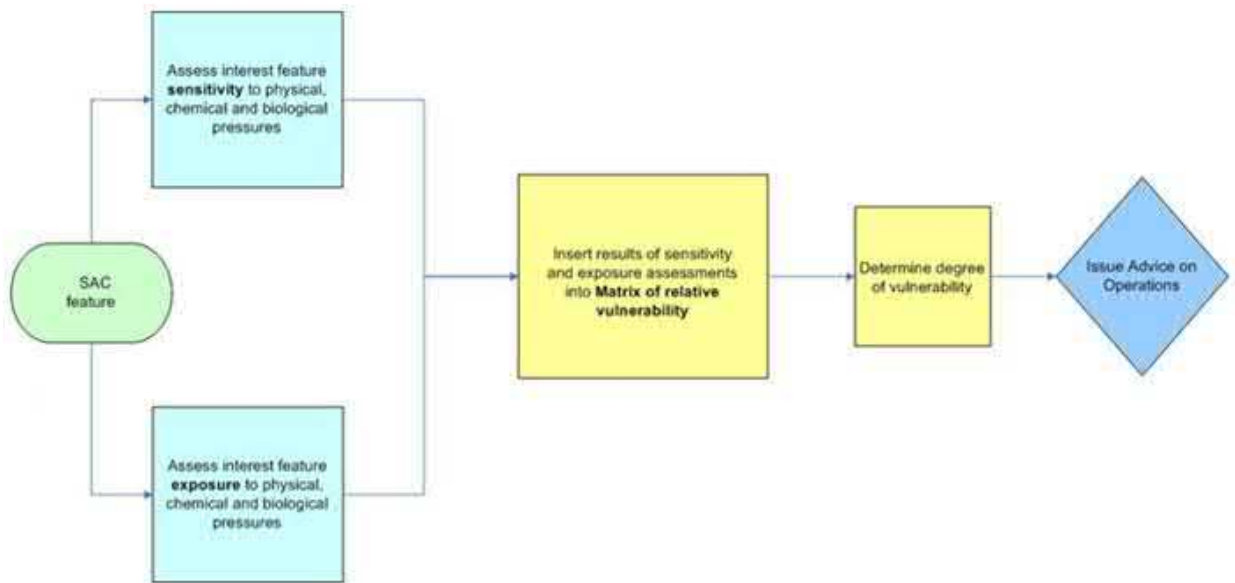
The relative vulnerability of an interest feature or sub-feature is determined by multiplying the scores for relative sensitivity and exposure, and classifying that total into categories of relative vulnerability.

Relative sensitivity of the interest feature

		High (3)	Moderate (2)	Low (1)	None detectable (0)
Relative exposure of the interest feature	High (3)	9	6	3	0
	Medium (2)	6	4	2	0
	Low (1)	3	2	1	0
	None (0)	0	0	0	0

Categories of relative vulnerability	
High	6-9
Moderate	3-5
Low	1-2
None detectable	0

An assessment of interest features' vulnerability helps to guide site management decisions by highlighting potentially detrimental activities that may need to be managed (or continue to be managed) by the relevant authorities.



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Appendix D. Summary of operations/pressures that may cause deterioration or disturbance of red-throated divers and their supporting habitat and prey species in the Outer Thames Estuary SPA at current levels of use

The advice below is not a list of prohibitions but rather a checklist for operations/pressures that may need to be subject to some form of management measure(s) or further measures where actions are already in force. Examples of activities under relevant authority jurisdiction are also provided. Operations marked with a ✓ indicate those to which red throated divers are considered to be **vulnerable** either directly or indirectly as a result of effects on their prey species and supporting habitat.

Operations (pressures) which may cause deterioration or disturbance with example activities	red-throated diver - Outer Thames Estuary SPA	Supporting habitats and prey species - Outer Thames Estuary SPA
<p>Physical loss of supporting habitat</p> <p>Removal of habitat feature (e.g. offshore development, capital dredging, 'active dredging zones')</p> <p>Smothering (e.g. by artificial structures, disposal of dredge spoil)</p>		<p>✓</p> <p>✓</p>
<p>Physical damage to their habitats</p> <p>Siltation (e.g. run-off, channel dredging, outfalls)</p> <p>Abrasion (e.g. anchoring, cables)</p> <p>Selective extraction (e.g. aggregate dredging)</p>		<p>✓</p> <p>✓</p> <p>✓</p>

Operations (pressures) which may cause deterioration or disturbance with example activities	red-throated diver - Outer Thames Estuary SPA	Supporting habitats and prey species - Outer Thames Estuary SPA
Non-physical disturbance Noise (e.g. boat activity) Visual (e.g. recreational activity)	 ✓ ✓	 ✓ ✓
Toxic contamination Introduction of synthetic compounds (e.g. pesticides, TBT, PCBs) Introduction of non-synthetic compounds (e.g. heavy metals, hydrocarbons) Introduction of radionuclides	 ✓ ✓ ✓	 ✓ ✓ ✓
Non-toxic contamination Changes in nutrient loading (e.g. agricultural run-off, outfalls) Changes in organic loading (e.g. mariculture, outfalls) Changes in thermal regime (e.g. power stations)		 ✓ ✓ ✓

Operations (pressures) which may cause deterioration or disturbance with example activities	red-throated diver - Outer Thames Estuary SPA	Supporting habitats and prey species - Outer Thames Estuary SPA
Changes in turbidity (e.g. run-off, dredging)		✓
Changes in salinity (e.g. water abstraction, outfalls)		✓
Biological disturbance		
Introduction of microbial pathogens		
Introduction of non-native species and translocation		✓
Non-selective extraction / removal of bird species (e.g. accidental turbine strike)	✓	
Non-selective extraction / removal of bird species (e.g. entanglement or bycatch)	✓	
Selective extraction and removal of prey species (e.g. commercial and recreational fishing)		✓

Appendix E Assessment of the relative vulnerability of interest features / Annex I Species and its supporting habitat for the Outer Thames Estuary SPA to different categories of operation (for key see appendix C). This aims to provide a 'high level' view of the operations which occur in the Outer Thames SPA and the likely vulnerability of the site's features to these activities. A more detailed assessment of each activity that is likely to occur in the site is provided in the Outer Thames SPA risk review.

Operations which may cause deterioration or disturbance	internationally important populations of the Annex I species and their supporting habitat and prey species		
	red-throated diver (<i>Gavia stellata</i>)		
	Sensitivity	Exposure	Vulnerability
Physical loss of supporting habitat			
Removal (e.g. harvesting, offshore development)	•••	+	Moderate
Smothering (e.g. by artificial structures, disposal of dredge spoil)	••	++	Moderate
Physical damage to habitat			
Siltation (e.g. run-off, channel dredging, outfalls)	••	+	Low
Abrasion (e.g. boating, anchoring,)	••	+	Low
Selective extraction (e.g. aggregate dredging)	••	+	Low
Non-physical disturbance			
Noise (e.g. boat activity)	•••	++	High
Visual (e.g. recreational activity)	•••	++	High
Toxic contamination			
Introduction of synthetic compounds (e.g. pesticides, TBT, PCBs)	••	+	Low
Introduction of non-synthetic compounds (e.g. heavy metals, hydrocarbons)	•••	+	Moderate
Introduction of radionuclides	DD	DD	DD

Operations which may cause deterioration or disturbance	internationally important populations of the Annex I species and their supporting habitat and prey species		
Non-toxic contamination			
Changes in nutrient loading (e.g. agricultural run-off, outfalls)	••	+	Low
Changes in organic loading (e.g. mariculture, outfalls)	••	+	Low
Changes in thermal regime (e.g. power stations)	••	+	Low
Changes in turbidity (e.g. run-off, dredging)	••	+	Low
Changes in salinity (e.g. water abstraction, outfalls)	••	+	Low
Biological disturbance			
Introduction of non-native species and translocations	•	+	Low
Selective extraction of prey species (e.g. commercial & recreational fishing)	••	+	Low
Non-selective extraction (through entanglement with static gear)	•••	+	Moderate
Non-selective extraction (through wind-turbine strike)	•••	+	Moderate
Introduction of microbial pathogens	•	+	Low



European Site Conservation Objectives for Sandlings Special Protection Area Site Code: UK9020286

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

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

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

This document should be read in conjunction with the accompanying *Supplementary Advice* document, which provides more detailed advice and information to enable the application and achievement of the Objectives set out above.

Qualifying Features:

A224 *Caprimulgus europaeus*; European nightjar (Breeding)

A246 *Lullula arborea*; Woodlark (Breeding)

Explanatory Notes: European Site Conservation Objectives

These Conservation Objectives are those referred to in the Conservation of Habitats and Species Regulations 2010 (the “Habitats Regulations”) and Article 6(3) of the Habitats Directive. They must be considered when a competent authority is required to make a ‘Habitats Regulations Assessment’ including an Appropriate Assessment, under the relevant parts of this legislation.

These Conservation Objectives and the accompanying Supplementary Advice (where this is available) will also provide a framework to inform the management of the European Site under the provisions of Articles 4(1) and 4(2) of the Wild Birds Directive, and the prevention of deterioration of habitats and significant disturbance of its qualifying features required under Article 6(2) of the Habitats Directive.

These Conservation Objectives are set for each bird feature for a [Special Protection Area \(SPA\)](#). Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving the aims of the Wild Birds Directive.

Publication date: 30 June 2014 (Version 2). This document updates and replaces an earlier version dated 29 May 2012 to reflect Natural England’s Strategic Standard on European Site Conservation Objectives 2014. Previous references to additional features identified in the 2001 UK SPA Review have also been removed.

NATURA 2000 – STANDARD DATA FORM

Special Protection Areas under the EC Birds Directive.

Each Natura 2000 site in the United Kingdom has its own Standard Data Form containing site-specific information. The data form for this site has been generated from the Natura 2000 Database submitted to the European Commission on the following date:

22/12/2015

The information provided here, follows the officially agreed site information format for Natura 2000 sites, as set out in the [Official Journal of the European Union recording the Commission Implementing Decision of 11 July 2011](#) (2011/484/EU).

The Standard Data Forms are generated automatically for all of the UK's Natura 2000 sites using the European Environment Agency's Natura 2000 software. The structure and format of these forms is exactly as produced by the EEA's Natura 2000 software (except for the addition of this coversheet and the end notes). The content matches exactly the data submitted to the European Commission.

Please note that these forms contain a number of codes, all of which are explained either within the data forms themselves or in the end notes.

Further technical documentation may be found here
http://bd.eionet.europa.eu/activities/Natura_2000/reference_portal

As part of the December 2015 submission, several sections of the UK's previously published Standard Data Forms have been updated. For details of the approach taken by the UK in this submission please refer to the following document:
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf

More general information on Special Protection Areas (SPAs) in the United Kingdom is available from the [SPA home page on the JNCC website](#). This webpage also provides links to Standard Data Forms for all SPAs in the UK.

Date form generated by the Joint Nature Conservation Committee
25 January 2016.



NATURA 2000 - STANDARD DATA FORM

For Special Protection Areas (SPA),
Proposed Sites for Community Importance (pSCI),
Sites of Community Importance (SCI) and
for Special Areas of Conservation (SAC)

SITE UK9009112
SITENAME Alde-Ore Estuary

TABLE OF CONTENTS

- [1. SITE IDENTIFICATION](#)
- [2. SITE LOCATION](#)
- [3. ECOLOGICAL INFORMATION](#)
- [4. SITE DESCRIPTION](#)
- [5. SITE PROTECTION STATUS AND RELATION WITH CORINE BIOTOPES](#)
- [6. SITE MANAGEMENT](#)
- [7. MAP OF THE SITE](#)

1. SITE IDENTIFICATION

1.1 Type A	1.2 Site code UK9009112	Back to top
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1.3 Site name

Alde-Ore Estuary

1.4 First Compilation date 1996-10	1.5 Update date 2015-12
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1.6 Respondent:

Name/Organisation: Joint Nature Conservation Committee

Address: Joint Nature Conservation Committee Monkstone House City Road Peterborough
PE1 1JY

Email:

1.7 Site indication and designation / classification dates

Date site classified as SPA:	1996-10
National legal reference of SPA designation	Regulations 12A and 13-15 of the Conservation Habitats and Species Regulations 2010, (http://www.legislation.gov.uk/uksi/2010/490/contents/made) as amended by The Conservation of Habitats and Species (Amendment) Regulations 2011 (http://www.legislation.gov.uk/uksi/2011/625/contents/made).

2. SITE LOCATION

2.1 Site-centre location [decimal degrees]:**Longitude**

1.5508

Latitude

52.0828

2.2 Area [ha]:

2403.5

2.3 Marine area [%]

48.6

2.4 Sitelength [km]:

0.0

2.5 Administrative region code and name**NUTS level 2 code****Region Name**

UKH1

East Anglia

2.6 Biogeographical Region(s)Atlantic (100.0
%)**3. ECOLOGICAL INFORMATION****3.2 Species referred to in Article 4 of Directive 2009/147/EC and listed in Annex II of Directive 92/43/EEC and site evaluation for them**

Species			Population in the site								Site assessment			
G	Code	Scientific Name	S	NP	T	Size		Unit	Cat.	D.qual.	A B C D		A B C	
						Min	Max				Pop.	Con.	Iso.	Glo
B	A081	Circus aeruginosus			r	3	3	p		G	C		B	
B	A183	Larus fuscus			r	14070	14070	p		G	A		C	
B	A151	Philomachus pugnax			w	3	3	i		G	C		C	
B	A132	Recurvirostra avosetta			w	766	766	i		G	A		B	
B	A132	Recurvirostra avosetta			r	104	104	p		G	A		B	
B	A195	Sterna albifrons			r	48	48	p		G	C		C	
B	A191	Sterna sandvicensis			r	170	170	p		G	C		C	
B	A162	Tringa totanus			w	1919	1919	i		G	C		C	

- **Group:** A = Amphibians, B = Birds, F = Fish, I = Invertebrates, M = Mammals, P = Plants, R = Reptiles

- **S:** in case that the data on species are sensitive and therefore have to be blocked for any public access enter: yes
- **NP:** in case that a species is no longer present in the site enter: x (optional)
- **Type:** p = permanent, r = reproducing, c = concentration, w = wintering (for plant and non-migratory species use permanent)
- **Unit:** i = individuals, p = pairs or other units according to the Standard list of population units and codes in accordance with Article 12 and 17 reporting (see [reference portal](#))
- **Abundance categories (Cat.):** C = common, R = rare, V = very rare, P = present - to fill if data are deficient (DD) or in addition to population size information
- **Data quality:** G = 'Good' (e.g. based on surveys); M = 'Moderate' (e.g. based on partial data with some extrapolation); P = 'Poor' (e.g. rough estimation); VP = 'Very poor' (use this category only, if not even a rough estimation of the population size can be made, in this case the fields for population size can remain empty, but the field "Abundance categories" has to be filled in)

4. SITE DESCRIPTION

[Back to top](#)

4.1 General site character

Habitat class	% Cover
N05	25.0
N07	5.0
N03	20.0
N02	50.0
Total Habitat Cover	100

Other Site Characteristics

1 Terrestrial: Soil & Geology: sedimentary, shingle, mud, nutrient-rich 2 Terrestrial: Geomorphology and landscape: coastal, lowland 4 Marine: Geomorphology: shingle bar, intertidal sediments (including sandflat/mudflat), lagoon, estuary

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC) During the breeding season the area regularly supports: *Circus aeruginosus* at least 1.9% of the GB breeding population 5 year mean, 1993-1997 *Recurvirostra avosetta* (Western Europe/Western Mediterranean - breeding) 23.1% of the GB breeding population 5 year mean, 1990-1994 *Sterna albifrons* (Eastern Atlantic - breeding) 2% of the GB breeding population 5 count mean, 1993-4, 1996-8 *Sterna sandvicensis* (Western Europe/Western Africa) 1.2% of the GB breeding population 5 year mean, 1992-1996 Over winter the area regularly supports: *Philomachus pugnax* (Western Africa - wintering) 0.4% of the GB population 5 year peak mean 1991/92-1995/96 *Recurvirostra avosetta* (Western Europe/Western Mediterranean - breeding) 60.3% of the GB population 5 year peak mean 1991/92-1995/96 ARTICLE 4.2 QUALIFICATION (79/409/EEC) During the breeding season the area regularly supports: *Larus fuscus* (Western Europe/Mediterranean/Western Africa) 11.3% of the breeding population 5 year mean 1994-1998 Over winter the area regularly supports: *Tringa totanus* (Eastern Atlantic - wintering) 1.1% of the population 5 year peak mean 1991/92-1995/96

4.3 Threats, pressures and activities with impacts on the site

The most important impacts and activities with high effect on the site

Negative Impacts			
Rank	Threats and pressures [code]	Pollution (optional) [code]	inside/outside [i o b]
H	M01		B
H	G01		I
H	J02		B
H	M02		B

Positive Impacts			
Rank	Activities, management [code]	Pollution (optional) [code]	inside/outside [i o b]
H	G03		I
H	D05		I
H	A04		I
H	A06		I
H	A02		I

Rank: H = high, M = medium, L = low

Pollution: N = Nitrogen input, P = Phosphor/Phosphate input, A = Acid input/acidification,

T = toxic inorganic chemicals, O = toxic organic chemicals, X = Mixed pollutions

i = inside, o = outside, b = both

4.5 Documentation

Conservation Objectives - the Natural England links below provide access to the Conservation Objectives (and other site-related information) for its terrestrial and inshore Natura 2000 sites, including conservation advice packages and supporting documents for European Marine Sites within English waters and for cross-border sites. See also the 'UK Approach' document for more information (link via the JNCC website).

Link(s): <http://publications.naturalengland.org.uk/category/3212324>
http://jncc.defra.gov.uk/pdf/Natura2000_StandardDataForm_UKApproach_Dec2015.pdf
<http://publications.naturalengland.org.uk/category/6490068894089216>

5. SITE PROTECTION STATUS (optional)

[Back to top](#)

5.1 Designation types at national and regional level:

Code	Cover [%]	Code	Cover [%]	Code	Cover [%]
UK01	4.5	UK04	100.0		

6. SITE MANAGEMENT

[Back to top](#)

6.1 Body(ies) responsible for the site management:

Organisation:	Natural England
Address:	
Email:	

6.2 Management Plan(s):

An actual management plan does exist:

<input checked="" type="checkbox"/>	Yes	Name: Alde-Ore Estuary: The Orfordness-Havergate National Nature Reserve (NNR) Management Plan provides management information related to this site. This is available from Natural England. Link: _____
<input type="checkbox"/>	No, but in preparation	
<input type="checkbox"/>	No	

6.3 Conservation measures (optional)

For available information, including on Conservation Objectives, see Section 4.5.

7. MAP OF THE SITES

[Back to top](#)

INSPIRE ID:

Map delivered as PDF in electronic format (optional)

Yes No

Reference(s) to the original map used for the digitalisation of the electronic boundaries (optional).

EXPLANATION OF CODES USED IN THE NATURA 2000 STANDARD DATA FORMS

The codes in the table below are also explained in the [official European Union guidelines for the Standard Data Form](#). The relevant page is shown in the table below.

1.1 Site type

CODE	DESCRIPTION	PAGE NO
A	Designated Special Protection Area	53
B	SAC (includes candidates Special Areas of Conservation, Sites of Community Importance and designated SAC)	53
C	SAC area the same as SPA. Note in the UK Natura 2000 submission this is only used for Gibraltar	53

3.1 Habitat representativity

CODE	DESCRIPTION	PAGE NO
A	Excellent	57
B	Good	57
C	Significant	57
D	Non-significant presence	57

3.1 Habitat code

CODE	DESCRIPTION	PAGE NO
1110	Sandbanks which are slightly covered by sea water all the time	57
1130	Estuaries	57
1140	Mudflats and sandflats not covered by seawater at low tide	57
1150	Coastal lagoons	57
1160	Large shallow inlets and bays	57
1170	Reefs	57
1180	Submarine structures made by leaking gases	57
1210	Annual vegetation of drift lines	57
1220	Perennial vegetation of stony banks	57
1230	Vegetated sea cliffs of the Atlantic and Baltic Coasts	57
1310	Salicornia and other annuals colonizing mud and sand	57
1320	Spartina swards (Spartinion maritimae)	57
1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	57
1340	Inland salt meadows	57
1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	57
2110	Embryonic shifting dunes	57
2120	Shifting dunes along the shoreline with Ammophila arenaria ("white dunes")	57
2130	Fixed coastal dunes with herbaceous vegetation ("grey dunes")	57
2140	Decalcified fixed dunes with Empetrum nigrum	57
2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	57
2160	Dunes with Hippophila rhamnoides	57
2170	Dunes with Salix repens ssp. argentea (Salicion arenariae)	57
2190	Humid dune slacks	57
21A0	Machairs (* in Ireland)	57
2250	Coastal dunes with Juniperus spp.	57
2330	Inland dunes with open Corynephorus and Agrostis grasslands	57
3110	Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)	57
3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea	57
3140	Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.	57
3150	Natural eutrophic lakes with Magnopotamion or Hydrocharition - type vegetation	57

CODE	DESCRIPTION	PAGE NO
3160	Natural dystrophic lakes and ponds	57
3170	Mediterranean temporary ponds	57
3180	Turloughs	57
3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitriche-Batrachion vegetation	57
4010	Northern Atlantic wet heaths with Erica tetralix	57
4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	57
4030	European dry heaths	57
4040	Dry Atlantic coastal heaths with Erica vagans	57
4060	Alpine and Boreal heaths	57
4080	Sub-Arctic Salix spp. scrub	57
5110	Stable xerothermophilous formations with Buxus sempervirens on rock slopes (Berberidion p.p.)	57
5130	Juniperus communis formations on heaths or calcareous grasslands	57
6130	Calaminarian grasslands of the Violetalia calaminariae	57
6150	Siliceous alpine and boreal grasslands	57
6170	Alpine and subalpine calcareous grasslands	57
6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites)	57
6230	Species-rich Nardus grasslands, on silicious substrates in mountain areas (and submountain areas in Continental Europe)	57
6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	57
6430	Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels	57
6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	57
6520	Mountain hay meadows	57
7110	Active raised bogs	57
7120	Degraded raised bogs still capable of natural regeneration	57
7130	Blanket bogs (* if active bog)	57
7140	Transition mires and quaking bogs	57
7150	Depressions on peat substrates of the Rhynchosporion	57
7210	Calcareous fens with Cladium mariscus and species of the Caricion davallianae	57
7220	Petrifying springs with tufa formation (Cratoneurion)	57
7230	Alkaline fens	57
7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	57
8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopsietalia ladani)	57
8120	Calcareous and calcshist screes of the montane to alpine levels (Thlaspietea rotundifolii)	57
8210	Calcareous rocky slopes with chasmophytic vegetation	57
8220	Siliceous rocky slopes with chasmophytic vegetation	57
8240	Limestone pavements	57
8310	Caves not open to the public	57
8330	Submerged or partially submerged sea caves	57
9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	57
9130	Asperulo-Fagetum beech forests	57
9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	57
9180	Tilio-Acerion forests of slopes, screes and ravines	57
9190	Old acidophilous oak woods with Quercus robur on sandy plains	57
91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	57
91C0	Caledonian forest	57
91D0	Bog woodland	57
91E0	Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)	57
91J0	Taxus baccata woods of the British Isles	57

3.1 Relative surface

CODE	DESCRIPTION	PAGE NO
A	15%-100%	58
B	2%-15%	58
C	< 2%	58

3.1 Conservation status habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	59
B	Good conservation	59
C	Average or reduced conservation	59

3.1 Global grade habitat

CODE	DESCRIPTION	PAGE NO
A	Excellent value	59
B	Good value	59
C	Significant value	59

3.2 Population (abbreviated to 'Pop.' in data form)

CODE	DESCRIPTION	PAGE NO
A	15%-100%	62
B	2%-15%	62
C	< 2%	62
D	Non-significant population	62

3.2 Conservation status species (abbreviated to 'Con.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent conservation	63
B	Good conservation	63
C	Average or reduced conservation	63

3.2 Isolation (abbreviated to 'Iso.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Population (almost) Isolated	63
B	Population not-isolated, but on margins of area of distribution	63
C	Population not-isolated within extended distribution range	63

3.2 Global Grade (abbreviated to 'Glo.' Or 'G.' in data form)

CODE	DESCRIPTION	PAGE NO
A	Excellent value	63
B	Good value	63
C	Significant value	63

3.3 Assemblages types

CODE	DESCRIPTION	PAGE NO
WATR	Non breeding waterfowl assemblage	UK specific code
SBA	Breeding seabird assemblage	UK specific code
BBA	Breeding bird assemblage (applies only to sites classified pre 2000)	UK specific code

4.1 Habitat class code

CODE	DESCRIPTION	PAGE NO
N01	Marine areas, Sea inlets	65
N02	Tidal rivers, Estuaries, Mud flats, Sand flats, Lagoons (including saltwork basins)	65
N03	Salt marshes, Salt pastures, Salt steppes	65
N04	Coastal sand dunes, Sand beaches, Machair	65
N05	Shingle, Sea cliffs, Islets	65
N06	Inland water bodies (Standing water, Running water)	65
N07	Bogs, Marshes, Water fringed vegetation, Fens	65
N08	Heath, Scrub, Maquis and Garrigue, Phygrana	65
N09	Dry grassland, Steppes	65
N10	Humid grassland, Mesophile grassland	65
N11	Alpine and sub-Alpine grassland	65
N14	Improved grassland	65
N15	Other arable land	65
N16	Broad-leaved deciduous woodland	65
N17	Coniferous woodland	65
N19	Mixed woodland	65
N21	Non-forest areas cultivated with woody plants (including Orchards, groves, Vineyards, Dehesas)	65
N22	Inland rocks, Scree, Sands, Permanent Snow and ice	65
N23	Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	65
N25	Grassland and scrub habitats (general)	65
N26	Woodland habitats (general)	65

4.3 Threats code

CODE	DESCRIPTION	PAGE NO
A01	Cultivation	65
A02	Modification of cultivation practices	65
A03	Mowing / cutting of grassland	65
A04	Grazing	65
A05	Livestock farming and animal breeding (without grazing)	65
A06	Annual and perennial non-timber crops	65
A07	Use of biocides, hormones and chemicals	65
A08	Fertilisation	65
A10	Restructuring agricultural land holding	65
A11	Agriculture activities not referred to above	65
B01	Forest planting on open ground	65
B02	Forest and Plantation management & use	65
B03	Forest exploitation without replanting or natural regrowth	65
B04	Use of biocides, hormones and chemicals (forestry)	65
B06	Grazing in forests/ woodland	65
B07	Forestry activities not referred to above	65
C01	Mining and quarrying	65
C02	Exploration and extraction of oil or gas	65
C03	Renewable abiotic energy use	65
D01	Roads, paths and railroads	65
D02	Utility and service lines	65
D03	Shipping lanes, ports, marine constructions	65
D04	Airports, flightpaths	65
D05	Improved access to site	65
E01	Urbanised areas, human habitation	65
E02	Industrial or commercial areas	65

CODE	DESCRIPTION	PAGE NO
E03	Discharges	65
E04	Structures, buildings in the landscape	65
E06	Other urbanisation, industrial and similar activities	65
F01	Marine and Freshwater Aquaculture	65
F02	Fishing and harvesting aquatic resources	65
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc.), trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)	65
F04	Taking / Removal of terrestrial plants, general	65
F05	Illegal taking/ removal of marine fauna	65
F06	Hunting, fishing or collecting activities not referred to above	65
G01	Outdoor sports and leisure activities, recreational activities	65
G02	Sport and leisure structures	65
G03	Interpretative centres	65
G04	Military use and civil unrest	65
G05	Other human intrusions and disturbances	65
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish)	65
H02	Pollution to groundwater (point sources and diffuse sources)	65
H03	Marine water pollution	65
H04	Air pollution, air-borne pollutants	65
H05	Soil pollution and solid waste (excluding discharges)	65
H06	Excess energy	65
H07	Other forms of pollution	65
I01	Invasive non-native species	65
I02	Problematic native species	65
I03	Introduced genetic material, GMO	65
J01	Fire and fire suppression	65
J02	Human induced changes in hydraulic conditions	65
J03	Other ecosystem modifications	65
K01	Abiotic (slow) natural processes	65
K02	Biocenotic evolution, succession	65
K03	Interspecific faunal relations	65
K04	Interspecific floral relations	65
K05	Reduced fecundity/ genetic depression	65
L05	Collapse of terrain, landslide	65
L07	Storm, cyclone	65
L08	Inundation (natural processes)	65
L10	Other natural catastrophes	65
M01	Changes in abiotic conditions	65
M02	Changes in biotic conditions	65
U	Unknown threat or pressure	65
XO	Threats and pressures from outside the Member State	65

5.1 Designation type codes

CODE	DESCRIPTION	PAGE NO
UK00	No Protection Status	67
UK01	National Nature Reserve	67
UK02	Marine Nature Reserve	67
UK04	Site of Special Scientific Interest (UK)	67

NATURA 2000

STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA)
FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)
AND
FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. Site identification:

1.1 Type 1.2 Site code

1.3 Compilation date 1.4 Update

1.5 Relationship with other Natura 2000 sites

1.6 Respondent(s)

1.7 Site name

1.8 Site indication and designation classification dates

date site proposed as eligible as SCI	
date confirmed as SCI	
date site classified as SPA	199205
date site designated as SAC	

2. Site location:

2.1 Site centre location

longitude	latitude
01 38 02 E	52 18 55 N

2.2 Site area (ha) 2.3 Site length (km)

2.5 Administrative region

NUTS code	Region name	% cover
UK403	Suffolk	100.00%

2.6 Biogeographic region

Alpine

Atlantic

Boreal

Continental

Macaronesia

Mediterranean

3. Ecological information:

3.1 Annex I habitats

Habitat types present on the site and the site assessment for them:

Annex I habitat	% cover	Representativity	Relative surface	Conservation status	Global assessment

3.2 Annex I birds and regularly occurring migratory birds not listed on Annex I

Code	Species name	Population			Site assessment				
		Resident	Breed	Winter	Stage	Population	Conservation	Isolation	Global
A056	<i>Anas clypeata</i>		23 P			B		C	
A056	<i>Anas clypeata</i>			98 I		C		C	
A052	<i>Anas crecca</i>		73 P			B		C	
A051	<i>Anas strepera</i>			93 I		C		C	
A051	<i>Anas strepera</i>		24 P			B		C	
A041a	<i>Anser albifrons albifrons</i>			67 I		C		B	
A021	<i>Botaurus stellaris</i>		7 I			A		B	
A224	<i>Caprimulgus europaeus</i>		24 P			C		C	
A081	<i>Circus aeruginosus</i>		16 P			B		B	
A082	<i>Circus cyaneus</i>			15 I		C		C	
A132	<i>Recurvirostra avosetta</i>		47 P			B		B	
A195	<i>Sterna albifrons</i>		28 P			C		C	

4. Site description:

4.1 General site character

Habitat classes	% cover
Marine areas. Sea inlets	
Tidal rivers. Estuaries. Mud flats. Sand flats. Lagoons (including saltwork basins)	14.0
Salt marshes. Salt pastures. Salt steppes	8.0
Coastal sand dunes. Sand beaches. Machair	3.0
Shingle. Sea cliffs. Islets	3.0
Inland water bodies (standing water, running water)	4.0
Bogs. Marshes. Water fringed vegetation. Fens	15.0
Heath. Scrub. Maquis and garrigue. Phygrana	23.0
Dry grassland. Steppes	
Humid grassland. Mesophile grassland	
Alpine and sub-alpine grassland	
Improved grassland	7.0
Other arable land	2.0
Broad-leaved deciduous woodland	16.0
Coniferous woodland	5.0
Evergreen woodland	
Mixed woodland	
Non-forest areas cultivated with woody plants (including orchards, groves, vineyards, dehesas)	
Inland rocks. Scree. Sands. Permanent snow and ice	
Other land (including towns, villages, roads, waste places, mines, industrial sites)	
Total habitat cover	100%

4.1 Other site characteristics

Soil & geology:

Acidic, Mud, Nutrient-poor, Peat, Sand, Shingle

Geomorphology & landscape:

Coastal, Estuary, Floodplain, Intertidal sediments (including sandflat/mudflat), Lagoon, Lowland, Open coast (including bay), Shingle bar

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC)

During the breeding season the area regularly supports:

<i>Botaurus stellaris</i> (Europe - breeding)	35% of the GB breeding population 5 year mean, 1993-1997
<i>Caprimulgus europaeus</i>	0.7% of the GB breeding population Count, as at 1990
<i>Circus aeruginosus</i>	10.2% of the GB breeding population 5 year mean, 1993-1997
<i>Recurvirostra avosetta</i> (Western Europe/Western Mediterranean - breeding)	10.4% of the GB breeding population Count, as at early 1990s
<i>Sterna albifrons</i> (Eastern Atlantic - breeding)	1.2% of the GB breeding population 5 year mean, 1992-1996
Over winter the area regularly supports:	
<i>Circus cyaneus</i>	2% of the GB population 5 year peak mean, 1985/6-1989/90

ARTICLE 4.2 QUALIFICATION (79/409/EEC)	
During the breeding season the area regularly supports:	
<i>Anas clypeata</i> (North-western/Central Europe)	2.3% of the population in Great Britain Count, as at 1990
<i>Anas crecca</i> (North-western Europe)	4.9% of the population in Great Britain Count, as at 1990
<i>Anas strepera</i> (North-western Europe)	3.1% of the population in Great Britain Count, as at 1990
Over winter the area regularly supports:	
<i>Anas clypeata</i> (North-western/Central Europe)	1% of the population in Great Britain 5 year peak mean 1991/92-1995/96
<i>Anas strepera</i> (North-western Europe)	1.1% of the population in Great Britain 5 year peak mean 1991/92-1995/96
<i>Anser albifrons albifrons</i> (North-western Siberia/North-eastern & North-western Europe)	1.1% of the population in Great Britain 5 year peak mean 1991/92-1995/96

4.3 Vulnerability

The site is actively managed to prevent scrub and tree invasion of the heathlands grazing marshes and reedbeds. Much of the land is managed by conservation organisations and positively by private landowners through ESA and Countryside Stewardship schemes. The coastline is going to be pushed back by natural processes, this is being addressed in the Shoreline Management Plan. Alternative sites for reed bed creation are being sought to help offset the possible future natural losses.

5. Site protection status and relation with CORINE biotopes:

5.1 Designation types at national and regional level

Code	% cover
UK01 (NNR)	27.6

UK SPA data form

UK04 (SSSI/ASSI)	100.0
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NATURA 2000**STANDARD DATA FORM**

FOR SPECIAL PROTECTION AREAS (SPA)
FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)
AND
FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. Site identification:

1.1 Type 1.2 Site code

1.3 Compilation date 1.4 Update

1.5 Relationship with other Natura 2000 sites

1.6 Respondent(s)

1.7 Site name

1.8 Site indication and designation classification dates

date site proposed as eligible as SCI	199506
date confirmed as SCI	200412
date site classified as SPA	
date site designated as SAC	200504

2. Site location:**2.1 Site centre location**

longitude	latitude
01 37 02 E	52 15 22 N

2.2 Site area (ha) 2.3 Site length (km)

2.5 Administrative region

NUTS code	Region name	% cover
UK403	Suffolk	100.00%

2.6 Biogeographic region

Alpine

Atlantic

Boreal

Continental

Macaronesia

Mediterranean

3. Ecological information:**3.1 Annex I habitats**

Habitat types present on the site and the site assessment for them:

Annex I habitat	% cover	Representativity	Relative surface	Conservation status	Global assessment
Coastal lagoons	0.1	D			
Annual vegetation of drift lines	0.4	A	B	A	A

Perennial vegetation of stony banks	0.3	C	C	C	C
European dry heaths	40	B	C	A	B

3.2 Annex II species

Species name	Population				Site assessment			
	Resident	Migratory			Population	Conservation	Isolation	Global
		Breed	Winter	Stage				
<i>Triturus cristatus</i>	Present	-	-	-	D			

4. Site description

4.1 General site character

Habitat classes	% cover
Marine areas. Sea inlets	
Tidal rivers. Estuaries. Mud flats. Sand flats. Lagoons (including saltwork basins)	
Salt marshes. Salt pastures. Salt steppes	
Coastal sand dunes. Sand beaches. Machair	5.0
Shingle. Sea cliffs. Islets	15.0
Inland water bodies (standing water, running water)	
Bogs. Marshes. Water fringed vegetation. Fens	20.0
Heath. Scrub. Maquis and garrigue. Phygrana	40.0
Dry grassland. Steppes	
Humid grassland. Mesophile grassland	
Alpine and sub-alpine grassland	
Improved grassland	
Other arable land	
Broad-leaved deciduous woodland	
Coniferous woodland	
Evergreen woodland	
Mixed woodland	20.0
Non-forest areas cultivated with woody plants (including orchards, groves, vineyards, dehesas)	
Inland rocks. Screes. Sands. Permanent snow and ice	
Other land (including towns, villages, roads, waste places, mines, industrial sites)	
Total habitat cover	100%

4.1 Other site characteristics

<p>Soil & geology: Acidic, Sand, Shingle</p> <p>Geomorphology & landscape: Coastal, Lagoon, Lowland</p>

4.2 Quality and importance

<p>Annual vegetation of drift lines</p> <ul style="list-style-type: none"> for which this is one of only four known outstanding localities in the United Kingdom. which is considered to be rare as its total extent in the United Kingdom is estimated to be less than 100 hectares. <p>Perennial vegetation of stony banks</p> <ul style="list-style-type: none"> for which the area is considered to support a significant presence. <p>European dry heaths</p> <ul style="list-style-type: none"> for which this is considered to be one of the best areas in the United Kingdom.

4.3 Vulnerability

Dry heath: These heaths were formed through, and are dependent upon, active management. Without grazing or cutting of heather, scrub and tree invasion onto the heaths is rapid and can be extensive. Bracken can also dominate large areas if suitable management has not been undertaken over the past decade. The heathland at Minsmere forms part of a RSPB reserve. The site management plan includes actions to ensure that open heathland is maintained and areas of scrub and bracken are cleared from former heath. Part of the cSAC is managed as Westleton Heath Nature Reserve.

Annual vegetation of drift lines: This habitat is maintained through the action of natural coastal processes upon the shoreline. The requirement for management is limited and is restricted to ensuring that significant human disturbance of the vegetated shore zone does not occur. This aspect of management is addressed through the RSPB visitor management plan.

5. Site protection status and relation with CORINE biotopes:

5.1 Designation types at national and regional level

Code	% cover
UK01 (NNR)	24.0
UK04 (SSSI/ASSI)	100.0

NATURA 2000

STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA)
FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)
AND
FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. Site identification:

1.1 Type 1.2 Site code

1.3 Compilation date 1.4 Update

1.5 Relationship with other Natura 2000 sites

U	K	0	0	1	3	6	9	0
U	K	0	0	3	0	3	7	1

1.6 Respondent(s)

1.7 Site name

1.8 Site indication and designation classification dates

date site proposed as eligible as SCI	
date confirmed as SCI	
date site classified as SPA	201008
date site designated as SAC	

2. Site location:

2.1 Site centre location

longitude	latitude
01 32 41 E	51 54 58 N

2.2 Site area (ha) 2.3 Site length (km)

2.5 Administrative region

NUTS code	Region name	% cover
0	Marine	100.0%

2.6 Biogeographic region

Alpine
 Atlantic
 Boreal
 Continental
 Macaronesia
 Mediterranean

3. Ecological information:

3.1 Annex I habitats

Habitat types present on the site and the site assessment for them:

Annex I habitat	% cover	Representativity	Relative surface	Conservation status	Global assessment

3.2 Annex I birds and regularly occurring migratory birds not listed on Annex I

Code	Species name	Population			Site assessment			
		Resident	Migratory		Population	Conservation	Isolation	Global
Breed	Winter	Stage						
A001	<i>Gavia stellata</i>		6466	I	A		C	

4. Site description:

4.1 General site character

Habitat classes	% cover
Marine areas. Sea inlets	100.0
Tidal rivers. Estuaries. Mud flats. Sand flats. Lagoons (including saltwork basins)	
Salt marshes. Salt pastures. Salt steppes	
Coastal sand dunes. Sand beaches. Machair	
Shingle. Sea cliffs. Islets	
Inland water bodies (standing water, running water)	
Bogs. Marshes. Water fringed vegetation. Fens	
Heath. Scrub. Maquis and garrigue. Phygrana	
Dry grassland. Steppes	
Humid grassland. Mesophile grassland	
Alpine and sub-alpine grassland	
Improved grassland	
Other arable land	
Broad-leaved deciduous woodland	
Coniferous woodland	
Evergreen woodland	
Mixed woodland	
Non-forest areas cultivated with woody plants (including orchards, groves, vineyards, dehesas)	
Inland rocks. Scree. Sands. Permanent snow and ice	
Other land (including towns, villages, roads, waste places, mines, industrial sites)	
Total habitat cover	100%

4.1 Other site characteristics

Soil & geology:

Gravel, Mud, Sand

Geomorphology & landscape:

Range of mobile sediments, Tidal current stream

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC)

Over winter the area regularly supports:

Gavia stellata

(North-western Europe - wintering)

38% of the population in Great Britain
peak mean over the period 1989-2006/07

ARTICLE 4.2 QUALIFICATION (79/409/EEC)

4.3 Vulnerability

The northernmost extent of the SPA contains some areas licenced for aggregate extraction and other prospecting areas. The site contains several constructed or consented offshore windfarms. There are proposals for extensions to several such windfarms. Furthermore, there is the possibility that new windfarms will be consented under Round 3. Certain shipping channels within the site have been and will continue to be subject to maintenance dredging. There may be a requirement for capital dredging in association with newly developed and future port developments. The Thames supports important commercial fisheries (as well as estuarine and marine recreational angling). There is also a well-established cockle harvesting industry. The potential impacts of many of these existing or future activities will be addressed through the relevant licence requirements and under the provision of the Habitats Regulations (including the review of consents process). Ongoing research associated with offshore windfarm development will improve understanding of the environmental factors influencing red-throated diver distribution and the extent of apparently suitable seabed habitat within the site.

Red throated divers are highly sensitive to non-physical disturbance by noise and visual presence during the winter. Locally, significant disturbance and displacement effects are predicted to arise from noise and visual impacts from wind farm construction, maintenance traffic and visually from the turbines themselves. Disturbance and displacement effects may also arise from shipping (including recreational boating) and boat movements associated with marine aggregate and fishing activities. Marine aggregates activities tend to be temporary and localised. Dredging and shipping activities are expected to be confined to existing shipping channels, which are already known to be avoided by divers. In all these cases it is expected that activity will be lowest during the winter months (when the birds are present) due to the limitations imposed by poor weather conditions. Prince's Channel (which runs through the southern area of the outer Thames SPA) carries a significant amount of vessel traffic in and out of ports in the inner Thames Estuary. Fisherman's Gat is also an active commercial shipping channel. In addition, smaller vessels use the shallower inshore channels across the site. The impacts of many of these existing or future activities will be addressed through the relevant licence requirements and under the provision of the Habitats Regulations. (including the review of consents process).

A number of operators discharge effluent into freshwater input sources upstream of the site and directly into coastal waters adjacent to the site. Direct discharges into the site include low levels of radionuclides and heavy metals. Deterioration of invertebrate and small fish populations as a result of large oil and chemical spills can have a significant impact on important food resources. Oil on the surface and in the water column would present a threat to diving and feeding seabirds. There is a considerable amount of shipping traffic within the site, mostly confined within recognised shipping channels. A small level of contamination will exist as a result of normal shipping activities. There is however, always the risk of a catastrophic spillage event from normal shipping traffic and there is an additional issue of ship-to-ship (s-t-s) oil transfers just off Southwold within 12nm.

Discharges to the freshwater environment upstream of the site will be subject to the requirements of relevant licencing. All major ports such as the Port of London will have oil spill contingency plans to deal with catastrophic events. All s-t-s transfers are well managed by the Maritime and Coastguard Agency (MCA).

Fishing activities within the site include: suction dredging for cockles, set and drift-net tramelling, drift gill netting, potting and a limited amount of beam trawling. Removal of fish and larger molluscs can have a significant impact on the structure and functioning of benthic communities. Mechanisms for these activities to impact on red-throated divers may be a direct or indirect reduction in food availability. However, the overall level of exposure of red-throated divers to prey species depletion from biological disturbance is currently considered low. Any future significant changes to the way in which certain fishing activities, such as cockle suction dredging, are conducted (eg total catch, timing etc) will be assessed under the provision of the Habitats Regulations, and will in any case likely be subject to licence arrangements and by-law restrictions overseen by the Marine Management Organisation and/or local Inshore Fishery and Conservation Authority.

Entanglement in static fishing nets is an important cause of death for red-throated divers in the UK waters. Thus, static/passive fishing gear methods such as set gillnets and drift netting represent potentially the most serious direct risk from fishing activity to the birds themselves. Netting is widespread across the sandbanks, however this is seasonally focussed and occurs primarily at times of year outwith the period when the red-throated diver population is at its peak. The scale of the by-catch within the site is unknown. Therefore, consideration of any fishery management measures will need to be preceded by monitoring of the scale of the by-catch problem within the site itself.

5. Site protection status and relation with CORINE biotopes:

5.1 Designation types at national and regional level

Code	% cover
UK00 (N/A)	100.00

NATURA 2000

STANDARD DATA FORM

FOR SPECIAL PROTECTION AREAS (SPA)
FOR SITES ELIGIBLE FOR IDENTIFICATION AS SITES OF COMMUNITY IMPORTANCE (SCI)
AND
FOR SPECIAL AREAS OF CONSERVATION (SAC)

1. Site identification:

1.1 Type 1.2 Site code

1.3 Compilation date 1.4 Update

1.5 Relationship with other Natura 2000 sites

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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1.6 Respondent(s)

1.7 Site name

1.8 Site indication and designation classification dates

date site proposed as eligible as SCI	
date confirmed as SCI	
date site classified as SPA	200108
date site designated as SAC	

2. Site location:

2.1 Site centre location

longitude	latitude
01 26 33 E	52 04 44 N

2.2 Site area (ha) 2.3 Site length (km)

2.5 Administrative region

NUTS code	Region name	% cover
UK403	Suffolk	100.00%

2.6 Biogeographic region

Alpine

Atlantic

Boreal

Continental

Macaronesia

Mediterranean

3. Ecological information:

3.1 Annex I habitats

Habitat types present on the site and the site assessment for them:

Annex I habitat	% cover	Representativity	Relative surface	Conservation status	Global assessment

3.2 Annex I birds and regularly occurring migratory birds not listed on Annex I

Code	Species name	Population			Site assessment				
		Resident	Migratory		Population	Conservation	Isolation	Global	
Breed	Winter	Stage							
A224	<i>Caprimulgus europaeus</i>		109 P			B		C	
A246	<i>Lullula arborea</i>		154 P			B		C	

4. Site description:

4.1 General site character

Habitat classes	% cover
Marine areas. Sea inlets	
Tidal rivers. Estuaries. Mud flats. Sand flats. Lagoons (including saltwork basins)	
Salt marshes. Salt pastures. Salt steppes	
Coastal sand dunes. Sand beaches. Machair	
Shingle. Sea cliffs. Islets	
Inland water bodies (standing water, running water)	1.5
Bogs. Marshes. Water fringed vegetation. Fens	0.9
Heath. Scrub. Maquis and garrigue. Phygrana	14.6
Dry grassland. Steppes	11.5
Humid grassland. Mesophile grassland	
Alpine and sub-alpine grassland	
Improved grassland	0.1
Other arable land	
Broad-leaved deciduous woodland	10.6
Coniferous woodland	57.6
Evergreen woodland	
Mixed woodland	1.4
Non-forest areas cultivated with woody plants (including orchards, groves, vineyards, dehesas)	
Inland rocks. Screes. Sands. Permanent snow and ice	
Other land (including towns, villages, roads, waste places, mines, industrial sites)	1.8
Total habitat cover	100%

4.1 Other site characteristics

Soil & geology:

Geomorphology & landscape:

4.2 Quality and importance

ARTICLE 4.1 QUALIFICATION (79/409/EEC)

During the breeding season the area regularly supports:

<i>Caprimulgus europaeus</i>	3.2% of the GB breeding population Count as at 1992
<i>Lullula arborea</i>	10.3% of the GB breeding population Count as at 1997

ARTICLE 4.2 QUALIFICATION (79/409/EEC)

4.3 Vulnerability

Sandlings SPA comprises six SSSIs. Sandlings Forest SSSI, the largest of these, is dominated by commercial forestry. Within the forest, large areas of open ground suitable for woodlark and nightjar were created by storm damage in 1987. Maintenance of open areas in the future relies on clear felling as the main silvicultural practice and the maintenance of some areas earmarked for woodlark and nightjar habitat. These objectives are included in the East Anglia Forest District Strategic Plan.

On the heathland SSSIs, lack of traditional management has resulted in the heathland being subjected to successional changes with the consequent spread of bracken, shrubs and trees. This is being addressed through habitat management work under the Countryside Stewardship Scheme and Tomorrows Heathland Heritage, and is resulting in the restoration of more typical heathland habitat favourable to both nightjar and woodlark.

Human influences on the site include the frequent presence of travellers' caravans. This is a longstanding problem, and a variety of mechanisms are utilised to keep them from the heathland; the digging of trenches and construction of earth barriers around the borders of sites is proving effective.

5. Site protection status and relation with CORINE biotopes:

5.1 Designation types at national and regional level

Code	% cover
UK04 (SSSI/ASSI)	100.0

Citation

County: Suffolk **Site name:** Alde-Ore Estuary
District: Suffolk Coastal

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981 as amended.

Local Planning Authority: Suffolk County Council
Suffolk Coastal District Council

National grid reference: from TM 394 757 **Area:** 2,554.3 (ha) 6,311.7 (acres)
to TM 358 402

Ordnance Survey sheet: 1 : 50,000: 156, 159 **1:10,000:** TM 45 SE, TM 44 NW,
TM 34 SE, TM 45 SW,
TM 34 NE, TM 35 SW,
TM 44 NE, TM 45 NE,
TM /45 NW

Date notified (Under 1949 Act): 1952 **Date of last revision:** 1980

Date notified (under 1981 Act): 1985 **Date of last revision:** 1992

Other information

The site has been extended at the 1992 revision. It includes the Orfordness-Havergate NNR (part of which is designated as a Special Protection Area), and previously named Orfordness-Havergate SSSI and part of the previously named Snape Warren and Blackheath Wood SSSI. Orfordness and Gedgrave Cliff are listed as being of national importance in the Geological Conservation Review.

Description and reasons for notification

This site stretches along the coast from Bawdsey to Aldeburgh and inland to Snape. It includes Orfordness, Shingle Street, Havergate Island, and the Butley, Ore and Alde Rivers.

The scientific interests of the site are outstanding and diverse. The shingle structures of Orfordness and Shingle Street are of great physiographic importance whilst the cliff at Gedgrave is of geological interest. The site also contains a number of coastal formations and estuarine features including mud-flats, saltmarsh, vegetated shingle and coastal lagoons which are of special botanical and ornithological value.

Geomorphology

Orfordness, together with Shingle Street, is one of three major shingle landforms in the British Isles and is the only one which combines a shingle spit with a cusped foreland. This large feature comprises a complex sequence of shingle ridges deposited over a long period of time which record stages in the evolution of the landform. The distal end of the spit is still

subject to rapid changes and is dynamically related to events at Shingle Street on the mainland shore. This well documented site is of the highest educational and research value.

Geology

The cliff at Gedgrave is a small but renowned exposure of Coralline Crag about 3 m in height. Here the sandwave facies, which is characterised by large-scale cross stratification, overlies highly fossiliferous silty crag with marked unconformity. Clasts of the lower facies can be found in the sandwave facies and are evidence of contemporaneous erosion. A rich shell fauna is present in the lower facies which includes many species of molluscs and bryozoan. The site is also notable for the occasional occurrence of articulated specimens of the brachiopod *Terebratula maxima*, the world's largest species of terebratulid. The site is of great historical as well as palaeontological interest and is one of the only Coralline Crag localities to show the lower erosional contact of the sandwave facies.

Botany

The botanical interest of this site is enriched by the variety of habitats present, including mudflats, saltmarsh, brackish lagoons, shingle beach, reedbeds, grassland, freshwater and brackish ditches.

Mudflats of mixed clay, silt and shingle border the Ore, Butley and Alde rivers and Havergate Island within a tidal range of up to 2 metres. In places this supports the rare intertidal flowering plant *Zostera angustifolia*. Narrow fringes of saltmarsh occur along the length of the rivers with wider expanses at Shingle Street, Havergate Island, Stony Ditch, the upper reaches of the Butley river and in places by the Alde river. These are mostly dominated by sea purslane *Halimione portulacoides* and sea lavender *Limonium vulgare*, but a wide range of other saltmarsh species also occur, including sea-heath *Frankenia laevis*, glasswort *Salicornia pusilla*, small cord-grass *Spartina maritima* and Borrer's saltmarsh-grass *Puccinellia fasciculata*. It is representative of the *Halimione portulacoides* community as described in the National Vegetation Classification. Saltmarsh elements also occur around the lagoons and borrowpits on Shingle Street, Havergate Island and the Kings and Lantern Marshes on Orfordness. These also contain the rare tasselpondweeds *Ruppia spiralis* and *R. maritima*.

The site contains the second largest and best preserved area of vegetated shingle in Britain. This is a nationally rare and delicate habitat which supports a highly specialised flora. Species typical of exposed, shifting shingle such as sea pea *Lathyrus japonicus* and sea kale *Crambe maritima* are abundant whilst extensive areas of sea campion *Silene maritima* and stonecrops *Sedum acre* and *S. anglicum* occur on more stable ground. Orfordness contains one of the best examples of zonation in the shingle vegetation. Above the high water mark *Rumex crispus* and *Glaucium flavum* give a highly distinctive character to the mainly bare shingle, with *Lathyrus japonicus* becoming much more abundant within the matrix further inland. This vegetation gives way in turn to grassland dominated by *Arrhenatherum elatius* and *Silene maritima*. A wide range of rare or local species also occur including yellow vetch *Vicia lutea* and the dwarf clovers *Trifolium suffocatum*, *T. glomeratum*, *T. striatum*, *T. scabrum* and bur medick *Medicago minima*. Lichen communities are also well developed here with extensive areas of *Cladonia* heath. A unique feature for East Anglia beach formations is the abundance on the ground of normally epiphytic lichens *Parmelia caperata* and *Evernia prunastre*.

Higher saltmarsh blending to neutral grassland, dominated by sea couch grass, *Elymus pungens*, occurs on former grazing marsh on Havergate Island and Orfordness and on the extensive system of clay embankments throughout the site. There are small areas of reedbed at the head of the Butley River and at Iken.

Ornithology

The site is of national importance for its birdlife. Havergate Island holds the largest breeding colony of avocets in Britain, and they also feed in large numbers of Hazelwood Marshes and the Alde mudflats. Other breeding birds on the Island and elsewhere on the site include gadwall, shoveler, oystercatcher, ringed plover, common tern, Arctic tern, sandwich tern and little tern, common gull, short-eared owl, wheatear and marsh harrier. There are also very large breeding colonies of black-headed gull, lesser-black-backed gull and herring gull on Orfordness.

In winter and during migration the site is visited by nationally important numbers of wildfowl and shore-birds, including Bewick's swan, shelduck, teal, wigeon, redshank and avocet.

Invertebrates

The lagoons at Shingle street are notable for a number of brackish water species particularly the rare anthozoan *Nematostella vectensis* and the site is also noted for a number of rare spiders. Several nationally rare and scarce insects are found within ditches running through Hazelwood Marshes.

COUNTY: SUFFOLK SITE NAME: LEISTON-ALDEBURGH

DISTRICT: SUFFOLK COASTAL

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981

Local Planning Authorities: SUFFOLK COASTAL DISTRICT COUNCIL, Suffolk County Council

National Grid Reference: TM 461595 Area: 534.34 (ha.) 1,319.82 (ac.)

Ordnance Survey Sheet 1:50,000: 156 1:10,000: TM 45 NE, TM 46 SE

Date Notified (Under 1949 Act): 1955 Date of Last Revision: –

Date Notified (Under 1981 Act): 1986 Date of Last Revision: 1999

Other Information:

Part RSPB and Suffolk Wildlife Trust reserves.

The site was named 'North Warren and Thorpeness Mere', before the 1999 boundary revision.

Description and Reasons for Notification:

Leiston-Aldeburgh 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. The variety of habitats support a diverse and abundant community of breeding and overwintering birds, a high number of dragonfly species and many scarce plants.

The heathland of North Warren, Aldringham Common, The Walks and Thorpeness Common is a fragment of the once extensive Sandlings heaths of coastal Suffolk and is of varying composition. There are patches of sand sedge *Carex arenaria* and heather *Calluna vulgaris* dispersed within acid grassland. Bracken *Pteridium aquilinum* and scrub, notably gorse *Ulex europaeus* and *U. gallii* also form part of the heathland. The short sward acidic grassland is dominated by sheep's-fescue *Festuca ovina* and common bent *Agrostis capillaris* with some bare patches, bryophytes and lichens. There is a varied associated flora including lady's bedstraw *Galium verum*, sheep's sorrel *Rumex acetosella* and the nationally scarce mossy stonecrop *Crassula tillea* and clustered clover *Trifolium glomeratum*.

On the vegetated shingle there is a gradual transition between the strandline community and the shingle heath resulting from increasing stability and distance from tidal influence. On the open shingle, sea-kale *Crambe maritima* and yellow horned-poppay *Glaucium flavum* are frequent with the irregularly occurring sea spurge *Euphorbia paralias*. The stable shingle areas support many species including early hair-grass *Aira praecox*, the nationally scarce sand catchfly *Silene conica*, dune fescue

Vulpia fasciculata, bur medick *Medicago minima*, suffocated clover *Trifolium suffocatum* and sea pea *Lathyrus japonicus*.

Thorpeness Mere is a shallow, eutrophic water body on a peat substrate. The adjacent areas of swamp and carr woodland are hydrologically dependant on the mere. To the south of the mere, grey willow *Salix cinerea* woodland surrounds a fragmentary mosaic of fen communities, mostly reed dominant *Phragmites australis* with nettle *Urtica dioica*, hemp-agrimony *Eupatorium cannabinum* and wild parsnip *Pastinaca sativa*. In the fen meadow areas there is a richer suite of species including a large colony of adder's tongue *Ophioglossum vulgatum*.

Church Farm Marshes south of the mere consists of grassland that is mostly a mix of creeping bent *Agrostis stolonifera*, Yorkshire-fog *Holcus lanatus* and perennial ryegrass *Lolium perenne* with frequent crested dog's-tail *Cynosurus cristatus*. It is dissected by ditches dominated by spiked water-milfoil *Myriophyllum spicatum* and fennel pondweed *Potamogeton pectinatus* with water-crowfoot *Ranunculus baudotii* in the shallow margins.

The Fens area is dominated by common reed *Phragmites australis* with occasional lesser bulrush *Typha angustifolia*, yellow iris *Iris pseudacorus*, great willowherb *Epilobium hirsutum*, purple-loosestrife *Lythrum salicaria* and nationally scarce marsh sow-thistle *Sonchus palustris*. Water mint *Mentha aquatica* is present in the understorey with cleavers *Galium aparine* and bittersweet *Solanum dulcamara* frequent in the drier areas. Surrounding, and in many places merging into the fen, is grey willow *Salix cinerea* woodland and alder *Alnus glutinosa* woodland with a field layer containing a mix of remnant swamp species.

Many species of bird regularly breed using the great mix of habitats available. These include nightjar, woodlark and skylark on the dry grassland and heath. The scrub and woodland supports tree pipit, turtle dove, bullfinch and nightingale. The marshes, the open water and their margins, in particular, support a diverse range of breeding birds, including water rail, marsh harrier, gadwall and grasshopper warbler. The site is also attractive to wintering waterfowl including Bewick's swan and bittern and regularly supports important populations of white-fronted goose, gadwall and teal.

The variety of water bodies and terrestrial habitats provides suitable breeding and hunting areas for many species of dragonfly and damselfly, including the nationally scarce hairy dragonfly *Brachytron pratense*.

COUNTY: SUFFOLK SITE NAME: MINSMERE-WALBERSWICK
HEATHS AND MARSHES

DISTRICT: SUFFOLK COASTAL/WAVENEY

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the
Wildlife and Countryside Act 1981, as amended

Local Planning Authority: SUFFOLK COASTAL DISTRICT COUNCIL, Waveney
District Council, Suffolk County Council

National Grid Reference: TM 475645 Area: 2325.89 (ha.) 5747.27 (ac.)
TM 467772

Ordnance Survey Sheet 1:50,000: 156 1:10,000: TM 46 NE-NW-SW
TM 47 NE-NW-SE-SW

Date Notified (Under 1949 Act): See below Date of Last Revision: 1972

Date Notified (Under 1981 Act): 1989 Date of Last Revision: 1993

Other Information:

This site amalgamates Minsmere Level SSSI (notified in 1954), Walberswick SSSI
(notified in 1954) and Brick Kiln Walks SSSI (notified in 1972).

Much of this site has been designated a Special Protection Area under EC Directive
79/409 on the Conservation of Wild Birds, and as a Wetland of International
Importance under the Ramsar Convention.

Much of the site is included within 'A nature conservation review' by Ratcliffe (1977).
It is within the Suffolk Coast and Heaths Area of Outstanding Natural Beauty.

Parts of the site are owned and/or managed as nature reserves and are listed below

Walberswick National Nature Reserve (English Nature)
Westleton Heath National Nature Reserve (English Nature)
Minsmere Reserve (Royal Society for the Protection of Birds)
Dunwich Heath (National Trust)
Norman Gwatkin Reserve (Suffolk Wildlife Trust)

Description and Reasons for Notification:

This composite site is situated on the coast of Suffolk between Southwold in the
north and Sizewell in the south. It 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.

The tidal mudflats of the River Blyth estuary form sheltered feeding grounds for
wildfowl and shorebirds, notably wigeon, shelduck, redshank and dunlin. Saltmarsh,
dominated by sea purslane *Halimione portulacoides*, but also composed of sea

lavender *Limonium vulgare*, sea aster *Aster tripolium* and common cord-grass *Spartina anglica* fringes the southern shore of the estuary. Other saltmarsh species include glasswort *Salicornia* spp., sea rush *Juncus maritimus*, common saltmarsh grass *Puccinellia maritima* and sea couch-grass *Elymus pycnanthus*.

Shingle beach forms the coastline at Walberswick and Minsmere. This is subject to sea erosion and human disturbance but, nevertheless, it supports a variety of scarce shingle plants including sea pea *Lathyrus japonicus*, sea campion *Silene maritima* and small populations of sea kale *Crambe maritima*, grey hair-grass *Corynephorus canescens* and yellow horned-poppay *Glaucium flavum*. A narrow strip of yellow dune extends southwards at Minsmere behind which is a strip of dune grassland. A series of shallow, brackish lagoons and saltmarsh occurs behind the shingle beach between Walberswick and Dunwich.

Extensive reedbeds, consisting largely of pure stands of reed *Phragmites australis*, occur at Minsmere and Walberswick. These developed on former grazing marshes which were flooded as a war-time defence measure in 1940. Both marshes contain shallow pools of open water and are intersected by deep water channels. The reedbeds are an important habitat for birds and insects. There are large breeding populations of reed warbler and bearded tit. Other notable breeding species include marsh harrier, bittern, cetti's warbler, garganey and water rail. The marshes have a rich insect fauna; particularly moths, which includes a number of rare species: notably *Archanara neurica*, *Photedes brevilinea* and *Senta flammea*.

At Minsmere, a 20 hectare area of shallow lagoons and islands has been created for wading birds and wildfowl. This area is renowned for its breeding colony of avocets; shoveler, gadwall, teal and shelduck also breed.

Large blocks of grazing marsh are found near Eastbridge and Southwold. These marshes support a high number of species of breeding waterfowl such as snipe, redshank, gadwall, shoveler and black-tailed godwit. Dykes within the marshes contain very diverse aquatic plant communities, with brackish and freshwater types represented. Many nationally rare and scarce invertebrates such as the soldier fly *Odontomyia ornata* are found east of Eastbridge, as are a number of nationally scarce plants including sea barley *Hordeum marinum* and whorled water-milfoil *Myriophyllum verticillatum*. The marshes west of Eastbridge support a mosaic of different unimproved wetland communities including fen-meadow characterised by blunt-flowered rush *Juncus subnodulosus* and marsh thistle *Cirsium palustre*, reed beds, swamps dominated by lesser pond sedge *Carex acutiformis*, marshes dominated by meadowsweet *Filipendula ulmaria* with some angelica *Angelica sylvestris*, and alder *Alnus glutinosa* woodland.

High land at Minsmere, Westleton and Walberswick forms part of the East Suffolk Sandlings and is composed of infertile sands and gravels. This supports large areas of lowland heath, bracken, dry acidic grassland, woods and scrub.

Lowland heath, dominated by ling *Calluna vulgaris* but also containing bell heath *Erica cinerea* and cross-leaved heath *E. tetralix*, occupies a large continuous tract of about 400 ha at Minsmere, Dunwich and Westleton Heath with smaller areas at

Walberswick. This heathland provides a valuable habitat for two nationally decreasing birds, the nightjar and woodlark.

Patches of unimproved acid grassland in which red fescue *Festuca rubra* and common bent *Agrostis capillaris* predominate, occur through the site but areas dominated by wavy hair-grass *Deschampsia flexuosa*, purple moor-grass *Molinia caerulea* and sand sedge *Carex arenaria* also occur. A variety of other acid grassland plants is also present, of which heath bedstraw *Galium saxatile* and sheep's sorrel *Rumex acetosella* are common. Scarce species include bird's-foot clover *Trifolium ornithopodioides* and mossy stonecrop *Crassula tillaea* together with a small colony of red-tipped cudweed *Filago lutescens*. There are also substantial areas dominated by bracken *Pteridium aquilinum* or gorse *Ulex europaeus* and *U. gallii*.

Mature plantation woodland, chiefly of oak *Quercus robur* or Scots pine *Pinus sylvestris* but also including sycamore *Acer pseudoplatanus* and sweet chestnut *Castanea sativa*, occur at Minsmere and Walberswick. Naturally regenerated woods of birch *Betula pendula* and Scots pine have arisen on former heathland and alder *Alnus glutinosa*, sallow *Salix* spp. and birch woodlands are also present on wet ground. This woodland and scrub provides important additional habitat diversity for birds and invertebrates.

COUNTY: SUFFOLK SITE NAME: SIZEWELL MARSHES

DISTRICT: SUFFOLK COASTAL

Status: Site of Special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981 as amended

Local Planning Authority: SUFFOLK COUNTY COUNCIL, Suffolk Coastal District Council

National Grid Reference: TM 466638 Area: 104.33 (ha.) 257.80 (ac.)

Ordnance Survey Sheet 1:50,000: 156 1:10,000: TM 46 SE

Data Notified (Under 1949 Act): – Date of Last Revision: –

Date Notified (Under 1981 Act): 1987 Date of Last Revision: 1992

Other Information:

The site has been extended at the 1992 revision.

Description and Reasons for Notification:

Sizewell Marshes are important for their large area of lowland, unimproved wet meadows which support outstanding assemblages of invertebrates and breeding birds. Several nationally scarce plants are also present.

The site occupies a low-laying basin of deep fen peat. The water table is permanently high, with the area being prone to flooding, and there is an extensive network of ditches across the site.

In the areas of unimproved wet meadow the principal grass species are Sweet Vernal-grass *Anthoxanthum odoratum*, Crested Dog's-tail *Cynosurus cristatus*, Rough-stalked Meadow-grass *Poa trivialis* and Yorkshire-fog *Holcus lanatus*. There are many other typical species including Marsh Pennywort *Hydrocotyle vulgaris*, Ragged Robin *Lychnis flos-cuculi*, Large Bird's-foot-trefoil *Lotus uliginosus*, Marsh-orchids *Dactylorhiza* spp., Bogbean *Menyanthes trifoliata*, Bog Pimpernel *Anagallis tenella*, Yellow Iris *Iris pseudacorus*, sedges *Carex* spp. and rushes *Juncus* spp. The nationally scarce Marsh Dock *Rumex palustris* and Greater Water-parsnip *Sium latifolium* are also present. It is considered that these communities are representative of the *Juncus subnodulosus* – *Cirsium palustre* fen-meadow and the *J. effusus/acutiflorus* – *Galium palustre* rush-pasture, as described in the National Vegetation Classification. In addition, several areas of reedbed dominated by Common Reed *Phragmites australis* and alder carr occur.

The extensive ditch system supports a diverse aquatic flora which includes the nationally scarce Soft Hornwort *Ceratophyllum submersum*, Fen Pondweed *Potamogeton coloratus* and Whorled Water-milfoil *Myriophyllum verticillatum*. The variety of ditch depths and widths, together with their fringing vegetation provide an important contribution to the site's habitat value for invertebrates and birdlife.

Sizewell Marshes are of exceptional interest for their invertebrate fauna, supporting a wide range of taxa and many nationally rare or scarce species. These include terrestrial and aquatic beetles (Coleoptera), flies (Diptera), moths (Lepidoptera), dragonflies (Odonata) and spiders (Araneae).

The breeding bird assemblage is also of national significance with many species that are typical of wet grassland and associated habitats, including Shoveler, Gadwall, Teal, Snipe and Lapwing.



VOLUME 9, CHAPTER 7, APPENDIX 7A, ANNEX 7A.3
SECONDARY DATA

- ANNEX 7A.3 - ALDHURST FARM WEST, BAT SURVEY

REPORT 2012

- ANNEX 7A.3 - LAND WEST OF LOVER'S LANE, BAT

SURVEY REPORT 2012

- ANNEX 7A.3 - PHASE 1 HABITAT SURVEY 2011

- ANNEX 7A.3 - BIRD SURVEY REPORT 2011-12

- ANNEX 7A.3 - GREAT CRESTED NEWT SURVEY 2012

NNB Generation Company

Aldhurst Farm West

Associated Development Site 1

DRAFT Bat Survey Report

February 2012

AMEC Environment & Infrastructure UK Limited

Report for

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NNB Generation Company

Aldhurst Farm West

Associated Development Site 1

DRAFT Bat Survey Report

February 2012

AMEC Environment & Infrastructure
UK Limited



Certificate No. FS 13881



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Document Revisions

No.	Details	Date
1	Draft	Feb 12

Contents

1.	Introduction	1
1.1	Background	1
1.2	Site Description and Value of Habitats for Bats	1
1.3	Purpose of this Report	2
1.4	Legislation and Policy Guidance	2
2.	Methods	3
2.1	Walked Transects	3
2.2	Static Bat Detector Survey	3
2.3	Personnel	4
3.	Results	5
3.1	Walked Transects	5
3.1.1	Weather Conditions	5
3.1.2	Relative Activity Levels of Bats	5
3.1.3	Spatial Distribution of Bats	6
3.2	Static Bat Detector Survey	6
3.2.1	Relative Activity Levels of all Bats	6
3.2.2	Relative Activity Levels of Group 1 Species	7
3.2.3	Relative Activity of Group 2 Species	8
4.	Conclusions	9
4.1	Barbastelle	9
4.2	Nathusius' Pipistrelle	9
4.3	Leisler's Bat	9
4.4	Common and Soprano Pipistrelle	10
4.5	Brown Long-Eared Bat	10
4.6	Myotis sp	10
4.7	Noctule	10
Table 2.1	Static Detector Dates (in 2011) and Locations	4
Table 3.1	Weather Conditions during Walked Transect Surveys	5



Table 3.2	Numbers of Passes and Relative Bat Activity Recorded during Walked Transects in 2011	5
Table 3.3	Number of Passes and Relative Activity Level Recorded during Static Bat Detector Survey	6
Figure 1.1	Site Boundary	After Page 10
Figure 2.1	Combined 2011 walked transect bat survey routes and static bat detector locations	After Page 10
Figure 3.1	Locations of bat passes recorded during 2011 walked transect surveys	After Page 10
Appendix A Policy and Legislation relating to Bats in Suffolk		
Appendix B Materials and Data Analysis		

1. Introduction

1.1 Background

An area of land directly north of Sizewell B Nuclear Power Station, which is located near Leiston in Suffolk, has been identified as having the potential to accommodate the proposed development of one or more new nuclear reactors. This proposed development is known as Sizewell C. The site of the proposed development has an approximate central National Grid Reference (NGR) of TM473640. NNB Generation Company (EDF) has identified a number of additional sites for a variety of developments associated with the new build proposals at Sizewell that will be located beyond the current EDF landholding. AMEC Environment & Infrastructure UK Ltd ('AMEC') has been commissioned to provide ecological services in relation to these sites, in order to inform the site selection process and support any future planning submissions. Baker Shepherd Gillespie (BSG) was commissioned to carry out bat surveys for these sites in 2011.

Aldhurst Farm West (Site 1), situated to the north of Leiston, Suffolk (approximate central NGR: TM439638) has been identified as a potential site for associated development. The sites proposed for associated development are currently at a preliminary stage of scoping with detailed scheme plans yet to be confirmed. Notwithstanding, current proposals for land at Aldhurst Farm West include the development of the site to support industrial and warehousing facilities.

1.2 Site Description and Value of Habitats for Bats

Site 1 is located on the north-eastern extent of Leiston, Suffolk within a rural setting (refer to Figure 1.11 for location details and a redline boundary of the site). The site is bordered to the north by Lover's Lane, and to the east by Abbey Road, with the remainder of the site bordered by arable land to the south. Residential housing is situated adjacent to the south-eastern corner of the site.

A brief description of the habitats present within the site in relation to the potential they have for supporting roosting, foraging or commuting bats is included below. For a full habitat description and habitat map, please refer to the Phase 1 Habitat Survey report for the site².

Although the site is predominantly arable farmland, which is likely to be of low value to bats, much of the site is bordered by hedgerows with mature trees, principally oak (*Quercus robur*), present along the edge of Lover's Lane and in the southwest corner of the site. These habitats may be of value to foraging and commuting bats. There are also a number of ditches (dry at the time of the survey), particularly along the southern boundary, with areas of rank semi-improved grassland on the edge of arable fields and scrub habitat in the centre of the site that may provide

¹ All figures can be found at the end of the report.

² Report reference: 28130ca135.

suitable foraging habitat for bats. In addition, there are several buildings and mature trees within the site boundary that may provide potential roosting opportunities for bats.

1.3 Purpose of this Report

This report summarises the findings of bat activity surveys carried out within the site in 2011 and provides a summary of the bat interest of the site. The focus of the survey work was to examine spatial and temporal patterns of bat activity, and to identify areas of importance for bats through quantitative analysis of relative activity levels. The survey work did not attempt to identify potential roost locations, although an initial assessment of potential roosting features (buildings and trees) was carried out in the Phase 1 Habitat Survey report for the site².

1.4 Legislation and Policy Guidance

Details of national policies and legislation that relate to bats, as well as details of the draft Suffolk Biodiversity Action Plan (BAP) for bats are provided in **Appendix A**.

2. Methods

2.1 Walked Transects

Three walked transect surveys were undertaken within the survey area, with one in each of the three sampling periods (May, July and August 2011), in order to collect representative data on bat activity throughout the peak season for such. See **Figure 2.1** for transect routes. During each transect survey two surveyors together (for health and safety reasons) walked a pre-determined transect route.

Two surveys were undertaken at dusk and one before dawn. The dusk survey visits started around sunset and typically took 2.5-3 hours to complete, and the dawn survey was carried out throughout the two hours prior to sunrise. The same (or a similar) transect route was walked on each survey visit with the start and end points changed on each visit to ensure that different parts of the site were surveyed at different times of the night. This approach was adopted to remove a bias that could be introduced if any given point on the transect route was sampled at approximately the same interval after sunset during the two dusk surveys. In addition, during the dusk transects, surveyors completed two circuits of the route to ensure sampling at each part of the site at two different intervals after sunset.

Surveys were carried out only when weather conditions were suitable for bats to be active, avoiding temperatures below 9°C, rain and high wind speeds. The dawn transect survey on 24 May was a little cold with the temperature dropping to 6°C by sunrise, but reasonable bat activity was recorded and this is not considered a significant constraint to the overall results.

Evidence of a common pipistrelle (*Pipistrellus pipistrellus*) roost (a number of bats were seen emerging from the building) was noted at a house at Gipsy Lodge on the northwest boundary of the site during the walked transect survey on 4 July. As a result, an emergence count of the exit point/s was undertaken on that date. Two surveyors watched the northwest facing gable end of the northern-most building (from where bats were emerging) for around 20 minutes. The transect survey was resumed when no further bats had been seen emerging for five minutes. Another short emergence survey was carried out on 3 August at sunset with two surveyors. One surveyor watched the same building while another walked around the perimeter of Gipsy Lodge watching for bats emerging from any other exit points. The watch lasted around 20 minutes and the transect survey again resumed when no further bats had been seen emerging for five minutes.

2.2 Static Bat Detector Survey

Anabat SD1 bat detectors were used to assess bat activity at three locations, thought to represent potentially high quality commuting or foraging habitat for bats (see **Figure 2.1** for locations). **Table 2.1** provides details of static detector deployment.

Table 2.1 Static Detector Dates (in 2011) and Locations

Static	Location (Figure 2.1)	Start	Finish	Nights	Dates analysed for Group 2 bats
A	Oak tree on south side of Lover's Lane	11/05	22/05	12	18, 19 and 20 May
B	Hedge east of Fisher's Farm	21/06	03/07	13	21, 22 and 25 June
C	Southern hedge	03/08	22/08	20	5, 17 and 22 August

The detectors were programmed to begin recording half an hour before sunset and finish half an hour after sunrise. The number of survey hours therefore varied throughout the survey season according to night length.

All recordings were checked for rarer species of potentially higher conservation significance by scanning sound files for these species. The species selected were: barbastelle (*Barbastella barbastellus*), Nathusius' pipistrelle (*Pipistrellus nathusii*) and Leisler's bat (*Nyctalus leisleri*) (hereafter referred to as Group 1). However, because a very large amount of data is likely to be recorded during static detector surveys, the majority of which will represent the common pipistrelle species, it is not cost-efficient or necessary to check and label every pass of all species of bats. For all other species, therefore, termed here Group 2, a sub-set of three nights of data from each deployment (as detailed in **Table 2.1**) - those with the highest number of bat calls recorded – were analysed in detail.

Full details of equipment used for bat surveys and analysis methods are included in **Appendix B**.

2.3 Personnel

Walked transect and static detector survey work during 2011 was carried out by a total of four ecologists. These surveys were all led by either Matthew Hobbs (MH) or Vilas Anthwal (VA; Natural England bat survey licence number 20110076) of BSG with another two experienced bat surveyors assisting³.

³ Stephanie Boocock (SB; Natural England bat survey licence number 20113031) of BSG and Iain Hysom (IH; freelance: Natural England bat survey licence number 20110086).

3. Results

3.1 Walked Transects

3.1.1 Weather Conditions

Table 3.1 Weather Conditions during Walked Transect Surveys

Date	Temperature (°C, start-end)	Wind strength ⁴	Cloud cover (%)	Rainfall
24/05	9-6	3-4	10	0
04/07	15-13	0	0	0
03/08	16	0	20	0

3.1.2 Relative Activity Levels of Bats

The total numbers of passes and relative activity levels recorded for each species are shown in **Table 3.2**.

Table 3.2 Numbers of Passes and Relative Bat Activity Recorded during Walked Transects in 2011

Species	Survey date			Total	B/h ⁵	% of total
	24/05	04/07	03/08			
Leisler's bat	0	0	1	1	0.1	0.6
Common pipistrelle	19	53	48	120	16.8	77.9
Common/soprano pipistrelle	0	0	3	3	0.4	1.9
Soprano pipistrelle	7	15	7	29	4.1	18.8
Barbastelle	0	0	1	1	0.1	0.6
Grand Total	26	68	60	154		
Survey duration (min)	137	145	147	429		
Total B/h	11.4	28.1	24.5	21.5		

⁴Wind strength is given in the Beaufort scale and wind direction is abbreviated to an eight point compass (e.g. NE = north-east). The Beaufort scale is an empirical measure that relates wind speed to observed conditions at sea or on land.

⁵ Number of bat passes per hour (see **Appendix B**).

In summary, 154 passes of four species of bats were recorded during the walked transect surveys. Common pipistrelle was the most frequently encountered species representing almost 80% of all passes recorded. Soprano pipistrelle (*Pipistrellus pygmaeus*) was the second most frequent, representing about 20% of the recorded activity. Just one pass of each of the other two species, barbastelle and Leisler's bat, was recorded, both on 3 August.

Bat activity levels varied between transects, with similar levels of 28.1 and 24.5 B/h on 4 July and 3 August respectively, and 11.4 B/h during the dawn May survey.

3.1.3 Spatial Distribution of Bats

The spatial distribution of the bat species recorded is shown in **Figure 3.1**. The majority of common pipistrelle passes were recorded along the northern boundary of the site, as far as the western point of the site boundary. A few passes were also recorded in the southern part of the site: south of Aldhurst Farm and on the eastern boundary and south-eastern corner of the site. Around 15 minutes after sunset on 3 July surveyors observed at least three bats flying southwest down Abbey Lane from the direction of Gypsy Lodge. By back-tracking in the direction from which they came the surveyors observed another 23 common pipistrelle bats emerging from the northern house at Gypsy Lodge. The bats all emerged from under a barge-board high on the north-west facing gable end of the building. On 3 August another short emergence watch was undertaken and 24 bats emerged from the northern gable of the southern house with a further seven from the south gable of the northern house.

Soprano pipistrelles were also recorded primarily from the northern boundary of the site, although most were in the eastern half of the site with only one west and four south of Aldhurst Farm respectively. The single passes of barbastelle and Leisler's bat were recorded close to each other on the edge of Lover's Lane just to the east of Aldhurst Farm. Both were recorded around two hours after sunset.

3.2 Static Bat Detector Survey

3.2.1 Relative Activity Levels of all Bats

The relative activity level recorded at each static detector for all species or grouped species categories are shown in **Table 3.3**.

Table 3.3 Number of Passes and Relative Activity Level Recorded during Static Bat Detector Survey

Species	Static no. and deployment dates				B/h
	Static A	Static B	Static C	Total	
	11-22/05	21/06-03/07	02-16/08		
Group 1 (all nights)					
Leisler's bat	1	7	3	11	<0.1
Nathusius' pipistrelle	4	0	1	5	<0.1
Barbastelle	3	42	25	70	0.2

Species	Static no. and deployment dates			Total	B/h
	Static A	Static B	Static C		
	11-22/05	21/06-03/07	02-16/08		
Group 1 total	8	49	39	86	
Group 2 (3x3 nights)					
Noctule	0	6	2	8	0.1
<i>Nyctalus</i> sp.	0	2	0	2	<0.1
Common/Nathusius' pipistrelle	0	1	0	2	<0.1
Common pipistrelle	639	455	125	1219	16.5
Common/soprano pipistrelle	4	26	5	35	0.5
Soprano pipistrelle	41	214	64	319	4.3
<i>Myotis</i> sp.	3	0	11	14	0.2
<i>Myotis</i> sp./brown long-eared bat	0	0	5	5	<0.1
Brown long-eared bat	1	0	0	1	<0.1
Group 2 total	688	704	212	1605	

In the nine nights selected for analysis of all species a total of 1605 bat passes of Group 2 species were recorded at an average of 21.7 B/h with a further 86 passes (0.3 B/h) of three Group 1 species: barbastelle, Leisler's bat and Nathusius' pipistrelle. An additional four species were recorded during static surveys that were not recorded during walked transects: noctule (*Nyctalus noctula*), Nathusius' pipistrelle, *Myotis* sp. and brown long-eared bat (*Plecotus auritus*).

3.2.2 Relative Activity Levels of Group 1 Species

Barbastelle was recorded from all three detector locations with the highest activity rate from Static B to the east of Fisher's Farm in June/July (0.3 B/h; $n^6 = 42$). A lower level of activity was recorded from Static C along the southern boundary of the site in August (0.2 B/h; $n = 25$), and just three passes from Static A on the edge of Lover's Lane in May. Nocturnal activity patterns show that most activity occurred within the site at least an hour after sunset or more than an hour before sunrise ($TC^7_3 = 0.3$ B/h; $TC_9 = 0.5$ B/h).

Only 11 Leisler's bat passes and five Nathusius' pipistrelle passes were recorded throughout the survey periods. Nathusius' pipistrelle passes were recorded during the period 11-19 May ($n = 4$) and on 15 August ($n = 1$). None of the passes of either species were recorded within an hour of sunset or sunrise.

⁶ Number of passes (refer to **Appendix B**).

⁷ Time Code (refer to **Appendix B**).

3.2.3 Relative Activity of Group 2 Species

A very low activity level of *Myotis* sp. were recorded with just 14 passes: 11 from Static C and three from Static A. All passes were recorded during the middle period of the night (TC6-7).

Eight noctule passes were recorded with six from Static B and two from Static C. All records were from TC3-7 (not within 40 minutes of sunset). A further two *Nyctalus* sp. passes were also recorded.

Relatively high activity levels were recorded for common pipistrelle (16.5 B/h), with moderate activity levels recorded for soprano pipistrelle (4.3 B/h). Common and soprano pipistrelle bats were recorded from all detectors, with higher activity rates recorded from Statics A (27.1 B/h) and B (20.9 B/h) than from Static C (4.4 B/h) for common pipistrelle. Higher activity rates were recorded from Static B (9.8 B/h) than Statics A (1.7 B/h) and C (2.3 B/h) for soprano pipistrelle.

Activity levels of common pipistrelle were high throughout the night with a peak recorded at around two hours after sunset (TC6; 42.3 B/h) across all detector locations. Highest activity levels for soprano pipistrelle were recorded within an hour of sunset and sunrise (TC3 = 14.7 B/h; TC11 = 22.7 B/h) with little activity recorded during the middle of the night.

A single pass of brown long-eared bat was recorded at Static A in May. This was at 72 minutes before sunrise.

4. Conclusions

Bat surveys were carried out by BSG at Site 1 during May-August 2011 and included three walked transect surveys of the site and the deployment of static bat detectors in three locations in May, June/July and August. Four species of bats were recorded during transect surveys: Leisler's bat, common pipistrelle, soprano pipistrelle and barbastelle. A further four species were only recorded during static bat detector surveys: noctule, Nathusius' pipistrelle, *Myotis* sp. and brown long-eared bat.

In summary, the site supports an assemblage of bat species that is typical of the area and, with the exception of common and soprano pipistrelle bats, most species recorded during surveys do not appear to use the site frequently. The following sections provide further details of the status of each species.

4.1 Barbastelle

A maternity colony of barbastelle was discovered on the Sizewell Estate as a result of radio-tracking surveys carried out in 2010⁸ and 2011⁹. The northeast corner of Site 1 is c630m from a barbastelle maternity roost tree adjacent to Leiston Old Abbey, which is part of a wider network of roost trees largely contained within the Sizewell Estate. Also, a single male barbastelle roosted in a barn 420m north of the site boundary in August 2011. The low activity levels recorded for this species in combination with the lack of records close to sunset and/or sunrise indicate that the site is unlikely to be a core foraging area for individuals of this species although it is used by occasional bats for foraging and/or commuting.

4.2 Nathusius' Pipistrelle

Very few passes of Nathusius' pipistrelle were recorded, and the surveys provided no evidence to suggest that the site is of importance for foraging/ commuting, or is located close to roosts of this species. Furthermore, all activity was recorded within the migratory period for this species, which may suggest that these records refer to transitory individuals.

4.3 Leisler's Bat

Very few passes of Leisler's bat were recorded, and the surveys provided no evidence to suggest that the site is of importance for foraging/ commuting. None of the records were close to sunset or sunrise and it is unlikely that the site is close to a roost.

⁸ Report reference: 28130ca68.

⁹ Draft report at time of writing.

4.4 Common and Soprano Pipistrelle

Formal roost surveys were not carried out but a roost of common pipistrelle was found at Gipsy Lodge. Although three exit points and two roof spaces were used by bats the counts probably represent a single mobile roost rather than two separate roosts. Given the moderately high numbers of bats involved and the season it is likely that the roost was a maternity roost.

Activity levels of common and soprano pipistrelles were relatively high and moderate respectively with some evidence that the site may be a core foraging area for both species. The timing of soprano pipistrelle passes suggests that there may be a roost relatively close to the site. The nearest known roost of soprano pipistrelle is a maternity colony of this species that uses bat boxes in woodland at Kenton Hills, 1km to the east of the closest point of the site boundary.

4.5 Brown Long-Eared Bat

The very low level of activity recorded for brown long-eared bat indicates that the site is not of importance for this species. The nearest known roost for this species is at the Suffolk Wildlife Trust workshop at Upper Abbey Farm, approximately 1km to the northeast of the site¹⁰.

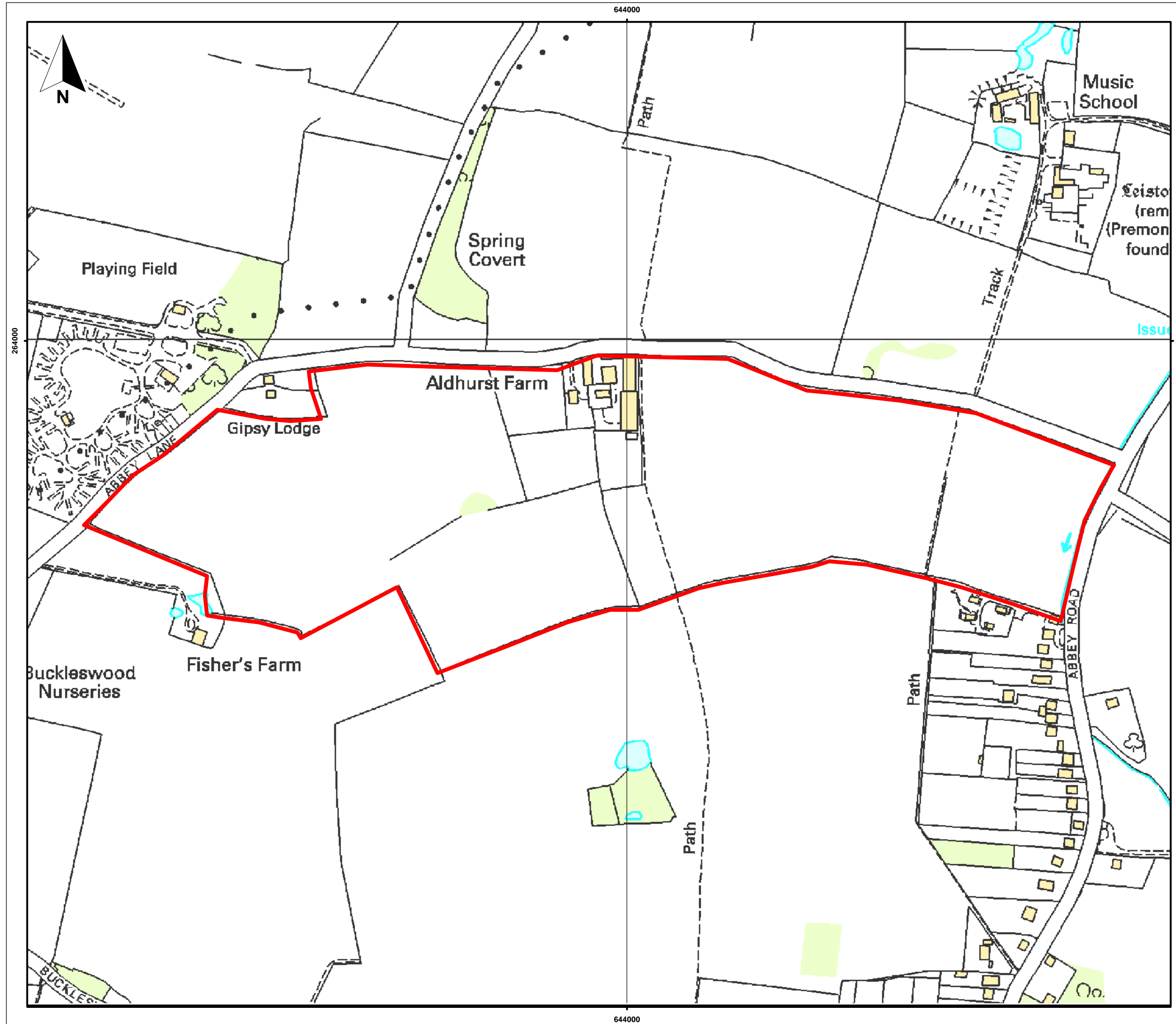
4.6 Myotis sp

Very few passes of *Myotis* bats were recorded and the surveys provided no evidence to suggest that the site is of importance for foraging/ commuting or located close to roosts of any of these species. Nonetheless, the northern boundary of Site 1 is 300m south of a maternity roost of Natterer's bats (*Myotis nattereri*) at Leiston Abbey ruins, where up to 49 bats were seen emerging in August 2011⁹.

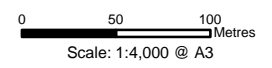
4.7 Noctule

The site does not appear to be regularly used by noctule, and there is no evidence that the site is close to any roosts of this species.

¹⁰ Report reference: 19801cb114.



Key:
 Site boundary



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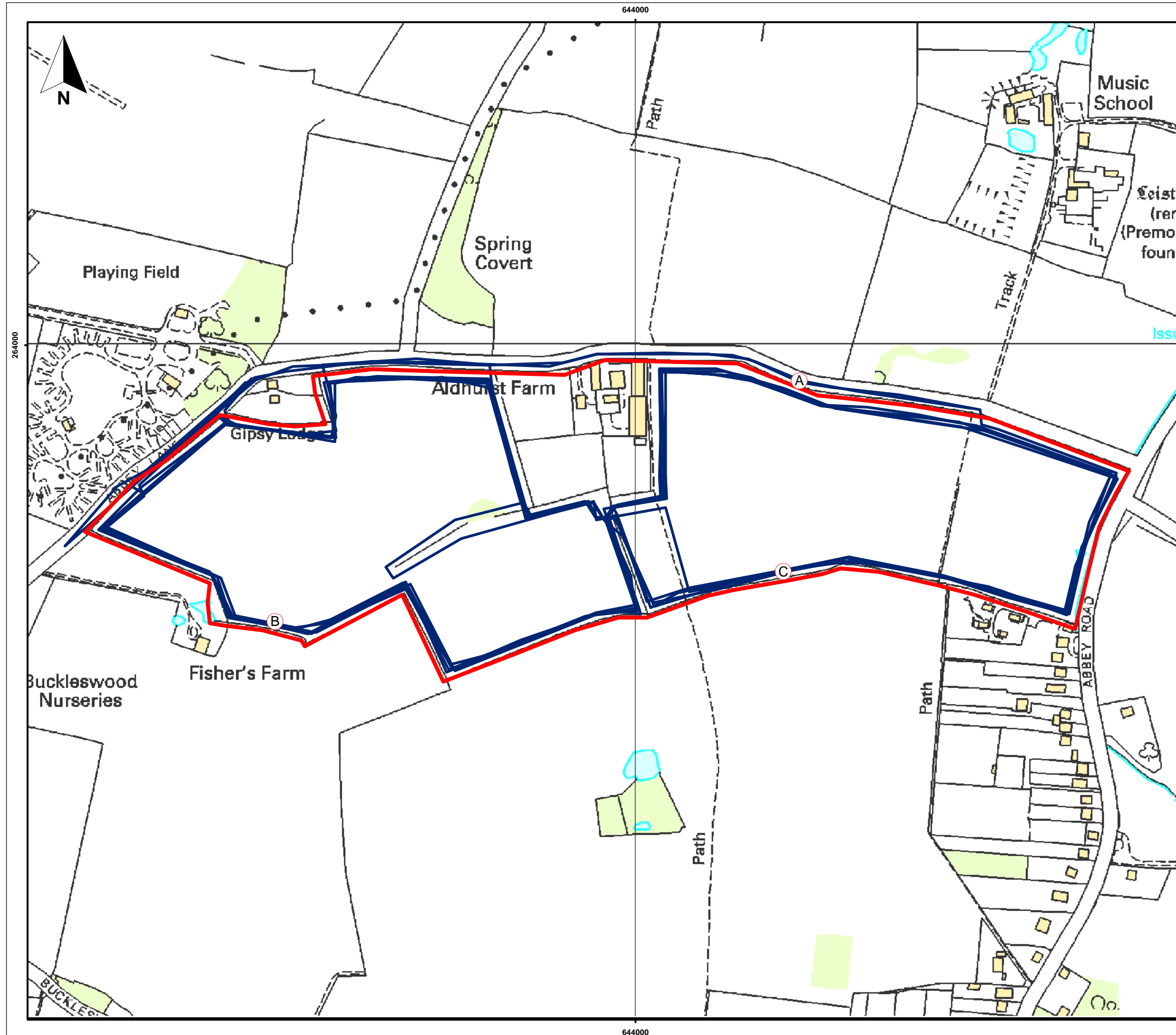


Aldhurst Farm West
 (Associated Development Site 1)
 Bat Survey Report

Figure 1.1
Site boundary

February 2012
 28130-A336.mxd tugwc





Key:

- Site boundary
- Walked transect route
- Static location

0 50 100 Metres
Scale: 1:4,000 @ A3

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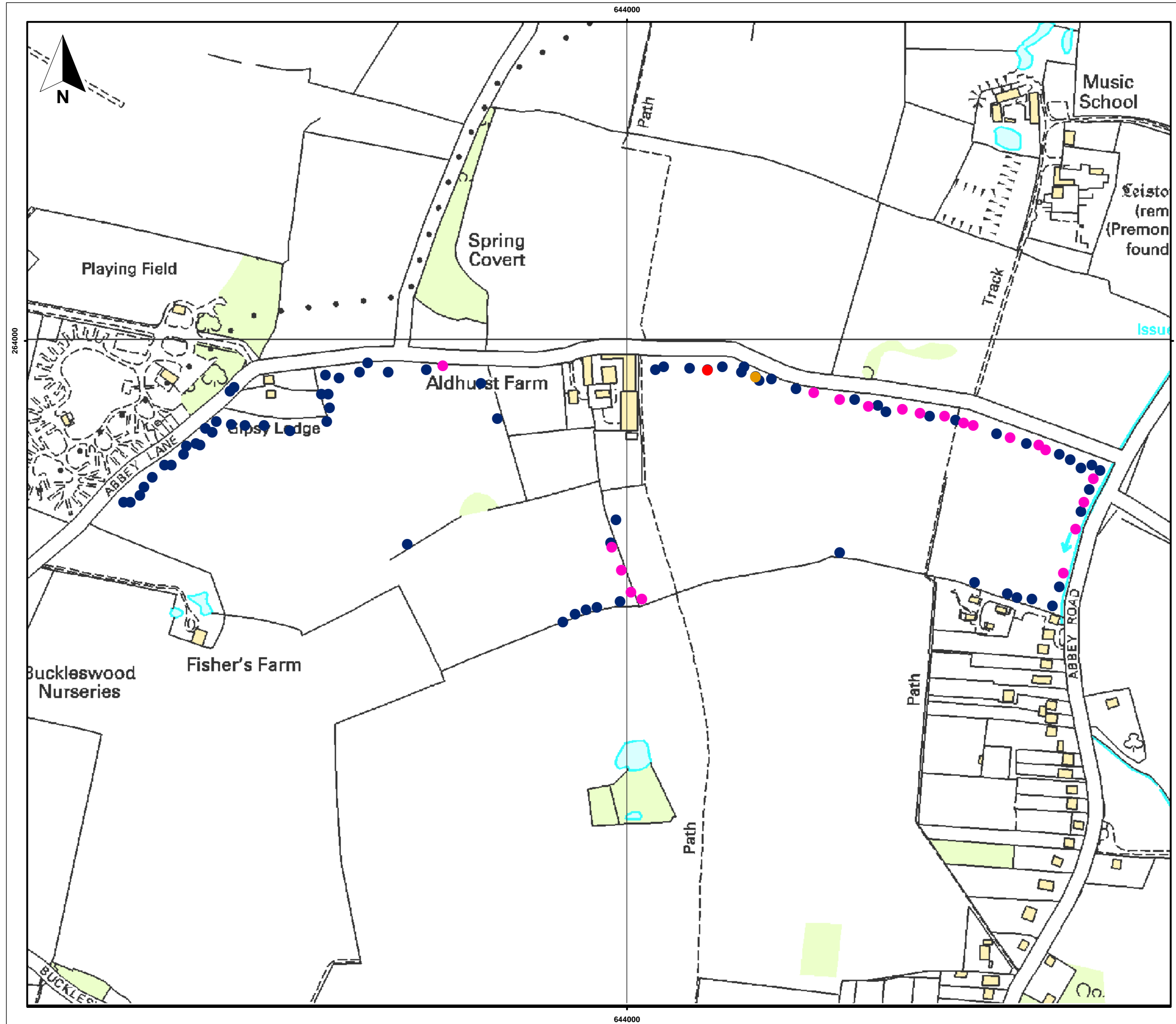


Aldhurst Farm West
(Associated Development Site 1)
Bat Survey Report

Figure 2.1
Combined 2011 walked
transect bat survey routes and
static bat detector locations

February 2012
28130-A337.mxd tugwc





- Key:**
- Barbastelle
 - Leisler's bat
 - Common pipistrelle
 - Soprano pipistrelle

0 37.5 75 150 Metres
Scale: 1:4,000 @ A3

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Aldhurst Farm West
(Associated Development Site 1)
Bat Survey Report

Figure 3.1
Locations of bat passes
recorded during 2011
walked transect surveys

February 2012
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Appendix A

Policy and Legislation relating to Bats in Suffolk

Legislation and Policy Guidance

Biodiversity Action Plan

Seventeen¹¹ species of bat are known to be resident in the UK, seven of which are on the new list of priority species¹² in the UK Biodiversity Action Plan (UK BAP), adopted by the Government in 2007. Species included on this list have been identified by the UK Government as needing special conservation effort because of their rarity and/or decline in numbers over recent decades. Species Action Plans (SAPs) have been developed to identify conservation priorities, propose action, and set targets to try and maintain and restore populations. Bat populations are at risk from changes to the landscape (such as those caused by agricultural practices or land development), which can cause loss of roosting, foraging or commuting habitat and be a contributing factor to population decline.

A clear understanding of the level and nature of use of a site by bats is necessary to ensure that environmental measures (mitigation, enhancement and offsetting) associated with a development can be appropriately targeted, and put in the context of local and National conservation priorities. The SAPs promote the favourable management of land, especially in the vicinity of known roost sites, and aim to maintain and enhance existing bat populations. These can lead to the designation of important sites for rarer species and notification to the local authority of important roosts such as maternity or hibernation sites.

Most of the Species Action Plans (SAPs) in the Suffolk Biodiversity Action Plan are based on National Biodiversity Action Plans. The process of identifying BAP priorities in Suffolk began in 1997, and an initial plan (Tranche 1) was produced in 1998. Priority species included the common pipistrelle bat. Tranche 2, published in 2000, was withdrawn and a new list was published in June 2010, with a new combined BAP for all bat species due for completion in autumn 2010. Although this had not been issued at the time of writing some data from the draft BAP for bats is included in **Table A1** below.

¹¹ This does not include greater mouse-eared bat (*Myotis myotis*), which is considered resident by some, but only a single individual has been recorded in recent years after the species was officially declared extinct in the UK.

¹² Priority bat species in the UK BAP: barbastelle, Bechstein's bat (*Myotis bechsteinii*), noctule, soprano pipistrelle, brown long-eared bat, greater horseshoe bat (*Rhinolophus ferrumequinum*) and lesser horseshoe bat (*Rhinolophus hipposideros*).

Table A1 Status of Bat Species in Suffolk¹³

Species	Number of occupied 1 km squares	Range & abundance	Notes	Source
Noctule	86	Uncommon but widespread		Suffolk BAP
Leisler's bat	14	Rare and locally distributed	Only three nursery colonies are known in the county. Appears to be confined to the northwest of Suffolk.	Suffolk BAP Suffolk Bat Group
Serotine	109	Uncommon but widespread	There are approximately 45 known colonies in Suffolk.	Suffolk BAP Suffolk Bat Group
Nathusius' Pipistrelle	2	Rare and locally distributed	There are only a few records from Suffolk currently; more may come to light from a new BCT survey, initial results of which are due to be published in February 2010.	Suffolk BAP Suffolk Bat Group
Soprano Pipistrelle	74	Uncommon but widespread		Suffolk BAP
Common pipistrelle	682	Common and widespread		Suffolk BAP
Lesser horseshoe bat	1	Rare and very local	A single bat (presumed to be the same individual) has been recorded at a hibernation site in most winters between 1996 and at least 2008.	Suffolk BAP Suffolk Bat Group
Natterer's bat	131	Uncommon but widespread		Suffolk BAP
Daubenton's bat	50	Locally common and widespread		Suffolk BAP
Whiskered/ Brandt's/ Alcatheo* whiskered bat	?	Rare and very local	Until January 2000 all records were from two hibernation sites, and refer to single animals. A breeding roost has yet to be discovered in the county.	Suffolk Bat Group
Brown-long eared bat	624	Common and widespread		Suffolk BAP
Barbastelle	40	Uncommon but widespread		Suffolk BAP

¹³ Information provided from the Suffolk BAP is draft and unpublished at the time of writing (13/12/2011).

- Whiskered (*Myotis mystacinus*) and Brandt's (*Myotis brandtii*) bats are cryptic species (i.e. very similar to each other and therefore difficult to distinguish), so all previous hibernation site records would have been recorded as "whiskered/Brandt's". However, a third cryptic species, Alcaethoe whiskered bat (*Myotis alcaethoe*), was confirmed to occur in the UK in 2010, and is now thought to have been resident and probably widespread here for some time. Hibernation records could therefore represent any of these three.

Protective Legislation relating to Bats

All bat species and their roosts are protected in the UK under *The Conservation of Habitats and Species Regulations 2010* which implements the EC Directive 92/43/EEC (the Habitats Directive). In addition, the lesser horseshoe, greater horseshoe bat, Bechstein's bat and barbastelle are listed in Annex II of the Habitats Directive, which requires sites to be designated by member states for their protection.

All bat species and their roosts are also protected under Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended), and under the *Countryside and Rights of Way Act 2000*. Taken together, these Acts and Regulations make it illegal to:

- Intentionally or deliberately kill, injure or capture bats;
- Deliberately or recklessly disturb bats;
- Damage, destroy or obstruct access to bat roosts;
- Possess or transport a bat or any part of a bat, unless acquired legally; and
- Sell, barter or exchange bats or parts of bats.

The Natural Environment and Rural Communities Act 2006 (NERC Act) states, in Section 40(1), that

“every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity”.

Section 40(3) of the NERC Act 2006 goes on to state that

“conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat”.

Section 41(1) of the NERC Act 2006 states that

“the Secretary of State must, as respects England, publish a list of the living organisms and types of habitat which in the Secretary of State's opinion are of principal importance for the purpose of conserving biodiversity”.

All seven species of bats that are priority species in the UK Biodiversity Action Plan (see Section 2.4.1) are also considered Species of Principal Importance for the Conservation of Biodiversity under Section 41 of the NERC Act.

In paragraph 16 of Planning Policy Statement 9, the Government indicates that local authorities should take steps to further the conservation of species of principal importance for the conservation of biodiversity in England and should ensure that that these species and their habitats are protected from adverse effects of development, where appropriate, by using planning conditions or obligations.

Developments that compromise the protection afforded to bats under the provisions of *The Conservation of Habitats and Species Regulations 2010* almost invariably require a licence from Natural England. Three tests must be satisfied before a licence to permit otherwise prohibited acts can be issued:

- Regulation 53(2) (e) states that licences may be granted by Natural England to *'preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment'*;
- Regulation 53(9) (a) states that a licence may not be granted unless Natural England is satisfied *'that there is no satisfactory alternative'*; and
- Regulation 53(9) (b) states that a licence cannot be issued unless Natural England is satisfied that the action proposed *'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range'*.

In conclusion, a licence permits otherwise unlawful actions and it is the responsibility of the developer, or their appointed advisor, to decide whether a licence is required for work that has the potential to affect bat populations. It is important that the developer carries out a thorough survey and accurate assessment to help avoid committing offences. It is also the responsibility of the developer to design and implement a mitigation scheme that meets the licensing requirements and ensures, as far as possible, the long-term maintenance of any bat population affected. Licence applications (under Regulation 53(2) (e) of the Habitats Regulations) will be determined by Natural England.

Appendix B

Materials and Data Analysis

Use of Bat Detectors

Walked Transects

Surveyors used two different bat detectors on every survey: a Batbox Duet or BatBox Griffin detector for listening to bat calls from the combined heterodyne/frequency division output and an Anabat SD1 or SD2 frequency division detector for recording calls for subsequent identification. Wherever possible, surveyors recorded the observed behaviour and numbers of bats onto field proforma. Notes were taken of all bat sightings in conjunction with the Anabat recordings. This was to aid in identification and also to provide additional detail on the behaviour of observed bats. Field notes included a record of the time of each bat encounter, allowing results to be cross-referenced with the recorded data.

Static Bat Detector Survey

Anabat SD1 bat detectors were placed in camouflaged waterproof boxes with a 12V battery attached. The microphone was attached to a 2m cable which was connected to the detector. The microphone was housed inside a sealed curved pipe to keep water off the microphone without incurring significant loss in sensitivity. The pipes were positioned at 1-2m height without any solid objects present close to the microphone to prevent interference or impedance to recording bat calls.

Assessment of Data From Bat Detectors

The Anabat SD1 and SD2 frequency division bat detectors were used to record bat calls during walked transect and static bat detector activity surveys. The Anabat provides a frequency down conversion which generates audible audio signals with frequencies directly related to those the bat is producing.

The likelihood of detecting bats acoustically depends on the propagation of sound through air, the characteristics of bat calls, and the way sound is received and processed by the bat detector. Recent collaborative research by BSG and Bristol University has shown that bat detectors detect calls from some species of bats at greater distances than others. In general, bats with calls that can be detected over greater distances are larger bats which use calls that are both high amplitude and low frequency such as the noctule and the most difficult to detect are those which use low amplitude calls, such as the brown long-eared bat and barbastelle, or high frequencies, such as horseshoe bats *Rhinolophus* spp. **Table B1** shows the mean frontal detection range of Anabats for echolocation calls from UK bat species based on research undertaken by BSG in collaboration with Bristol University¹⁴.

¹⁴ Holderied *et al.* (2011), unpublished data.

Table B1 Estimated Mean Frontal Detection Ranges for Selected Bat Species using Anabat Detectors at Standard 'Field' Settings

Species	Mean frontal detection range (m)
Soprano pipistrelle	24
Brown long-eared bat	9
Natterer's bat	13
Noctule	47
Leisler's bat	38
Barbastelle	7
Lesser horseshoe bat	7

Data Analysis

Selection of Data for Analysis

Because a very large amount of data is likely to be recorded during a full field season of static bat detector recording, the majority of which will represent the common pipistrelle species, it is not cost-efficient or necessary to check and label every pass of all species of bats. All recordings were checked for rarer species of potentially higher conservation significance by scanning sound files for these species. The species selected were: barbastelle, Nathusius' pipistrelle and Leisler's bat (Group 1).

For all other species of bats (Group 2), a sub-set of three nights of data from each deployment - those with the highest number of bat calls recorded - were analysed in detail. By choosing the nights with the highest activity levels it is assumed that nights with optimal conditions for recording bat activity were also chosen. In this sense, the bias inherent to selecting data for analysis non-randomly in this way is similar to the bias when selecting nights with favourable conditions for carrying out other bat surveys. The only bias which is likely to result is that the activity rates for Group 1 species will be higher than if all the data within the relevant recording period were analysed (as for Group 2 species). As the data have been used to determine relative activity levels and not to provide a measure of abundance, this upward bias is unlikely to make any difference to the evaluation of the importance of bat populations at Sizewell.

Bat Call Identification

Recorded bat calls were analysed using Analook software to confirm the identity of the bats present. Where possible, the bat was identified to species level. For species of long-eared bats records were not identified to species level due to the overlapping call parameters of each species but were assumed to refer to brown long-eared bats. It is unlikely that grey long-eared bat *Plecotus austriacus* occurs in Suffolk, given the species' known distribution and rarity (Harris & Yalden, 2008). Species of the genus *Myotis* were grouped together as many of the species have overlapping call parameters, making species identification problematic (BCT, 2007).

For *Pipistrellus* species the following criteria, based on measurements of peak frequency, were used to classify calls:

Common pipistrelle	≥ 42 and < 49 kHz
Soprano pipistrelle	≥ 51 kHz
Nathusius' pipistrelle	< 39 kHz
Common pipistrelle / Soprano pipistrelle	≥ 49 and < 51 kHz
Common pipistrelle / Nathusius' pipistrelle	≥ 39 and < 42 kHz

In addition, the following categories were used for calls which could not be identified with confidence due to the overlap in call characteristics between species or species groups:

- *Myotis/Plecotus* sp; and
- *Nyctalus* sp. (either Leisler's bat or noctule).

Bat calls which could not be ascribed to any of these categories were not used in the analysis.

Calculation of Relative Activity

The Anabook software enables analysis of the relative activity of different species of bats by counting the minimum number of bats recorded within discrete sound files. Once triggered by ultrasound, the Anabat records sound files with a duration of 15 seconds, which may contain a number of individual bat passes, or discrete groups of ultrasound 'pulses'. For the purposes of this analysis, the recording of one or more passes by a single species of bat within a 15 second sound file is counted as a single bat pass (B). More than one pass of the same species was counted within a sound file if multiple bats were recorded calling simultaneously. During analysis of sound files, it was possible to estimate the minimum number of bats recorded on individual sound files but not whether consecutive sound files had recorded, for example, a number of individual bats passing as they commute to a feeding habitat or one bat calling repeatedly as it flies up and down a hedgerow. Therefore, relative abundance of bats cannot be estimated from this analysis, but the number of bat passes does reflect the relative importance of a feature/habitat to bats by assigning a level of bat activity that is associated with that feature, regardless of the type of activity. In this analysis, bat passes per hour (B/h) has been used a measure of 'relative activity'.

Analysis by Sunset-Sunrise Times

As part of the analysis of nocturnal patterns of behaviour for bats at Sizewell the data were split into discrete time periods relating to their proximity to sunset or sunrise. The time categories (time codes: TC) were as follows:

TC 0 = before sunset

TC 1 = 0-20 min after sunset

TC 2 = 20-40 min after sunset

TC 3 = 40-60 min after sunset

TC 4 = 60-80 min after sunset

TC 5 = 80-100 min after sunset

TC 6 = 100-120 min after sunset

TC 7 = Middle of night (varies across seasons)

TC 8 = 120-100 min before sunrise

TC 9 = 100-80 min before sunrise

TC 10 = 80-60 min before sunrise

TC 11 = 60-40 min before sunrise

TC 12 = 40-20 min before sunrise

TC 13 = 20-0 min before sunrise

For each of these categories B/h was calculated to allow a comparison between the activity level recorded in different time periods and TC7 was corrected to allow for variation in night length throughout the survey season.

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Draft - See Disclaimer

B6

TC 6 = 100-120 min after sunset

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TC 9 = 100-80 min before sunrise

TC 10 = 80-60 min before sunrise

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TC 13 = 20-0 min before sunrise

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NNB Generation Company

Land West of Lover's Lane, Leiston

Associated Development Site 6

DRAFT Bat Survey Report

February 2012

AMEC Environment & Infrastructure UK Limited

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February 2012

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Document Revisions

No.	Details	Date
1	Draft Report	Feb 2012

Contents

1.	Introduction	1
1.1	Background	1
1.2	Site Description and Value of Habitats for Bats	1
1.3	Purpose of this Report	2
1.4	Legislation and Policy Guidance	2
2.	Methods	3
2.1	Walked Transects	3
2.2	Static Bat Detector Survey	3
2.3	Personnel	4
3.	Results	5
3.1	Walked Transects	5
3.1.1	Weather Conditions	5
3.1.2	Relative activity levels of bats	5
3.1.3	Spatial Distribution of Bats	6
3.2	Static Bat Detector Survey	6
3.2.1	Relative Activity Levels of all Bats	6
3.2.2	Relative Activity Levels of Group 1 Species	7
3.2.3	Relative Activity of Group 2 Series	7
4.	Conclusions	9
4.1	Barbastelle	9
4.2	Nathusius' Pipistrelle	9
4.3	Common and Soprano Pipistrelle	9
4.4	Brown Long-eared Bat	10
4.5	Myotis sp.	10
4.6	Noctule	10
Table 2.1	Static Detector Dates and Locations	4
Table 3.1	Weather Conditions during Walked Transect Surveys	5
Table 3.2	Numbers of Passes and Relative Bat Activity Recorded during Walked Transects In 2011	5



Table 3.3	Number of Passes and Relative Activity Level Recorded during Static Bat Detector Survey	6
Figure 1.1	Site Boundary	After Page 10
Figure 2.1	Combined 2011 Walked Transect Bat Survey Routes and Static Bat Detector	After Page 10
Figure 3.1	Locations of Bat Passes Recorded during 2011 Walked Transect Surveys	After Page 10
Appendix A	Policy and Legislation relating to Bats In Suffolk	
Appendix B	Materials and Data Analysis	

1. Introduction

1.1 Background

An area of land directly north of Sizewell B Nuclear Power Station, which is located near Leiston in Suffolk, has been identified as having the potential to accommodate the proposed development of one or more new nuclear reactors. This proposed development is known as Sizewell C. The site of the proposed development has an approximate central National Grid Reference (NGR) of TM473640. NNB Generation Company (EDF) has identified a number of additional sites for a variety of developments associated with the new build proposals at Sizewell that will be located beyond the current EDF landholding. AMEC Environment & Infrastructure UK Ltd ('AMEC') has been commissioned to provide ecological services in relation to these sites, in order to inform the site selection process and support any future planning submissions. Baker Shepherd Gillespie (BSG) was commissioned to carry out bat surveys for these sites in 2011.

Land to the west of Lovers Lane, Leiston (Site 6) (approximate central NGR: TM457624) has been identified as a potential site for associated development. The sites proposed for associated development are currently at a preliminary stage of scoping with detailed scheme plans yet to be confirmed. Notwithstanding, current proposals include the development of the site to support industrial and warehousing facilities.

1.2 Site Description and Value of Habitats for Bats

Site 6 is located on the east side of Leiston within a largely rural setting. The site is bordered to the north by King Georges Avenue, to the west and south by a dismantled railway line, and to the east by Grimseys Lane. Residential housing is situated approximately 200m to the west of the site. The site is on the boundary between the urban environment of Leiston to the west and the surrounding landscape of agricultural land (arable and pig farm), often bordered by treelines, hedgerows and occasional copses, broom or gorse coverts, or shelter belt plantation woodland (refer to **Figure 1.1**¹ for location details and a redline boundary of the site).

A brief description of the habitats present within the site in relation to the potential they have for supporting roosting, foraging or commuting bats is included below. For a full habitat description and habitat map, please refer to the Phase 1 Habitat Survey report for the site².

On-site habitats comprise arable land, hedgerows, hedgerows with trees and neutral grassland along field edges. No buildings, man-made structures or trees supporting features suitable for roosting bats were recorded within or around the edge of the site. The tree-lined hedgerows, particularly along the dismantled railway line are likely to offer some foraging opportunities for bats.

¹ All figures can be found at the end of the report.

² Report reference: 28130ca207).

1.3 Purpose of this Report

This report summarises the findings of bat activity surveys carried out within the site in 2011 and provides a summary of the bat interest of the site. The focus of the survey work was to examine spatial and temporal patterns of bat activity, and to identify areas of importance for bats through quantitative analysis of relative activity levels. The survey work did not attempt to identify potential roost locations, although an initial assessment of potential roosting features was carried out in the Phase 1 Habitat Survey report for the site².

1.4 Legislation and Policy Guidance

Details of national policies and legislation that relate to bats, as well as details of the draft Suffolk Biodiversity Action Plan (BAP) for bats are provided in **Appendix A**.

2. Methods

2.1 Walked Transects

Three walked transect surveys were undertaken within the survey area, with one in each of the three sampling periods (May, July and August 2011), in order to collect representative data on bat activity throughout the peak season for such. See **Figure 2.1** for transect routes. During each transect survey two surveyors together (for health and safety reasons) walked a pre-determined transect route. The transect route for Site 6 also incorporated Site 7 and Site 9 due to the small size of these sites. Only the data collected from Site 6 is included within this report, with the data from the Sites 7 and 9 detailed in separate documents^{3,4}..

All surveys began at around sunset and took 2.5-3 hours to complete. The same or a similar route was walked on each survey, with the start and end points changed on each visit to ensure that different parts of the sites were surveyed at different times of the night. This approach was adopted to remove a bias that could be introduced if any given point on the transect route was sampled at approximately the same interval after sunset. Each evening surveyors completed two circuits of the route to ensure sampling at each part of the site at two different intervals after sunset. Surveys were carried out only when weather conditions were suitable for bats to be active, avoiding temperatures below 9°C, rain and high wind speeds.

Conditions during the July and August walked activity surveys were optimal and there were no restrictions to accessing all parts of the site. There were strong gusts of wind up to force 6 on the Beaufort scale during the May walked transect which may have decreased bat activity. However, bats were recorded during the survey and the weather conditions during this survey are therefore not considered to have compromised the findings of the survey.

2.2 Static Bat Detector Survey

Anabat SD1 bat detectors were used to assess bat activity at three locations, thought to represent potentially high quality commuting or foraging habitat for bats (see **Figure 2.1** for locations). **Table 2.1** provides details of static detector deployments.

³ Report reference: 28130 cr299

⁴ Report reference: 28130 cr301

Table 2.1 Static Detector Dates and Locations

Static	Location (Figure 2.1)	Start	Finish	Nights	Dates analysed for Group 2
A	Hedge in north-east corner	24/05	06/06	14	29 and 30 May, 6 June
B	Hedge on southern boundary	05/07	17/07	13	7, 15 and 16 July
C	Hedge on eastern boundary	06/09	11/09	6	7, 8 and 9 September

The detectors were programmed to begin recording half an hour before sunset and finish half an hour after sunrise. The number of survey hours therefore varied throughout the survey season according to night length.

Static C was initially deployed in August, however this recorded electronic interference, and was re-deployed successfully in September. This is not considered to have constrained the findings of the survey.

All recordings were checked for rarer species of potentially higher conservation significance by scanning sound files for these species. The species selected were: barbastelle (*Barbastella barbastellus*), Nathusius' pipistrelle (*Pipistrellus nathusii*) and Leisler's bat (*Nyctalus leisleri*) (hereafter referred to as Group 1). However, because a very large amount of data is likely to be recorded during static detector surveys, the majority of which will represent the common pipistrelle species, it is not cost-efficient or necessary to check and label every pass of all species of bats. For all other species, therefore, termed here Group 2, a sub-set of three nights of data from each deployment (as detailed in **Table 2.1**) - those with the highest number of bat calls recorded – were analysed in detail.

Full details of equipment used for bat surveys and analysis methods are included in **Appendix B**.

2.3 Personnel

Walked transect survey work during 2011 was carried out by a total of three ecologists. These surveys were all led by Laura Jennings (LJ) of BSG with another two experienced surveyors assisting⁵. Static bat detector deployments were led by Matt Hobbs (MH) of BSG with another two surveyors assisting⁶.

⁵ Helen Evriviades (HE; Natural England bat survey licence number 20114266) and Ed Austin (EA) of BSG

⁶ Vilas Anthwal (VA; Natural England bat survey licence number 20110076) of BSG and Iain Hysom (IH; freelance: Natural England bat survey licence number 20110086).

3. Results

3.1 Walked Transects

3.1.1 Weather Conditions

Details of weather conditions during the surveys are provided in **Table 3.1**.

Table 3.1 Weather Conditions during Walked Transect Surveys

Date	Temperature (°C, start-end)	Wind strength ⁷	Cloud cover (%)	Rainfall
25/05	13	4	50	0
06/07	16-15	3	5	0
25/08	17-15	2	80	Light rain from 22:00

3.1.2 Relative activity levels of bats

The total numbers of passes and relative activity levels recorded for each species are shown in **Table 3.2**.

Table 3.2 Numbers of Passes and Relative Bat Activity Recorded during Walked Transects In 2011

Species	Survey date			Total	B/h ⁸	% of total
	26/05	06/07	25/08			
Noctule	0	0	3	3	1.6	4.5
<i>Nyctalus</i> sp.	0	0	1	1	0.5	1.5
Common/Nathusius' pipistrelle	2	0	0	2	1.1	3.0
Common pipistrelle	13	13	19	45	24.5	67.2
Common/soprano pipistrelle	0	4	0	4	2.2	6.0
Soprano pipistrelle	1	6	5	12	6.5	17.9
Total	16	23	28	67		

⁷Wind strength is given in the Beaufort scale and wind direction is abbreviated to an eight point compass (e.g. NE = northeast). The Beaufort scale is an empirical measure that relates wind speed to observed conditions at sea or on land.

⁸ Number of bat passes per hour (see **Appendix B**).

Species	Survey date			Total	B/h ⁹	% of total
	26/05	06/07	25/08			
Survey duration (min)	41	33	36	110		
Total B/h	23.4	41.8	46.7	36.5		

In summary, 67 passes of three species of bats were recorded during walked transect surveys. Common pipistrelle (*Pipistrellus pipistrellus*) was the most frequently encountered species on walked transects with 67.2% of all passes recorded as this species. Twelve passes of soprano pipistrelle (*Pipistrellus pygmaeus*) were also recorded with four passes of common/soprano pipistrelle, two passes that were either common or Nathusius pipistrelle, three passes of noctule (*Nyctalus noctula*) and one pass that was either noctule or Leisler's bat. Bat activity levels varied between transect surveys, with similar levels of 41.8 and 46.7 B/h on 6 July and 25 August respectively, and 23.4 B/h on 26 May.

3.1.3 Spatial Distribution of Bats

The spatial distribution of recorded passes of all bats is illustrated in **Figure 3.1**. Common pipistrelle passes were widely distributed along the field boundaries of the site with soprano pipistrelle passes largely on the western side of the field. The noctule and *Nyctalus* sp. passes were also recorded on the western boundary.

3.2 Static Bat Detector Survey

3.2.1 Relative Activity Levels of all Bats

The relative activity level recorded at each static detector for all species or grouped species categories are shown in **Table 3.3**.

Table 3.3 Number of Passes and Relative Activity Level Recorded during Static Bat Detector Survey

Species	Static no. and deployment dates				
	Static A	Static B	Static C	Total	B/h
	24/05-06/06	05-17/07	06-11/09		
Group 1 (all nights)					
Nathusius pipistrelle	6	1	2	9	<0.1

⁹ Number of bat passes per hour (see **Appendix B**).

Species	Static no. and deployment dates				
	Static A	Static B	Static C	Total	B/h
	24/05-06/06	05-17/07	06-11/09		
Group 1 (all nights)					
Barbastelle	10	2	7	19	<0.1
Group 1 total	16	3	9	28	0.1
Group 2 (3x3 nights)					
Noctule	0	2	7	11	0.1
Common/Nathusius' pipistrelle	0	3	0	3	<0.1
Common pipistrelle	332	191	10	533	6.7
Common/soprano pipistrelle	5	43	1	49	0.6
Soprano pipistrelle	6	24	7	37	0.5
<i>Myotis</i> sp.	1	1	4	6	<0.1
<i>Myotis</i> sp./brown long-eared bat	0	3	0	3	<0.1
Brown long-eared bat	0	0	2	2	<0.1
Group 2 total	344	267	31	644	

In the nine nights selected for analysis of all species a total of 644 bat passes (8.1 B/h) of five Group 2 species were recorded: common and soprano pipistrelle, noctule, *Myotis* sp. and brown long-eared bat (*Plecotus auritus*). A further 28 passes were recorded (0.1 B/h) of two Group 1 species: barbastelle and Nathusius' pipistrelle.

3.2.2 Relative Activity Levels of Group 1 Species

Barbastelle was recorded from all three detector locations at low activity levels; 10 passes were recorded at Static A with two at Static B and seven recorded at Static C. Nocturnal activity patterns show that activity occurred within the site at least 40 minutes after sunset and more than an hour before sunrise.

Nine passes were recorded of Nathusius' pipistrelle from Static A (six passes), Static B (one pass) and Static C (two passes). Just one pass was recorded within an hour of sunset (47 minutes after sunset) and none were recorded within an hour of sunrise

3.2.3 Relative Activity of Group 2 Series

A very low activity level of *Myotis* sp. was recorded with just six passes, one each from Statics A and B, and four from Static C. No passes of this species group were recorded within an hour of sunset or two hours of sunrise.

Nine noctule passes were recorded with two from Static B and seven from Static C. One of the passes was relatively close to sunset (30 minutes after).

Moderate levels of pipistrelle activity were recorded, with 533 common pipistrelle passes recorded (6.7 B/h), and 37 soprano pipistrelle (0.5 B/h), and a total of 52 unidentified passes (0.6 B/h). 49 of these were recorded as either common or soprano pipistrelle. Highest activity levels were recorded towards the middle of the night (TC6¹⁰ = 24.3 B/h) for common pipistrelle. A similar peak was recorded for soprano pipistrelle (TC5 = 1.4 B/h). No passes were recorded within 30 minutes of sunset or 40 minutes of sunrise for both species.

Two passes of brown long-eared bat were recorded at Static C in September. These passes were during TC7, with both recorded around four hours before sunrise.

¹⁰ Time Code (refer to **Appendix B**).

4. Conclusions

Bat surveys were carried out by BSG at Site 6 during May-September 2011 and included three walked transect surveys of the site and the deployment of static bat detectors in May/June, July and September. Three species of bats were recorded during transect surveys: common pipistrelle, soprano pipistrelle and noctule. A further four species were only recorded during static bat detector surveys: barbastelle, Nathusius' pipistrelle, *Myotis* sp. and brown long-eared bat. During the static detector surveys, moderate levels of pipistrelle bat activity were recorded with low levels for all other species.

In summary, the site supports an assemblage of bat species that is typical of the area and the site does not appear to be of particular importance for any species of bats, although pipistrelle species use it regularly for foraging and/or commuting. The following sections provide further details of the status of each species.

4.1 Barbastelle

There is no evidence that the site is close to a roost of barbastelle, although a maternity colony of this species was discovered in the Sizewell Estate as a result of radio-tracking surveys carried out in 2010¹¹ and 2011¹². The northern boundary of Site 6 is around 1.5km from several known barbastelle maternity roost trees in the woodland around Leiston Old Abbey and Kenton Hills which form part of a wider network of roost trees that are largely contained within the Sizewell Estate. Overall the low activity levels recorded within Site 6, in combination with the lack of records close to sunset and/or sunrise indicate that the site is unlikely to be a core foraging area for individuals of this species. No radio-tracked bats from the Sizewell Estate have been recorded in the vicinity of Site 6, although it is possible that they may frequent the site occasionally

4.2 Nathusius' Pipistrelle

Very few passes of Nathusius' pipistrelle were recorded, and the surveys provided no evidence to suggest that the site is of importance for foraging/ commuting, or is located close to roosts of this species.

4.3 Common and Soprano Pipistrelle

During the static detector surveys, moderate levels of common and soprano pipistrelle bat activity were recorded, and the site appears to be of some importance for foraging/ commuting for this species. There is no evidence that the site is close to a roost of any of either common or soprano pipistrelle bats.

¹¹ Report reference: 28130ca68.

¹² Draft report at time of writing.

4.4 Brown Long-eared Bat

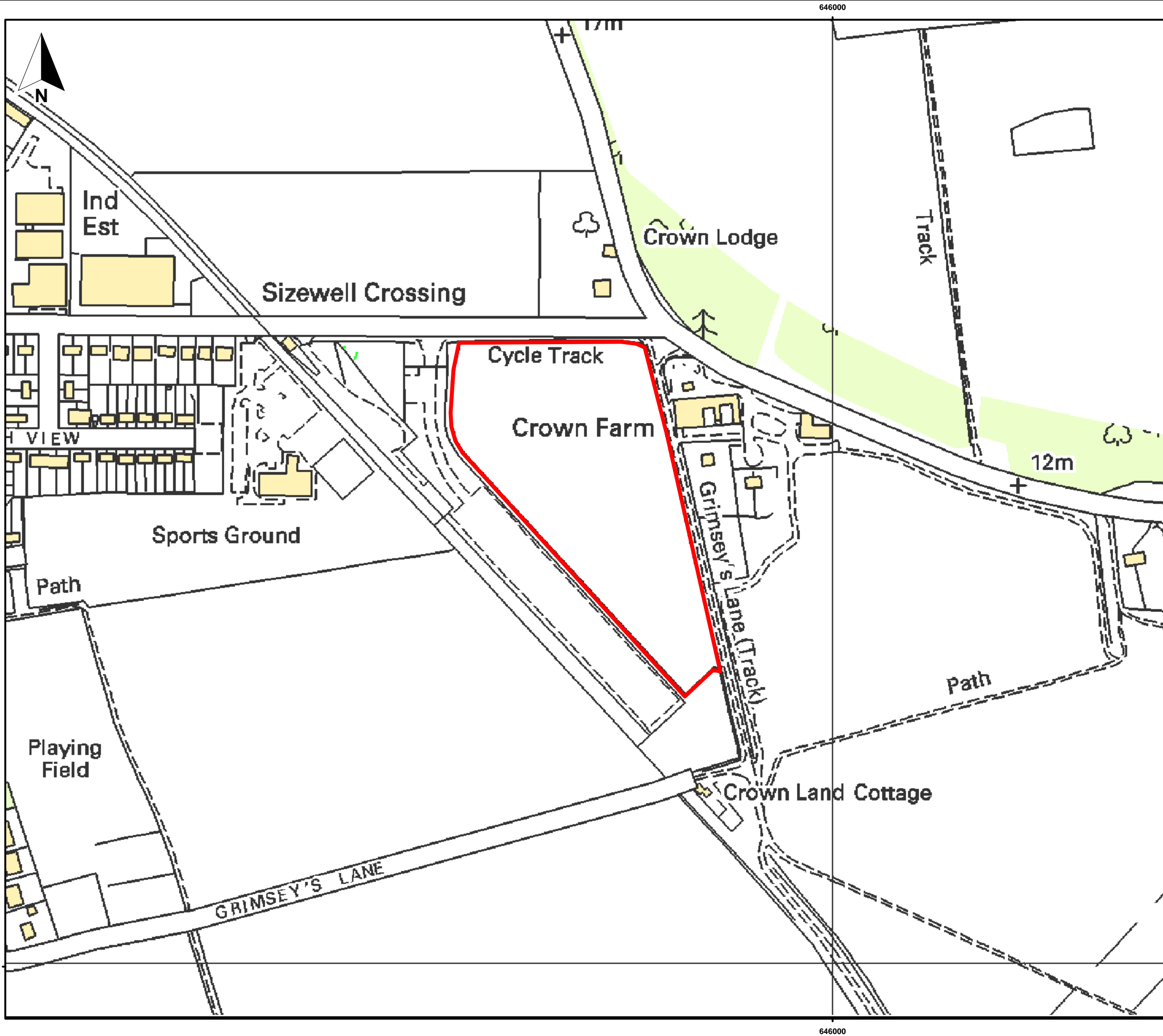
Low levels of brown long-eared bat activity were recorded only during the static detector surveys. There is no evidence that the site is close to a roost of this species, or that the site is of importance to this species for foraging or commuting.

4.5 Myotis sp.

The site does not appear to be frequently used by, or of particular importance to, *Myotis* bats. Furthermore, there is no evidence that any species from this group roost close to or on the site.

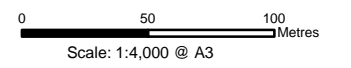
4.6 Noctule

The site does not appear to be regularly used by noctule, and there is no evidence that the site is close to any roosts of this species.



Key:

Site boundary



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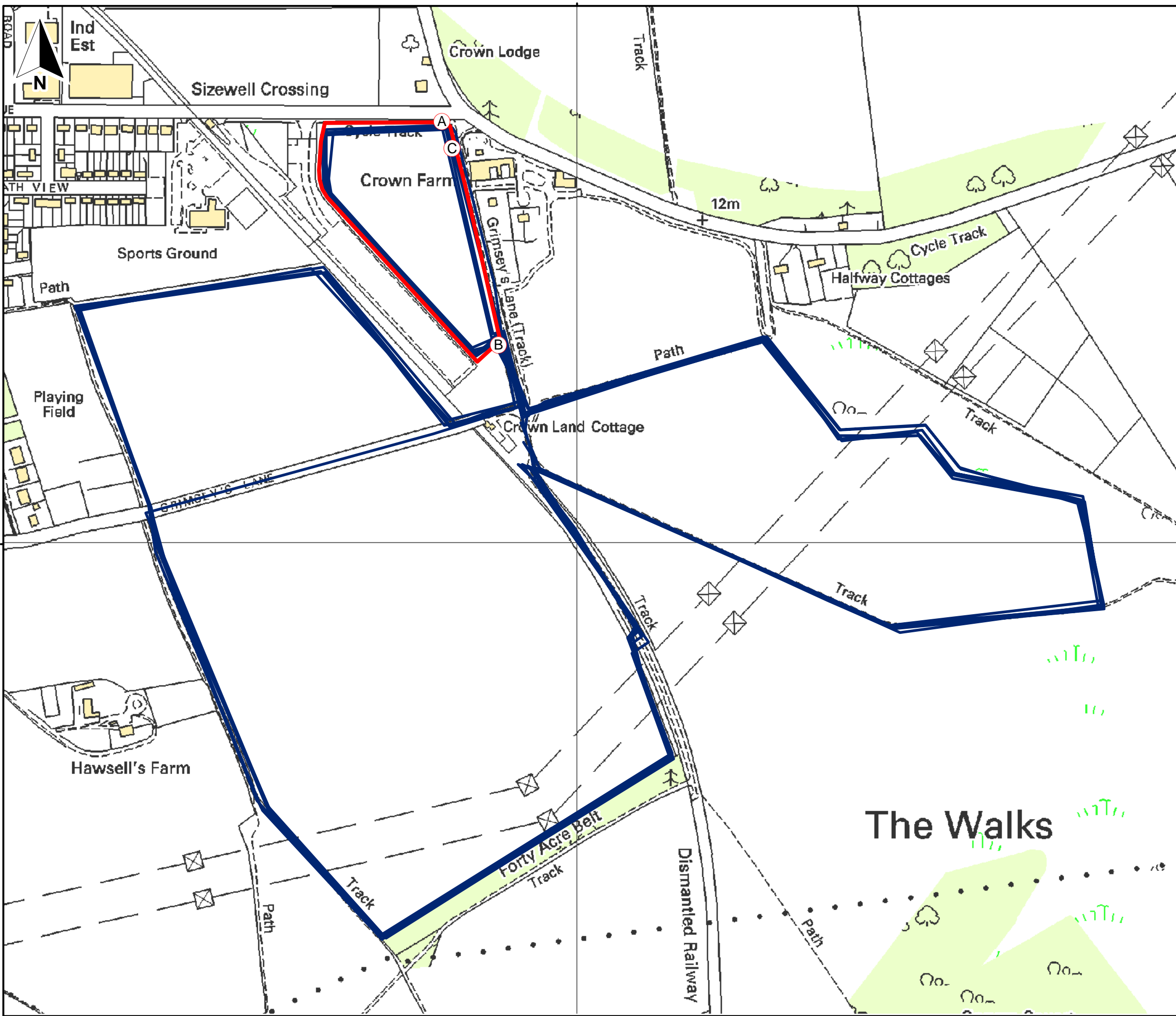
Land West of Lover's Lane, Leiston
(Associated Development Site 6)
Bat Survey Report

Figure 1.1
Site boundary

February 2012
28130-A352.mxd tugwc

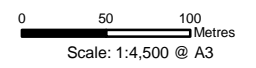


646000



Key:

- Site boundary
- Walked transect route
- Static location



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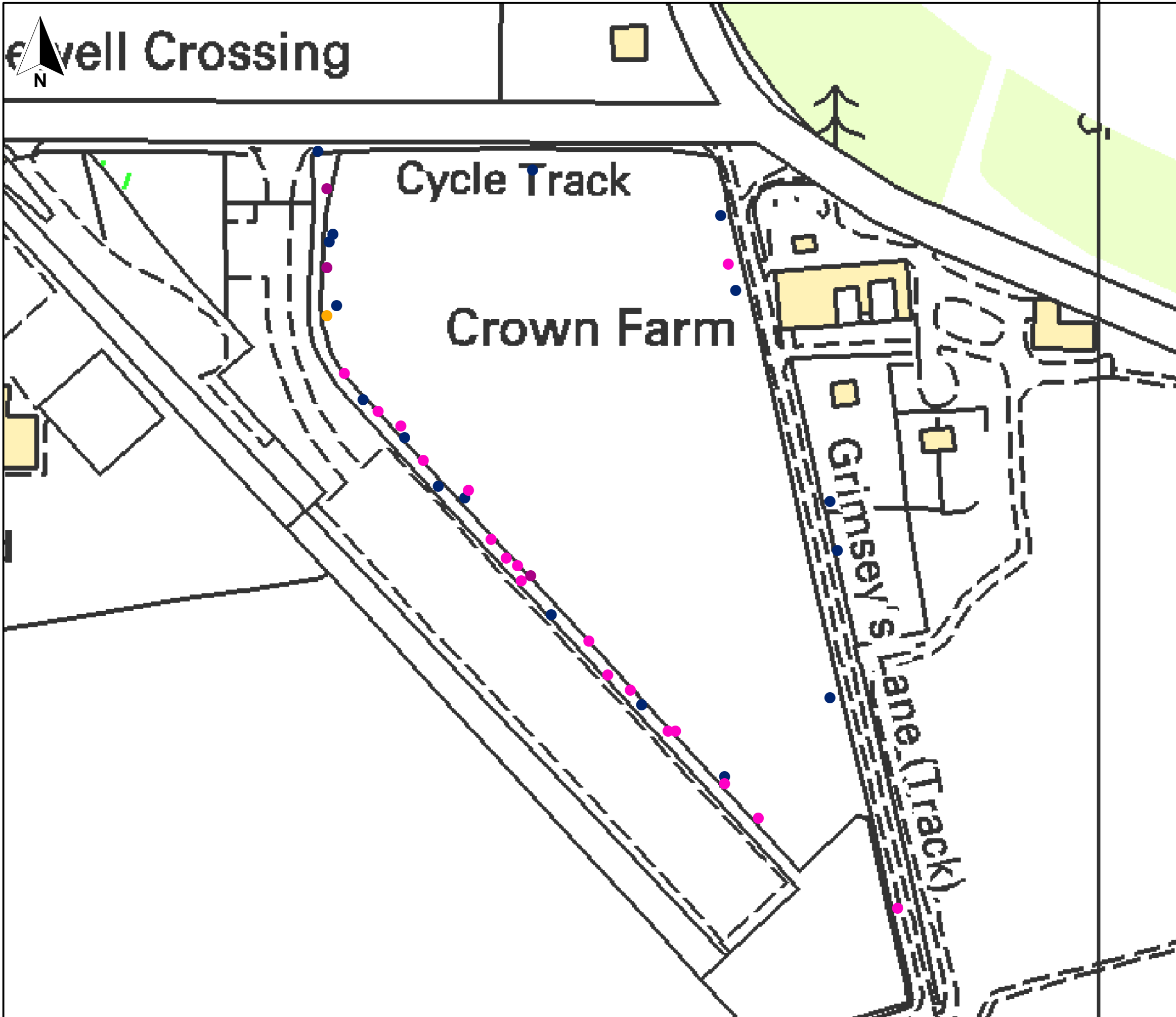
Land West of Lover's Lane, Leiston
(Associated Development Site 6)
Bat Survey Report

Figure 2.1
Combined 2011 walked transect bat
survey routes and static bat detector

February 2012
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Key:

- Noctule
- *Nyctalus* sp.
- Common pipistrelle
- Soprano pipistrelle

0 37.5 75 Metres
Scale: 1:1,500 @ A3

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Land West of Lover's Lane, Leiston
(Associated Development Site 6)
Bat Survey Report

Figure 3.1
Locations of bat passes recorded during 2011 walked transect surveys

February 2012
28130-A354.mxd tugwc



Appendix A

Policy and Legislation relating to Bats In Suffolk

Legislation and Policy Guidance

Biodiversity Action Plan

Seventeen¹³ species of bat are known to be resident in the UK, seven of which are on the new list of priority species¹⁴ in the UK Biodiversity Action Plan (UK BAP), adopted by the Government in 2007. Species included on this list have been identified by the UK Government as needing special conservation effort because of their rarity and/or decline in numbers over recent decades. Species Action Plans (SAPs) have been developed to identify conservation priorities, propose action, and set targets to try and maintain and restore populations. Bat populations are at risk from changes to the landscape (such as those caused by agricultural practices or land development), which can cause loss of roosting, foraging or commuting habitat and be a contributing factor to population decline.

A clear understanding of the level and nature of use of a site by bats is necessary to ensure that environmental measures (mitigation, enhancement and offsetting) associated with a development can be appropriately targeted, and put in the context of local and National conservation priorities. The SAPs promote the favourable management of land, especially in the vicinity of known roost sites, and aim to maintain and enhance existing bat populations. These can lead to the designation of important sites for rarer species and notification to the local authority of important roosts such as maternity or hibernation sites.

Most of the Species Action Plans (SAPs) in the Suffolk Biodiversity Action Plan are based on National Biodiversity Action Plans. The process of identifying BAP priorities in Suffolk began in 1997, and an initial plan (Tranche 1) was produced in 1998. Priority species included the common pipistrelle bat. Tranche 2, published in 2000, was withdrawn and a new list was published in June 2010, with a new combined BAP for all bat species due for completion in autumn 2010. Although this had not been issued at the time of writing some data from the draft BAP for bats is included in **Table A1** below.

¹³ This does not include greater mouse-eared bat (*Myotis myotis*), which is considered resident by some, but only a single individual has been recorded in recent years after the species was officially declared extinct in the UK.

¹⁴ Priority bat species in the UK BAP: barbastelle, Bechstein's bat (*Myotis bechsteinii*), noctule, soprano pipistrelle, brown long-eared bat, greater horseshoe bat (*Rhinolophus ferrumequinum*) and lesser horseshoe bat (*Rhinolophus hipposideros*).

Table A1 Status of Bat Species in Suffolk¹⁵

Species	Number of occupied 1 km squares	Range & abundance	Notes	Source
Noctule	86	Uncommon but widespread		Suffolk BAP
Leisler's bat	14	Rare and locally distributed	Only three nursery colonies are known in the county. Appears to be confined to the northwest of Suffolk.	Suffolk BAP Suffolk Bat Group
Serotine	109	Uncommon but widespread	There are approximately 45 known colonies in Suffolk.	Suffolk BAP Suffolk Bat Group
Nathusius' Pipistrelle	2	Rare and locally distributed	There are only a few records from Suffolk currently; more may come to light from a new BCT survey, initial results of which are due to be published in February 2010.	Suffolk BAP Suffolk Bat Group
Soprano Pipistrelle	74	Uncommon but widespread		Suffolk BAP
Common pipistrelle	682	Common and widespread		Suffolk BAP
Lesser horseshoe bat	1	Rare and very local	A single bat (presumed to be the same individual) has been recorded at a hibernation site in most winters between 1996 and at least 2008.	Suffolk BAP Suffolk Bat Group
Natterer's bat	131	Uncommon but widespread		Suffolk BAP
Daubenton's bat	50	Locally common and widespread		Suffolk BAP
Whiskered/ Brandt's/ Alcatheo* whiskered bat	?	Rare and very local	Until January 2000 all records were from two hibernation sites, and refer to single animals. A breeding roost has yet to be discovered in the county.	Suffolk Bat Group
Brown-long eared bat	624	Common and widespread		Suffolk BAP
Barbastelle	40	Uncommon but widespread		Suffolk BAP

¹⁵ Information provided from the Suffolk BAP is draft and unpublished at the time of writing (13/12/2011).

* Whiskered (*Myotis mystacinus*) and Brandt's (*Myotis brandtii*) bats are cryptic species (i.e. very similar to each other and therefore difficult to distinguish), so all previous hibernation site records would have been recorded as "whiskered/Brandt's". However, a third cryptic species, Alcathe whiskered bat (*Myotis alcathoe*), was confirmed to occur in the UK in 2010, and is now thought to have been resident and probably widespread here for some time. Hibernation records could therefore represent any of these three.

Protective Legislation relating to Bats

All bat species and their roosts are protected in the UK under *The Conservation of Habitats and Species Regulations 2010* which implements the EC Directive 92/43/EEC (the Habitats Directive). In addition, the lesser horseshoe bat, greater horseshoe bat, Bechstein's bat and barbastelle are listed in Annex II of the Habitats Directive, which requires sites to be designated by member states for their protection.

All bat species and their roosts are also protected under Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended), and under the *Countryside and Rights of Way Act 2000*. Taken together, these Acts and Regulations make it illegal to:

- Intentionally or deliberately kill, injure or capture bats;
- Deliberately or recklessly disturb bats;
- Damage, destroy or obstruct access to bat roosts;
- Possess or transport a bat or any part of a bat, unless acquired legally; and
- Sell, barter or exchange bats or parts of bats.

The Natural Environment and Rural Communities Act 2006 (NERC Act) states, in Section 40(1), that

“every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity”.

Section 40(3) of the NERC Act 2006 goes on to state that

“conserving biodiversity includes, in relation to a living organism or type of habitat, restoring or enhancing a population or habitat”.

Section 41(1) of the NERC Act 2006 states that

“the Secretary of State must, as respects England, publish a list of the living organisms and types of habitat which in the Secretary of State's opinion are of principal importance for the purpose of conserving biodiversity”.

All seven species of bats that are priority species in the UK Biodiversity Action Plan (see Section 2.4.1) are also considered Species of Principal Importance for the Conservation of Biodiversity under Section 41 of the NERC Act.

In paragraph 16 of Planning Policy Statement 9, the Government indicates that local authorities should take steps to further the conservation of species of principal importance for the conservation of biodiversity in England and should ensure that that these species and their habitats are protected from adverse effects of development, where appropriate, by using planning conditions or obligations.

Developments that compromise the protection afforded to bats under the provisions of *The Conservation of Habitats and Species Regulations 2010* almost invariably require a licence from Natural England. Three tests must be satisfied before a licence to permit otherwise prohibited acts can be issued:

- Regulation 53(2) (e) states that licences may be granted by Natural England to *'preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment'*;
- Regulation 53(9) (a) states that a licence may not be granted unless Natural England is satisfied *'that there is no satisfactory alternative'*; and
- Regulation 53(9) (b) states that a licence cannot be issued unless Natural England is satisfied that the action proposed *'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range'*.

In conclusion, a licence permits otherwise unlawful actions and it is the responsibility of the developer, or their appointed advisor, to decide whether a licence is required for work that has the potential to affect bat populations. It is important that the developer carries out a thorough survey and accurate assessment to help avoid committing offences. It is also the responsibility of the developer to design and implement a mitigation scheme that meets the licensing requirements and ensures, as far as possible, the long-term maintenance of any bat population affected. Licence applications (under Regulation 53(2) (e) of the Habitats Regulations) will be determined by Natural England.

Appendix B

Materials and Data Analysis

Use of Bat Detectors

Walked Transects

Surveyors used two different bat detectors on every survey: a Batbox Duet or BatBox Griffin detector for listening to bat calls from the combined heterodyne/frequency division output and an Anabat SD1 or SD2 frequency division detector for recording calls for subsequent identification. Wherever possible, surveyors recorded the observed behaviour and numbers of bats onto field proforma. Notes were taken of all bat sightings in conjunction with the Anabat recordings. This was to aid in identification and also to provide additional detail on the behaviour of observed bats. Field notes included a record of the time of each bat encounter, allowing results to be cross-referenced with the recorded data.

Static Bat Detector Survey

Anabat SD1 bat detectors were placed in camouflaged waterproof boxes with a 12V battery attached. The microphone was attached to a 2m cable which was connected to the detector. The microphone was housed inside a sealed curved pipe to keep water off the microphone without incurring significant loss in sensitivity. The pipes were positioned at 1-2m height without any solid objects present close to the microphone to prevent interference or impedance to recording bat calls.

Assessment of Data from Bat Detectors

The Anabat SD1 and SD2 frequency division bat detectors were used to record bat calls during walked transect and static bat detector activity surveys. The Anabat provides a frequency down conversion which generates audible audio signals with frequencies directly related to those the bat is producing.

The likelihood of detecting bats acoustically depends on the propagation of sound through air, the characteristics of bat calls, and the way sound is received and processed by the bat detector. Recent collaborative research by BSG and Bristol University has shown that bat detectors detect calls from some species of bats at greater distances than others. In general, bats with calls that can be detected over greater distances are larger bats which use calls that are both high amplitude and low frequency such as the noctule and the most difficult to detect are those which use low amplitude calls, such as the brown long-eared bat and barbastelle, or high frequencies, such as horseshoe bats *Rhinolophus* spp. **Table B1** shows the mean frontal detection range of Anabats for echolocation calls from UK bat species based on research undertaken by BSG in collaboration with Bristol University¹⁶.

¹⁶ Holderied *et al.* (2011), unpublished data.

TableB.2 Estimated Mean Frontal Detection Ranges for Selected Bat Species using Anabat Detectors at Standard 'Field' Settings

Species	Mean frontal detection range (m)
Soprano pipistrelle	24
Brown long-eared bat	9
Natterer's bat	13
Noctule	47
Leisler's bat	38
Barbastelle	7
Lesser horseshoe bat	7

Data Analysis

Selection of Data for Analysis

Because a very large amount of data is likely to be recorded during a full field season of static bat detector recording, the majority of which will represent the common pipistrelle species, it is not cost-efficient or necessary to check and label every pass of all species of bats. All recordings were checked for rarer species of potentially higher conservation significance by scanning sound files for these species. The species selected were: barbastelle, Nathusius' pipistrelle and Leisler's bat (Group 1).

For all other species of bats (Group 2), a sub-set of three nights of data from each deployment - those with the highest number of bat calls recorded - were analysed in detail. By choosing the nights with the highest activity levels it is assumed that nights with optimal conditions for recording bat activity were also chosen. In this sense, the bias inherent to selecting data for analysis non-randomly in this way is similar to the bias when selecting nights with favourable conditions for carrying out other bat surveys. The only bias which is likely to result is that the activity rates for Group 1 species will be higher than if all the data within the relevant recording period were analysed (as for Group 2 species). As the data have been used to determine relative activity levels and not to provide a measure of abundance, this upward bias is unlikely to make any difference to the evaluation of the importance of bat populations at Sizewell.

Bat Call Identification

Recorded bat calls were analysed using Analook software to confirm the identity of the bats present. Where possible, the bat was identified to species level. For species of long-eared bats records were not identified to species level due to the overlapping call parameters of each species but were assumed to refer to brown long-eared bats. It is unlikely that grey long-eared bat *Plecotus austriacus* occurs in Suffolk, given the species' known distribution and rarity (Harris & Yalden, 2008). Species of the genus *Myotis* were grouped together as many of the species have overlapping call parameters, making species identification problematic (BCT, 2007).

For *Pipistrellus* species the following criteria, based on measurements of peak frequency, were used to classify calls:

Common pipistrelle	≥ 42 and < 49 kHz
Soprano pipistrelle	≥ 51 kHz
Nathusius' pipistrelle	< 39 kHz
Common pipistrelle / Soprano pipistrelle	≥ 49 and < 51 kHz
Common pipistrelle / Nathusius' pipistrelle	≥ 39 and < 42 kHz

In addition, the following categories were used for calls which could not be identified with confidence due to the overlap in call characteristics between species or species groups:

- *Myotis/Plecotus* sp.
- *Nyctalus* sp. (either Leisler's bat or noctule).

Bat calls which could not be ascribed to any of these categories were not used in the analysis.

Calculation of Relative Activity

The Anabook software enables analysis of the relative activity of different species of bats by counting the minimum number of bats recorded within discrete sound files. Once triggered by ultrasound, the Anabat records sound files with a duration of 15 seconds, which may contain a number of individual bat passes, or discrete groups of ultrasound 'pulses'. For the purposes of this analysis, the recording of one or more passes by a single species of bat within a 15 second sound file is counted as a single bat pass (B). More than one pass of the same species was counted within a sound file if multiple bats were recorded calling simultaneously. During analysis of sound files, it was possible to estimate the minimum number of bats recorded on individual sound files but not whether consecutive sound files had recorded, for example, a number of individual bats passing as they commute to a feeding habitat or one bat calling repeatedly as it flies up and down a hedgerow. Therefore, relative abundance of bats cannot be estimated from this analysis, but the number of bat passes does reflect the relative importance of a feature/habitat to bats by assigning a level of bat activity that is associated with that feature, regardless of the type of activity. In this analysis, bat passes per hour (B/h) has been used a measure of 'relative activity'.

Analysis by Sunset-Sunrise Times

As part of the analysis of nocturnal patterns of behaviour for bats at Sizewell the data were split into discrete time periods relating to their proximity to sunset or sunrise. The time categories (time codes: TC) were as follows:

TC 0 = before sunset

TC 1 = 0-20 min after sunset

TC 2 = 20-40 min after sunset

TC 3 = 40-60 min after sunset

TC 4 = 60-80 min after sunset

TC 5 = 80-100 min after sunset

TC 6 = 100-120 min after sunset

TC 7 = Middle of night (varies across seasons)

TC 8 = 120-100 min before sunrise

TC 9 = 100-80 min before sunrise

TC 10 = 80-60 min before sunrise

TC 11 = 60-40 min before sunrise

TC 12 = 40-20 min before sunrise

TC 13 = 20-0 min before sunrise

For each of these categories B/h was calculated to allow a comparison between the activity level recorded in different time periods and TC7 was corrected to allow for variation in night length throughout the survey season.



NNB Generation Company

Associated Development Site 1

Associated Development Site 1

DRAFT Extended Phase 1 Habitat Survey Report

December 2011

AMEC Environment & Infrastructure UK Limited

Report for

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Document Revisions

No.	Details	Date
1	Final Draft i1	July 2011
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Contents

1. Introduction	1
1.1 Background	1
1.2 Site Context	1
1.3 Scheme Description	1
2. Methodology for Data Collection	3
2.1 Desk Study	3
2.2 Field Surveys	6
2.2.1 Habitats	6
2.2.2 Species	6
3. Site Baseline	9
3.1 Policy and Legislative Context	9
3.1.1 Policy Context	9
3.2 Desk Study Results	10
3.2.1 European and Ramsar Sites	10
3.2.2 Statutory Nature Conservation Sites	12
3.2.3 Non-statutory Nature Conservation Sites	12
3.2.4 Protected or Notable Species	13
3.3 Field Survey Results	15
3.3.1 Habitats	15
3.3.2 Species	16
4. Conclusions and Recommendations	19
4.1 Summary	19
4.1.1 Designated Sites	19
4.1.2 Habitats	20
4.1.3 Species	20
4.2 Ecological Impact Assessment	20
4.2.1 Habitats Regulations Assessment (HRA)	20
4.2.2 Masterplanning	21
4.3 Further Studies	22



4.3.1	Bats	22
4.3.2	Birds	22
4.3.3	Great Crested Newts	22
4.3.4	Reptiles	23
4.4	Other Recommendations	23
4.4.1	Nesting Birds	23

Table 2.1	Sources of Desk Study Information	5
Table 3.1	Policy Issues to be considered	9
Table 3.2	European and Ramsar Designated Conservation Sites within 5km of the Site	10
Table 3.3	Statutory Nature Conservation Sites within 2km of the Site	12
Table 3.4	Non-Statutory Nature Conservation Sites within 1km of the Site	12
Table 3.5	Protected and Otherwise Notable Species Recorded within 1km of the Site	13

Figure 1.1	Site Location Plan	After Page 24
Figure 3.1	Phase 1 Habitat Survey Plan	After Page 24

Appendix A	Relevant Legislation
Appendix B	Desk Study Data
Appendix C	CONFIDENTIAL: Badger Survey
Appendix D	Assessment of Waterbodies



1. Introduction

1.1 Background

An area of land directly north of the Sizewell 'B' Power Station has been identified as having the potential to accommodate a new nuclear plant. NNB Generation Company (EDF) has identified a number of additional sites for a variety of developments associated with the new build proposals at Sizewell that will be located beyond the current EDF landholding. AMEC has been commissioned by EDF to provide an initial ecological appraisal of each of these sites to inform the site selection process and support any future planning submissions.

Aldhurst Farm West, situated to the north of Leiston, Suffolk (National Grid Reference: TM 439 638) (Refer to **Figure 1.1** for location details) has been identified as a potential site for associated development. This report summarises the findings of an extended Phase 1 Habitat Survey for the site that includes a desk study exercise. This report identifies potential ecological receptors, should the site be re-developed and makes recommendations for further work where appropriate.

1.2 Site Context

The Site is situated on the north eastern extent of Leiston, Suffolk within a rural setting. The site is bordered to the north by Abbey Lane, to the east by Abbey Road with the remainder of the Site being bordered by arable land to the south. Residential housing is situated adjacent to the south eastern corner of the Site.

1.3 Scheme Description

The sites proposed for associated development are currently at a preliminary stage of scoping with detailed scheme plans yet to be confirmed. Notwithstanding this, current proposals for land at Aldhurst Farm West include the development of the Site to support industrial and warehousing facilities.





2. Methodology for Data Collection

2.1 Desk Study

A data-gathering exercise was undertaken to obtain information relating to statutory and non-statutory nature conservation sites, priority habitats and species, and legally protected and controlled species (see Boxes 1 and 2).

Box 1 Designated Wildlife Sites, and Priority Habitats and Species
Statutory nature conservation sites

Internationally important sites: Special Areas of Conservation (SACs) and candidate SACs, Special Protection Areas (SPAs) and proposed SPAs, Sites of Community Importance, Ramsar sites and European offshore marine sites.

Nationally important sites: Sites of Special Scientific Interest (SSSIs) that are not subject to international designations and National Nature Reserves (NNRs)

Local Nature Reserves (LNRs) are statutory sites that are of importance for recreation and education as well as nature conservation. Their level of importance is defined by their other statutory or any non-statutory designation (e.g. if an LNR is also an SSSI but is not an internationally important site, it will be of national importance). If an LNR has no other statutory or non-statutory designation it should be treated as being of district-level importance for biodiversity (although it may be of greater socio-economic value).

Non-statutory nature conservation sites

Sites of county importance: In Suffolk, County Wildlife Sites (CWS) are designated by the Suffolk CWS panel (which includes representatives from Suffolk County Council, Suffolk Biological Records Centre (SBRC), Suffolk Wildlife Trust and Natural England). Suffolk Wildlife Trust (SWT) monitors all planning applications for any potential impact on County Wildlife Sites.

Priority habitats and species

In this report, the geographic level at which a species/habitat has been identified as a priority for biodiversity conservation is referred to as its level of 'species/habitat importance'. For example, habitats and species of principal importance for the conservation of biological diversity in England (see the first bullet point below) are identified as of national species/habitat importance reflecting the fact that these species/habitats have been defined at a national level. The level of importance therefore pertains to the species/habitat as a whole rather than to individual areas of habitat or species populations, which cannot be objectively valued, other than for waterfowl, for which thresholds have been defined for national/international 'population importance'.

- National importance: Habitats and species of principal importance for the conservation of biological diversity in England. These are listed on: <http://www.defra.gov.uk/wildlife-countryside/pdf/biodiversity/s41-nerc-may2008species.pdf> and <http://www.defra.gov.uk/wildlife-countryside/pdf/biodiversity/s41-nerc-may2008habitats.pdf>. These include those UK Biodiversity Action Plan (UK BAP) priority habitats and species that occur in England.
- National importance: Species listed as being of conservation concern in the relevant UK Red Data Book (RDB) or the Birds of Conservation Concern¹ Red List.
- National importance: Nationally Scarce species, which are species recorded from 16-100 10x10km squares of the national grid.
- National importance: Ancient woodland (i.e. areas that have been under continuous woodland cover since at least 1600).
- County importance: Species listed in the Suffolk LBAP.

¹ Eaton, M.A. et al. (2009). Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. *British Birds* **102**:296-341.

Box 2 Legally Protected and Controlled Species
Legal protection

Many species of animal and plant receive some degree of legal protection. For the purposes of this study, legal protection refers to:

- Species included on Schedules 1, 5 and 8 of the *Wildlife and Countryside Act 1981* (as amended), excluding species that are only protected in relation to their sale (see Section 9[5] and 13[2]), reflecting the fact that the proposed development does not include any proposals relating to the sale of species;
- Species included on Schedules 2 and 5 of The *Conservation of Habitats and Species Regulations 2010*; and
- Badgers, which are protected under the *Protection of Badgers Act 1992*.

Legal control

Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended) lists species of animal that it an offence to release or allow to escape into the wild and species of plant that it is an offence to plant or otherwise cause to grow in the wild.

Data were gathered for:

- European and Ramsar sites on or within 5km, of the site;
- Nationally statutory designated sites on or within 2km of the site;
- Non-statutory designated sites of nature conservation interest located on or within 1km of the site;
- Records of legally protected and priority species to a distance of 1km from the site boundary; and
- Water bodies within 500m of the site, not separated from the site by barriers to great crested newt (*Triturus cristatus*) movement (e.g. major roads, rivers, etc.).

This contextual information is important as it may point to notable species that could occur on the site itself. Sources of desk study information are listed in **Table 2.1**.

Table 2.1 Sources of Desk Study Information

Topic	Date	Source of Information
Statutory nature and non-statutory nature conservation sites.	2011	Suffolk Biological Records Centre (SBRC)
Records of priority and legally protected species	2011	SBRC
Ancient woodland	2011	SBRC
Potential great crested newt aquatic habitat	2011	1:10,000 Ordnance Survey maps

2.2 Field Surveys

2.2.1 Habitats

A Phase 1 Habitat survey of the Site and its surrounds was undertaken by an AMEC ecologist on the 24th of March 2011; during the survey, distinct habitats were identified and any features of interest subjected to a more detailed description in a target note (TN)². As the standard Phase 1 Habitat survey methodology is mainly concerned with vegetation communities, the survey was extended³ to allow for the provision of information on other ecological features, including identification of the presence/potential presence of legally protected and otherwise notable species.

2.2.2 Species

The methodologies used to establish the presence/potential presence of specific species/species groups are summarised below. These relate to those species/biological taxa that the desk study and habitat types present indicated could occur on the site.

Badgers

During the survey the on-site habitats were assessed for their potential to provide suitable areas for sett excavation and badger foraging. Any evidence of badger activity was also recorded, such as:

- Setts - comprising either single holes or a series of holes likely to be connected underground;
- Hairs - usually with a white root, black band, white tip (often caught in sett entrances/fences/vegetation);
- Footprints – located in soft mud, often in sett entrances;
- Evidence of foraging – usually in the form of ‘snuffle holes’ (small scrapes created by badgers searching for insects and earthworms);
- Latrines - badgers usually deposit faeces in holes or scrapes in the ground; and
- Paths - particularly around setts or leading to feeding areas.

Mammal paths and snuffle holes were assumed to be created by badgers if the character of the path (in terms of size) was appropriate, and if other field signs were in close vicinity.

Bats

A general assessment of the suitability of the habitats on the site to support roosting, foraging and commuting bats was made. Mature trees were inspected for evidence of cavities, splits, cracks, loose bark and dense and woody ivy (*Hedera helix*) growth that could be used by bats

² Joint Nature Conservation Committee (2007). *Handbook for Phase 1 habitat survey - a technique for environmental audit*. JNCC, Peterborough.

³ Institute of Environmental Assessment (1995). *Guidelines for Baseline Ecological Assessment*. E&FN Spon, London.



for roosting. Furthermore, any buildings or structures on site were inspected externally for suitable access or egress points.

Birds

The habitats on site were assessed for their potential to support any nesting or foraging bird species or assemblages of notable species.

Great Crested Newts

Where access was possible, on and off-site water bodies (within 500m) identified by the desktop study, with their associated terrestrial habitats, were assessed for their potential to support great crested newt suitable habitats including generally still water bodies with adjacent woodland or grassland areas where there is invertebrate prey potential.

Reptiles

The Site and wider survey area were assessed for their potential to provide sheltering, foraging and breeding habitats for the four common reptile species: slow worm (*Anguis fragilis*), viviparous lizard (*Zootoca vivipara*), grass snake (*Natrix natrix*) and adder (*Vipera berus*). These native reptile species generally require open areas with mixed-height vegetation, such as heathland, rough grassland, open scrub or (in the case of grass snake) water body margins. Suitable well drained and frost free areas are needed so that they can survive the winter.

Other Species

In addition, an assessment was made of the potential for the Site to support any other species considered to be of value for biodiversity conservation, including those that were identified as occurring within the local area by the desk study.



3. Site Baseline

3.1 Policy and Legislative Context

3.1.1 Policy Context

Relevant policies are listed in **Table 3.1**, along with an outline of the issues included in these policies that would need to be taken into account when considering development of the site, and when undertaking an ecological appraisal.

Table 3.1 Policy Issues to be considered

Policy Reference	Policy Issue
<i>National planning policies</i>	
Planning Policy Statement 9 (PPS9)⁴: Biodiversity and geological conservation.	<p>The identification of effects on: designated sites of international, national and local importance; protected species, habitats and species of principal importance for the conservation of biodiversity in England; and ancient woodland and veteran trees.</p> <p>The identification of measures to mitigate adverse effects and of opportunities for enhancing biodiversity.</p>
<i>Regional planning policies</i>	
The East of England Plan⁵. Policy ENV3 of the Regional Spatial Strategy (RSS) for the East of England	<p>Proper consideration should be given to the potential effects of development on the conservation of habitats and species outside designated sites, and on species protected by law. Planning authorities and other agencies should ensure that the region's wider biodiversity, earth heritage and natural resources are protected and enriched through the conservation, restoration and re-establishment of key resources.</p> <p>This will be achieved by ensuring new development minimises damage to biodiversity and earth heritage resources by avoiding harm to local wildlife sites and, wherever possible, achieving net environmental gains in development sites through the retention of existing assets, enhancement measures, and new habitat creation.</p>

⁴ Office of the Deputy Prime Minister (2005). *Planning Policy Statement 9: Biodiversity and Geological Conservation*. HMSO.

⁵ Government Office for East of England (2008). *The East of England Plan*. Cambridge.

Policy Reference	Policy Issue
<i>Local planning policies</i>	
Suffolk Coastal Local Plan ("Saved" policies incorporating 1 st and 2 nd Alterations 2001 and 2006")	The council seek to protect, restore, maintain and enhance biodiversity interests. Planning permission would not be granted for development that results in significant harm to biodiversity interests unless there is no satisfactory alternative, all statutory and regulatory requirements are met and suitable mitigation and compensation measures are provided.
Reviewed Suffolk Coastal Core Strategy & Development Management Policies	DM27 - Development will not be permitted where there is an unacceptable impact on biodiversity and geodiversity having a regard to: the status and designation of sites habitats and species, the need to avoid the loss and fragmentation of important sites and habitats: and the impact and effectiveness of mitigation measures.
SP14 - Biodiversity and Geodiversity and	SP14 - Biodiveristy and geodiversity will be protected and enhanced using a framework based on a network of Wildfie corridors; rivers coast and estuaries, idenitified habitats and geodiversity features, landscape character areas and protected species.
DM27 – Biodiversity and Geodiversity	
<i>Other policies</i>	
UK Biodiversity Action Plan (UK BAP) (Biodiversity Reporting and Information Group, 2007)	Effects on priority habitats and species listed in the UK BAP.
The Suffolk Local Biodiversity Action Plan (LBAP).	Effects on priority habitats and species listed in the Suffolk LBAP.

3.2 Desk Study Results

3.2.1 European and Ramsar Sites

Four Sites are located within 5km of the site and these sites are listed and summarised in **Table 3.2** below.

Table 3.2 European and Ramsar Designated Conservation Sites within 5km of the Site

Site	Type of designation	Area (ha)	Ecological interest	Grid Reference	Approximate distance (m) and direction from site
Minsmere to Walberswick Heaths and Marshes	Ramsar Site,	2018.92	The site contains a mosaic of marine, freshwater, marshland and associated habitats complete with transition areas in between. It contains the largest continuous stand of reedbeds in England and Wales and rare transition in grazing marsh ditch plants from brackish to fresh water.	TM 477 747	3200m, E

Site	Type of designation	Area (ha)	Ecological interest	Grid Reference	Approximate distance (m) and direction from site
			This site supports nine nationally scarce plants and at least 26 red data book invertebrates. As well as an important assemblage of rare breeding birds associated with marshland and reedbeds.		
Minsmere to Walberswick Heaths and Marshes	Special Protection Area (SPA)	2019.55	The reserve is designated as an important breeding, roosting and feeding site for many bird species with over 100 resident species and around a further 240 species of migratory visitors being recorded at the site. The site is of particular conservation importance for great bittern (<i>Botaurus stellaris</i>), western marsh harrier (<i>Circus aeruginosus</i>), pied avocet (<i>Recurvirostra avosetta</i>), savi's warbler (<i>Locustella luscinioides</i>), bearded reedling (<i>Panurus biarmicus</i>) and reed bunting (<i>Emberiza schoeniclus</i>).	TM 456 666	3200m, E
Minsmere to Walberswick Heaths and Marshes	Special Area of Conservation (SAC)	1265.52	The principal reason for the designation of this site are the two Annex I habitats which it supports. Annual vegetation of drift lines occurs on a well developed beach strandline and is the best and most extensive example of this restricted geographical type. European dry heaths occupy an extensive area of this site on the east coast of England, which is at the extreme easterly range of heath development in the UK	TM 468 682	3200m, E
Sandlings	SPA	3405.71	The Sandlings SPA consists of a large area formerly dominated by heathland which has been used for commercial conifer forestry and arable agriculture resulting in remnant areas of heath. Recent restoration work has restored many areas with heathland supporting acid grassland and heather-dominated plant communities with dependent invertebrate and bird communities of conservation value. Woodlark (<i>Lullula arborea</i>) and Nightjar (<i>Caprimulgus europaeus</i>) have also adapted to breeding in the large blocks of conifer forest, using areas that have recently been felled and recent plantation, as well as areas managed as open ground.	TM 464 622	2500m, SE

3.2.2 Statutory Nature Conservation Sites

One statutory wildlife site was recorded within 2km of the site boundary and is listed and summarised in **Table 3.3** below.

Table 3.3 Statutory Nature Conservation Sites within 2km of the Site

Site	Type of designation	Area (ha)	Ecological interest	Grid Reference	Approximate distance (m) and direction from site
Sizewell Marshes	SSSI	105.39	Habitats consist of marsh, reedbed and wet woodland with adjacent heathland and beach with a broad range of wildflower species including four species of orchid, yellow rattle (<i>Rhinanthus minor</i>), ragged-robin (<i>Lychnis flos-cuculi</i>), bogbean (<i>Menyanthes trifoliata</i>) and lady's smock (<i>Cardamine pratensis</i>). The site also supports a broad range of faunal species including otter, water vole, kingfisher, water rail and barn owl, bittern and bearded tit.	TM 454 636	980m, E

3.2.3 Non-statutory Nature Conservation Sites

There are two non-statutory nature conservation sites within 1km of the site. These sites are listed and summarised in **Table 3.4**.

Table 3.4 Non-Statutory Nature Conservation Sites within 1km of the Site

Site	Type of designation	Area (ha)	Ecological interest	Grid Reference	Approximate distance (m) and direction from site
Buckle's Wood	CWS	4.62	Buckle's Wood is a mixture of ancient and semi natural woodland, containing old coppice stools consisting of hazel, with ash, field maple and hornbeam mixed with oak standards. A good ditch and bank boundary with a mixed species hedge, indicates a woodland of some considerable age.	TM 431 635	315m, SW

Site	Type of designation	Area (ha)	Ecological interest	Grid Reference	Approximate distance (m) and direction from site
Sizewell Levels and Associated Areas	CWS	105.33	A large area of land, consisting of woodland, plantation, wet meadow, osier beds and scrub considered to be of both regional and national importance for wildlife conservation. The whole site with its diversity of habitats, is considered to be one of the most important County Wildlife Sites in the county. In 1994 the area designated as a Site of Special Scientific Interest was extended to include a large proportion of this County Wildlife Site.	TM 463 640	750m, E

3.2.4 Protected or Notable Species

A number of protected or notable species have been recorded within 1km of the site as outlined in **Table 3.5**.

Table 3.5 Protected and Otherwise Notable Species Recorded within 1km of the Site

Species common name	Species biological name	Number of records	Date (most recent)	Distance of nearest recording from site (m)
Mammals				
Otter	<i>Lutra lutra</i>	1	2008	100, E
Common pipistrelle bat	<i>Pipistrellus pipistrellus</i>	4	1993	670, NE
Serotine bat	<i>Eptesicus serotinus</i>	1	1990	Exact location unknown.
Noctule bat	<i>Nyctalus noctula</i>	1	1990	Exact location unknown.
Reptiles and amphibians				
Great crested newt	<i>Triturus cristatus</i>	2	1998	400, E
Viviparous lizard	<i>Zootoca vivipara</i>	1	1999	800, NW
Grass snake	<i>Natrix natrix</i>	1	2008	1000, E

Species common name	Species biological name	Number of records	Date (most recent)	Distance of nearest recording from site (m)
Birds				
Barn owl	<i>Tyto alba</i>	3	1999	Exact location unknown.
Bittern	<i>Botaurus stellaris</i>	3	1999	Exact location unknown.
Bullfinch	<i>Pyrrhula pyrrhula</i>	2	2002	Exact location unknown.
Grasshopper Warbler	<i>Locustella naevia</i>	1	1992	Exact location unknown.
Grey Partridge	<i>Perdix perdix</i>	1	1998	Exact location unknown.
Lesser Spotted Woodpecker	<i>Dendrocopos minor</i>	1	1993	Exact location unknown.
Linnet	<i>Carduelis cannabina</i>	1	1999	Exact location unknown.
Reed Bunting	<i>Emberiza schoeniclus</i>	1	1991	Exact location unknown.
Skylark	<i>Alauda arvensis</i>	5	2002	Exact location unknown.
Song Thrush	<i>Turdus philomelos</i>	3	2002	Exact location unknown.
Spotted Flycatcher	<i>Muscicapa striata</i>	1	2002	Exact location unknown.
Turtle Dove	<i>Streptopelia turtur</i>	3	2004	Exact location unknown.
Woodlark	<i>Lullula arborea</i>	2	1999	Exact location unknown.
Wryneck	<i>Jynx torquilla</i>	1	1993	Exact location unknown.
Invertebrates				
Small Square-spot	<i>Diarsia rubi</i>	1	2002	500, E
Small Phoenix	<i>Ecliptopera silaceata</i>	1	2002	500, E
August Thorn	<i>Ennomos quercinaria</i>	1	2002	500, E
Oblique Carpet	<i>Orthonama vittata</i>	1	2002	500, E
Dark Spinach	<i>Pelurga comitata</i>	1	2002	500, E
Oak Hook-tip	<i>Watsonalla binaria</i>	1	2002	500, E

Species common name	Species biological name	Number of records	Date (most recent)	Distance of nearest recording from site (m)
Dark-barred Carpet	<i>Xanthorhoe ferrugata</i>	1	2002	500, E
White Letter Hairstreak	<i>Satyrium w-album</i>	1	2004	1000, E
Grey Dagger	<i>Acronicta pisi</i>	1	2007	Exact location unknown.

3.3 Field Survey Results

3.3.1 Habitats

Figure 3.1 presents the Phase 1 Habitat survey map. The following sections describe the habitats on and around the site.

Site Context and Surrounding Habitats

The Site is situated within a rural setting approximately 1km to the north east of Leiston, Suffolk. Abbey Lane, borders the north of the site with Abbey Road to the east. The wider landscape consists predominantly of large arable fields with boundary hedges and treelines with occasional copses, broom or gorse coverts.

On-site Habitats

The Site consists of a farmhouse and farm cottage located centrally to the north of the site with a number of associated agricultural and light industrial out-buildings. The remainder of the farm site comprises four large arable fields with two smaller fields of improved grazing pasture adjacent to the south of the farm buildings. Field margins are present around the arable fields and are formed by a non-continuous strip of rank semi-improved grassland between 0.5m and 3m wide, with occasional patches of bramble (*Rubus fruticosus agg*) and tall ruderal vegetation. Dominant grass species consist of cocks-foot (*Dactylus glomerata*), Yorkshire fog (*Holcus lanatus*) with some tufted hair grass (*Deschampsia cespitosa*) while the predominant ruderal species comprise Alexander's (*Smyrniium olusatrum*), common nettle (*Urtica dioica*) and spear thistle (*Cirsium vulgare*).

Sections of species-poor hedgerow consisting predominately of hawthorn (*Crataegus monogyna*) with interspersed ash (*fraxinus excelsior*) are present around field and site boundaries in the northern half of the site. Dense sections of continuous mature hedgerow approximately 2m in height are present around the grazing pastures adjacent to the farm buildings and around Gypsy Lodge in the north western corner of the Site. A discontinuous scattered hedgerow also stretches along the north eastern and eastern boundary of the Site, following the edge of the Abbey Lane and Abbey Road with latter containing a greater proportion of oak and ash stands. A short stretch of Leyland cypress, (*Cupressocyparis leylandii*) hedge borders residential properties in the south eastern corner of the Site.

Drainage ditches form the Site boundary to the southern half of the site, however these were dry at the time of survey and support scattered ruderals and grasses of similar composition to the

field margins. Mature trees are scattered throughout the field edges and Site boundaries and are comprised in the main of oak (*Quercus sp.*) trees.

An access track branches off Abbey Lane, west of the farm buildings to an excavated area with a small copse of oak and elder (*Sambucus nigra*) trees located near the centre of the Site. This area has been used for waste storage which includes large piles of rubble and stone, and cut brash vegetation (TN1) with much of this area covered in bramble.

3.3.2 Species

Badger

See Appendix C.

Bats

The desk study contained records of common pipistrelle (*Pipistrellus pipistrellus*), serotine (*Eptesicus serotinus*) and noctule (*Nyctalus noctula*) in the local area; however results from the Sizewell Bat Survey Report 2010 (28130ca068) identified the following 8 species, including serotine, soprano pipistrelle (*Pipistrellus pygmaeus*) common pipistrelle, Leisler's bat (*Nyctalus leisleri*), Myotis bats (*Myotis sp.*), noctule, Nathusius' pipistrelle and brown long-eared bat (*Plecotus auritus*) occurring in the nearby locality with barbastelle (*Barbastella barbastellus*) known to roost in trees and a building approximately 1km from the site boundary.

A number of mature trees (c.11) located on or adjacent to the Site are considered to have potential to support roosting bats. These trees all exhibit features including broken limbs, cracks, crevices and bark flakes that would be suitable for bat roosts. The on-site grassland and hedgerow habitats could provide suitable foraging habitat for bats roosting in the vicinity, both in trees and in the residential buildings near to the site.

The farm houses and associated out-buildings located on the north of the site were assessed for their potential to support roosting bats. The majority of the buildings are thought to have low bat roosting potential as they are large storage sheds with unlined corrugated roofs and interspersed clear lighting sheets; there is however, some potential for occasional roosting in the wooden clad sides of these units. The farm house is a two-storey red brick building with pitched tiled roof; this building is in a good condition with no obvious holes in the roof or wooden gutter boards, and thus offering no entrance holes for bats. The adjacent smaller farm house to the west comprises two storeys and a hipped tiled roof, this building is in good condition apart from a hole in the soffit box which is full of bird nesting material. A small one-storey building situated between the two houses offers some roosting potential with gaps between the wooden gutter board and the wall. A long two-storey red brick building with attached single-storey lean-to is located centrally between the two farm house properties and offers some bat roosting potential with a hole in a lintel above an open door while the lean-to has gaps between the wooden gutter board and the wall.

Birds

Desk study results provided multiple records of notable bird species, including woodlark (*Lullula arborea*), skylark (*Alauda arvensis*), bittern (*Botaurus stellaris*), barn owl (*Tyto alba*) and wryneck (*Jynx torquilla*), which receive additional protection under Schedule 1 of the Wildlife and Countryside Act (1981). No protected or moderate to high conservation status

species however, were recorded nesting or potentially breeding within or around the site. In particular, no ground nesting birds, such as Skylark [BoCC⁶ Red list].

The tree-lined hedgerows around the boundary of the site are likely to support several common or garden species, including the following which were recorded during the walkover: goldfinch (*Carduelis carduelis*), chiffchaff (*Phylloscopus collybita*), robin (*Erithacus rubecula*) and blue tit (*Cyanistes caeruleus*).

Great Crested Newt

Desk study results provided records of great crested newt within 500m of the site.

Multiple waterbodies within 500m of the Site were identified during the desk study that have ecological connectivity with the Site; 8 of these were potentially suitable to support great crested newt. Details of these waterbodies are provided in Appendix D. The on-site habitats provide limited habitat suitability for great crested newt, as waterbodies are absent and the majority of the site consists of intensively farmed arable fields, which is sub-optimal terrestrial habitat. Nevertheless, the field margins provide ruderals, tussocky grassland and scrub suitable to support newts, while the small woodland copse and pile of earth covered rubble could provide suitable hibernation sites.

Reptiles

Desk study results provided records of viviparous lizard and grass snake within 1km of the Site.

Suitable reptile habitats on-site were limited to the field margins of rank grassland, scrub and ruderal vegetation. These have the potential to provide sheltering and foraging habitat for reptile populations, although the lack of aquatic habitat may limit the suitability for grass snake. A suitable hibernation site was identified adjacent to the sunken wooded copse near the centre of the site, where piles of scrub covered brick hardcore and tarmac were present along with brash cuttings (TN1). The site lies within an area known to support relatively high populations of reptiles, and as such, any of the common reptile species may be found to be present..

Other Species

Desk study results provide records of otter, approximately 100m to the east of the Site. The Site however, is unlikely to support this species, given the lack of wetland and/or aquatic habitat.

A number of notable moths were recorded within 1km of the Site. These were recorded east of the Site predominantly within the Sizewell Levels and Associated Areas, County Wildlife Site where the habitat consists of woodland, plantation, wet meadow and scrub and is considered to be one of the most important County Wildlife Sites in the county. The predominately arable habitats, with limited marginal vegetation on site however are not thought suitable to support a similar community of notable invertebrates.

⁶ Birds of Conservation Concern



4. Conclusions and Recommendations

4.1 Summary

An Extended Phase 1 Habitat Survey was undertaken for the Site in parallel with a desk top study of readily available ecological information. The following potential ecological receptors within the potential zone of influence of the development proposals are outlined below:

4.1.1 Designated Sites

International/European Statutory Designated Sites

Four international/European statutory designated sites are located within 5km of the Site:

- Sandlings SPA (2.5km south).
- Minsmere to Walberswick Heaths and Marshes Special Protection Area (SPA) (3.2km north east).
- Minsmere to Walberswick Heaths and Marshes Ramsar Site (3.2km north east).
- Minsmere to Walberswick Heaths and Marshes Special Area of Conservation (SAC)(3.2km north east).

Given the proximity of these sites, particularly the Sandlings SPA, and the absence of detailed proposals for the Site, there is potential for these sites to be affected by the proposed development and as such should be taken into account within any further design and assessment.

National Statutory Designated Sites

One national statutory designated sites are located within 2km of the Site:

- Sizewell Marshes SSSI (980m east).

Given the proximity of these sites and the absence of detailed proposals for the site, there is potential for these sites to be affected by the proposed development and as such should be taken into account within any further design and assessment.

Non-Statutory Designated Sites

Two non-statutory designated sites are located within 1km of the Site:

- Buckle's Wood CWS (315m south west); and
- Sizewell Levels and Associated Areas (CWS)(750m north).

Given the proximity of these sites, particularly Buckle's Wood, and the absence of detailed proposals for the Site, there is potential for these sites to be affected by the proposed development and as such should be taken into account within any further design and assessment.

4.1.2 Habitats

The Site comprises arable fields with two smaller fields of improved grazing pasture/amenity grassland adjacent to the south of the farm buildings. Field margins are formed by a non-continuous strip of rank improved grassland with interspersed patches of scrub and tall ruderals. The fields are fringed by overgrown drainage ditches and species-poor boundary hedges with interspersed mature tree stands. A small copse of mixed deciduous trees is located in the centre of the site.

4.1.3 Species

The following protected species and species groups have been identified as being potentially present on site:

- Bats (roosting, foraging and commuting);
- Great crested newt (foraging, commuting and hibernating);
- Reptiles; and
- Nesting birds.

Recommendations are provided below in order to inform any Ecological Impact Assessment (EcIA) and scheme design and also to ensure compliance with the relevant wildlife legislation and planning policy relating to these species.

4.2 Ecological Impact Assessment

It is recommended that this report (and future survey findings) is used to form the basis of an EcIA once additional information relating to the scheme design becomes available. This should assess the effects of the development on the biodiversity receptors identified in section 4.1, as well as informing any masterplanning and detailed design of an ecological enhancement and mitigation strategy where appropriate.

4.2.1 Habitats Regulations Assessment (HRA)

There are four European or Ramsar sites within 5km of the Site, the nearest being 2.5km to the south (Sandlings SPA). At this stage, detailed development proposals for the site have not been established. It is considered unlikely that the development proposals will result in effects on these designated areas or the features for which they have been designated however, in the absence of more information this cannot be scoped out at this stage. As such, there is the potential that a Habitats Regulations Assessment (HRA) would need to be undertaken for the site.

The need for Habitat Regulations Assessment is set out within Article 6 of the EC Habitats Directive 1992, and interpreted into British law by the Conservation of Habitats and Species Regulations 2010. The ultimate aim of HRA is to “*maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest*” (Habitats Directive, Article 2(2)). This aim relates to habitats and species, not the European sites themselves, although the sites have a significant role in delivering favourable conservation status.

It is recommended that consultation should commence with Natural England in order to establish their expectations particularly in relation to the need for undertaking HRA for this site.

4.2.2 Masterplanning

Development proposals for the Site are still in their very early stages and as such, it is not appropriate at this stage to provide any detailed assessment of effects upon ecological receptors and protected species. As such, we have provided below a number of broad recommendations and principles that can be further refined once more detailed designs become available.

According to PPS93 there is a need to 'enhance biodiversity in green spaces and among developments so that they are used by wildlife and valued by people'. Furthermore, there is a requirement by policy to consider the BAP priority species that may occur on the Site. In order to adequately address these requirements, it is recommended that there is specialist ecological input into the development of the scheme design from the outset. This will ensure that the new development retains existing habitats used by protected and notable species on the site, as well as incorporating features within the design to enhance the habitats for biodiversity in general. Such features may include:

- Retention of tree and scrub lines which may be used by foraging and commuting bats;
- Increasing botanical diversity by planting native fruit and flower-bearing species (of local provenance): this will in turn increase invertebrate diversity and thus prey for bats and herpetofauna;
- Provision of artificial roost sites for bats through installation of appropriate boxes and other roost spaces incorporated within new buildings;
- Avoidance of excessive lighting, particularly around artificial bat roost sites and commuting and foraging habitat;
- Installing hibernacula – these involve loose, inert fill being dug into, and piled up above the ground. The material is then covered in top soil and turf with the edges left to expose the fill and allow access for reptiles and amphibians;
- Stag beetle pyramids - these consist of a number of logs half buried into the ground vertically. While providing a source of rotting dead wood and shelter for invertebrates, they also provide sheltering, hibernating and basking locations for herpetofauna;
- Retaining a graded edge to grassland habitats, with a long grass sward, ruderal species and scrub buffer between short sward grass and denser scrub/woodland; and
- Further guidance is provided in the publications 'Biodiversity by Design', 'Habitat Management for Bats' and 'Herpetofauna Workers' Manual'⁷.

⁷ Bullock, D. J., Oldham, R. and Corbett, K. (1998). Habitats and their management. In: Gent, A. H. and Gibson, S. D. eds. Herpetofauna workers' manual. Joint Nature Conservation Committee, Peterborough, pp61-73.

4.3 Further Studies

Further survey work is recommended to establish the status of any protected or otherwise notable species or assemblages of species present or potentially present on site. The findings of this additional survey work will inform the scheme design and any necessary mitigation strategy that may be required to comply with legislation of planning policy. Such information can also provide baseline data against which the success of future restoration and enhancement work can be measured through monitoring.

4.3.1 Bats

Due to the level of protection afforded to bats and the potential for them to be effected by the development proposals, it is recommended that building inspections, emergence and activity surveys are undertaken in order to ascertain the level of bat activity within and around the Site.

Detailed internal and external inspections of the buildings and trees should be undertaken in order to identify any direct evidence of usage by bats. If appropriate these should be followed up by emergence/re-entry surveys at dusk or dawn.

Activity surveys should also be undertaken across the site using a pre-defined transect. These surveys will aim to highlight which bat species use the area and where the highest areas of usage are.

Should bats be found to use the site there would be a requirement to design a mitigation strategy taking into account the available guidance and advice⁸. If roosts are identified It may be necessary to obtain a licence from Natural England to destroy the roost and to mitigate for its loss. This may also have an effect on the timing of the removal of trees and/or buildings, which may need to be scheduled to avoid breeding and/or hibernation periods (May-September and November-March respectively).

4.3.2 Birds

The site has the potential to support notable bird species. As such it is recommended that a suite of Common Bird Census (CBC)⁹ surveys should be undertaken in order to determine the species assemblage utilising the Site and habitats in close proximity to the Site.

4.3.3 Great Crested Newts

It is recommended that all ponds within 500m of the site that have the potential to support great crested newt (pond details are provided in Appendix D) are subject to a great crested newt presence / likely absence survey. The survey methods should accord to best practice guidelines¹⁰, and thus would involve four separate visits to the site under suitable weather conditions between mid-March and mid-June (two visits to be made between mid-April and mid-May).

⁸ Mitchell-Jones, A. J. (2004) Bat mitigation guidelines. English Nature, Peterborough.

⁹ Gilbert G, Gibbons, D.W. and Evans, J. (1998). Bird Monitoring Methods. RSPB, Sandy.

¹⁰ English Nature (2001). *Great crested newt mitigation guidelines*. Peterborough, English Nature.

4.3.4 Reptiles

Due to the level of protection afforded to reptiles it is recommended that a presence/ likely absence survey is conducted to establish the presence of reptile species in suitable habitat on the site in line with best practice guidelines^{11,12} should development proposals result in the direct loss of habitats with the potential to support these species. This will involve laying artificial reptile refugia across areas of suitable habitat. Refugia would then be examined on a subsequent seven survey visits combined with early-morning walkover surveys to search for basking animals. Surveys are seasonally constrained and must be undertaken between April and September, with optimal survey periods being late April-May and September. It is likely that, should the presence of reptiles be identified, the total number of survey visits may need to be increased to 20 in order to make population estimates.

4.4 Other Recommendations

4.4.1 Nesting Birds

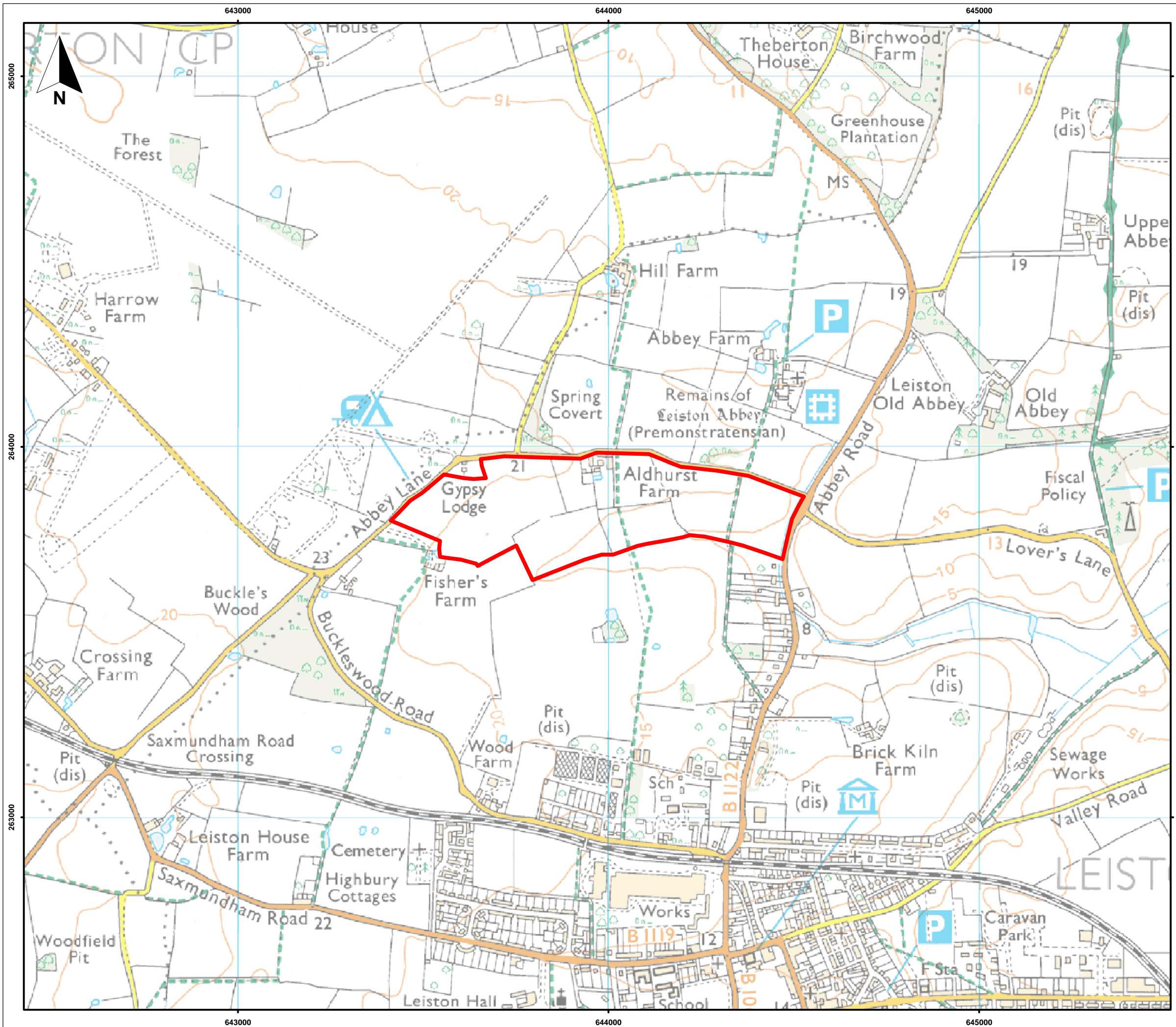
All active bird nests are legally protected under the Wildlife and Countryside Act (1981, as amended). This means that, with certain exceptions, it is illegal to intentionally or recklessly destroy an actively used nest during the breeding season, which is considered to be between March and August inclusive.

In order to minimise this risk of contravening legislation, site clearance should be completed outside the breeding bird season when active nests are not present. Where site clearance outside the breeding bird season is not possible, an ecologist will need to carefully inspect vegetation prior to clearance to ensure that active nests are not present. Should an active nest be found, it will be left in-situ and undisturbed until the young have fledged.

¹¹ Griffiths, R. and Inns, H. (1998). Surveying. In: Gent, A. H. and Gibson, S. D. eds. *Herpetofauna workers' manual*. Peterborough, Joint Nature Conservation Committee, pp1-13.

¹² Froglife (1999). *Reptile survey: an introduction to planning, conducting and interpreting surveys for snake and lizard conservation*. Froglife Advice Sheet 10. Froglife, Halesworth.





Key:

Site boundary

0 0.5
Kilometres

Scale: 1:10,000 @ A3

H:\Projects\28130 Sizewell Ecology Studies (Sub File)\5 Design\Drawings\GIS\MapInfo\Workspaces

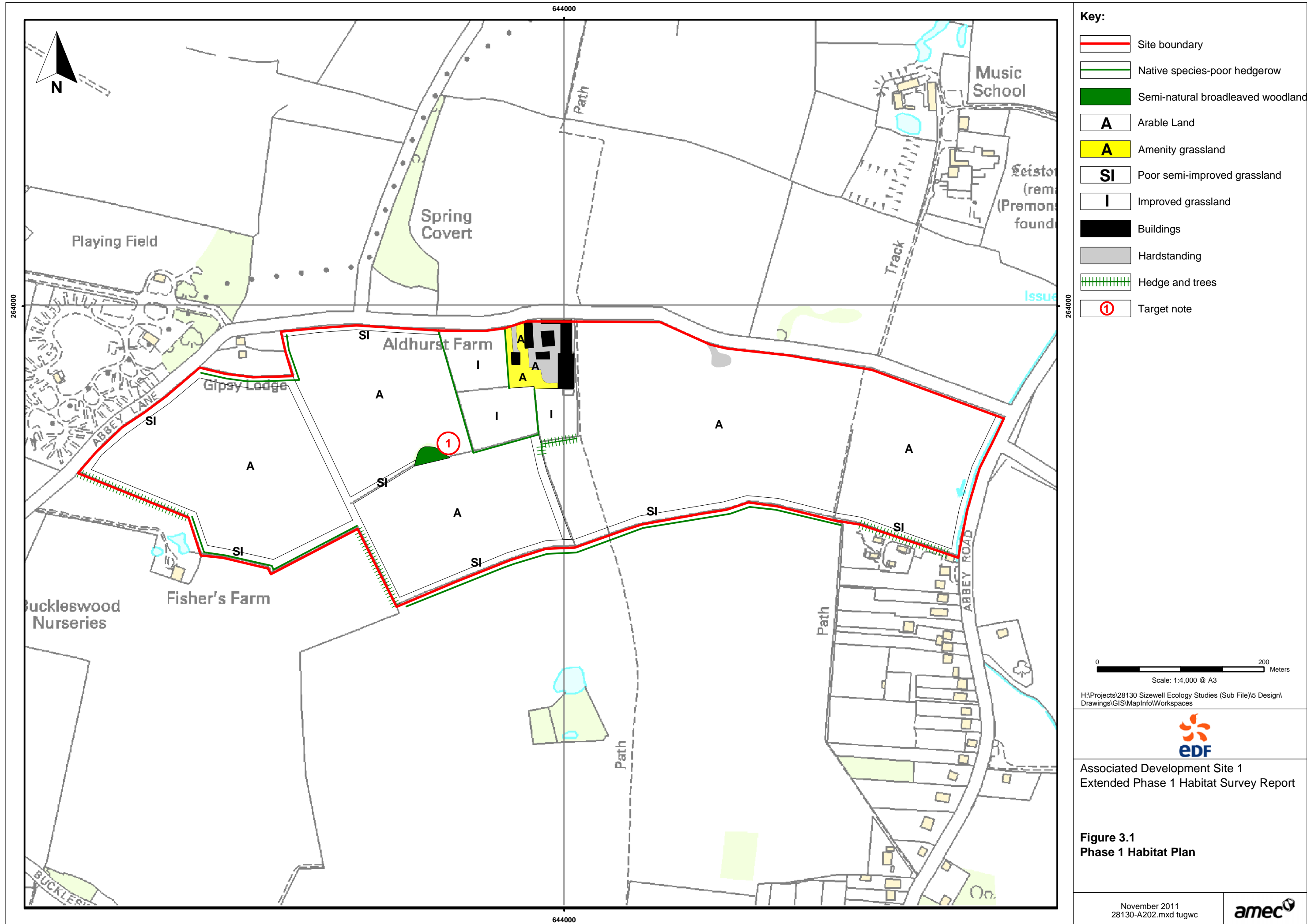


Associated Development Site 1
Extended Phase 1 Habitat Survey Report

Figure 1.1
Site boundary plan

November 2011
28130-A201.mxd tugwc





Appendix A

Relevant Legislation

Badgers

The *Protection of Badgers Act 1992* consolidates previous legislation (including the *Badgers (Further Protection) Act 1991*). It makes it a serious offence to intentionally or recklessly:

- Kill, injure or take, or attempt to kill, injure or take a badger;
- To damage, destroy or obstruct access to a sett; and
- To disturb a badger when it is occupying a sett.

Bats

All British bat species are listed in Schedule 5 of *The Wildlife and Countryside Act 1981* (as amended). The Act transposes into UK law the Convention on the Conservation of European Wildlife and Natural Habitats (commonly referred to as the 'Bern Convention'). All British bat species are listed on Schedule 5 of the Act in respect of Section 9, which makes it an offence, *inter alia*, to:

- Intentionally or recklessly kill, injure, or take (handle) a bat;
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place that a bat uses for shelter or protection; and
- Intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection.

British bat species receive further protection under Regulation 41 of the *The Conservation of Habitats and Species Regulations 2010*, which make provision for the purpose of implementing European Union Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora 1992. All British bat species are listed on Annex IV of the Directive, which means that member states are required to put in place a system of strict protection as outlined in Article 12, and this is done through inclusion on Schedule 2 of the Regulations, which makes it an offence, *inter alia*, to:

- Deliberately capture, injure or kill any bat;
- Deliberately disturb a bat, in particular any disturbance which is likely
 - (a) to impair their ability
 - (i) to survive, to breed or reproduce, or to rear or nurture their young, or
 - (ii) to hibernate or migrate
 - (b) to affect significantly the local distribution or abundance of the bat species; or
- Damage or destroy a breeding site or resting place of a bat.

In addition, five British bat species are listed on Annex II of the *Habitats Directive*. These are:

- Greater horseshoe bat (*Rhinolophus ferrumequinum*);
- Lesser horseshoe bat (*Rhinolophus hipposideros*);
- Bechstein's bat (*Myotis bechsteinii*);
- Barbastelle (*Barbastella barbastellus*); and
- Greater mouse-eared bat (*Myotis myotis*).

As Annex II species under the Habitats Regulations, the Directive requires the designation of Special Areas of Conservation (SACs) by EC member states to ensure that their populations are maintained at a favourable conservation status. Where bats occur outside SACs the level of legal protection that these species receive is the same as for other bat species, however their inclusion on Annex II serves to underline their conservation significance and it is therefore less likely that adequate mitigation for loss of roosts of these species will be possible.

For projects in England: Further details of the above legislation, and of the roles and responsibilities of developers and planners in relation to bats, can be found in Natural England's *Bat Mitigation Guidelines*, which can be downloaded from the NE website: <http://naturalengland.etraderstores.com/NaturalEnglandShop/IN136>

Birds

With certain exceptions¹³, all wild birds, their nests and eggs are protected by the *Wildlife and Countryside Act 1981* (as amended). Therefore, it is an offence, *inter alia*, to:

- Intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; and
- Take or destroy the egg of any wild bird.

Bird species listed on Schedule 1 of the Act receive further protection, thus for these species it is also an offence to:

- Disturb any bird while it is nest building, or is at a nest containing eggs or young; or disturb the dependent young of any such bird.

Great Crested Newts

The great crested newt is listed on Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and is therefore afforded protection under Section 9 of this Act. In addition, the species is listed in Schedule 2 of *The Conservation (Natural Habitats, &c.) Regulations 1994* (SI 1994 No. 2716) (as amended) (known as the Habitats Regulations) and is therefore protected under Regulation 39 of the Regulations. The Act and Regulations makes it an offence, *inter alia*, to

- intentionally kill, injure, take (handle), or capture a great crested newt;

¹³ Some species, such as game birds, are exempt in certain circumstances.

- intentionally or recklessly damage, destroy or obstruct access to any place that a great crested newt uses for shelter or protection- under the Habitats Regulations it is an offence to damage or destroy a breeding site or resting place of any great crested newt; or
- intentionally or recklessly disturb a great crested newt while it is occupying a structure or place that it uses for shelter or protection - under the Habitats Regulations it is an offence to deliberately disturb a great crested newt (this applies anywhere, not just at its roost) in such a way as to be likely to significantly affect:
 - the ability of any significant group of great crested newts to survive, breed, or rear or nurture their young; or
 - the local distribution or abundance of great crested newts.

This relates to both the aquatic and terrestrial habitat that it may occupy. The legislation applies to all life stages of great crested newts.

Reptiles

The four widespread¹⁴ species of reptile that are native to Britain, namely viviparous lizard, slow worm, adder and grass snake, are listed on Schedule 5 of the *Wildlife and Countryside Act 1981* (as amended) and are afforded limited protection under Section 9 of this Act. This makes it an offence, *inter alia*, to:

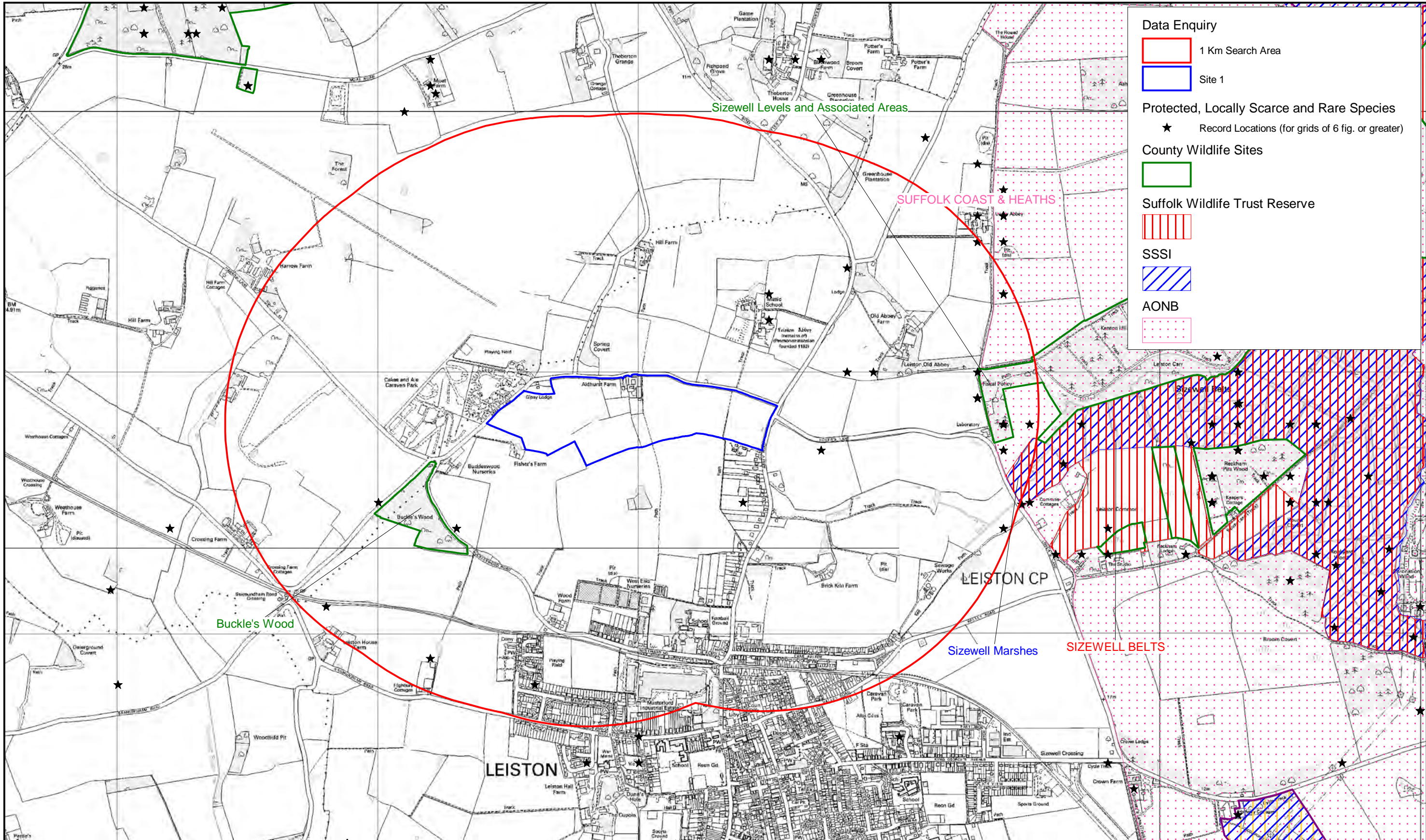
- Intentionally kill or injure any of these species.

¹⁴ The two other native species of British reptile (sand lizard *Lacerta agilis* and smooth snake *Coronella austriaca*) receive a higher level of protection under the *Wildlife and Countryside Act 1981* (as amended). However, the distribution of these species is restricted to a limited number of sites in particular geographic locations.



Appendix B

Desk Study Data



Data Enquiry

- 1 Km Search Area
- Site 1

Protected, Locally Scarce and Rare Species

- ★ Record Locations (for grids of 6 fig. or greater)

County Wildlife Sites

-

Suffolk Wildlife Trust Reserve

-

SSSI

-

AONB

-

**SUFFOLK
BIOLOGICAL
RECORDS
CENTRE**

Suffolk Biological Records Centre
Ipswich Museum, High Street
Ipswich, IP1 3QH
Tel: 01473 433571

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▲
NORTH
Grid North

Scale 1:14000

Entec (Aldhurst Farm (West) TM 439 638)
1 Km Data Enquiry

PRODUCED BY Ben Heather
CHECKED BY
DRAWING No.
DATE 10/02/2011



Appendix C

CONFIDENTIAL: Badger Survey

Appendix D Assessment of Waterbodies

Table D.1 Waterbodies Located Within 500m of the Site Boundary

Ref no.	Water body	Nat Grid Ref	Distance/direction from Study area (m) - (WSA = within study area)	Approximate Area (m ²)	Description
WB1	Buckleswood Road Pond	TM432635	276m, SW	200	Still, supporting a range of aquatic plant life with 90% of the water surface being covered by pond weed (<i>Potamogeton sp.</i>). Overshaded on 75% of its margins with adjacent habitat consisting of woodland and drainage ditches.
WB2	Fisher's Farm Pond 1	TM435637	51m, SW	-	A swimming pool.
WB3	Fisher's Farm Pond 2	TM435637	51m, SW	250	Assessed visually from 20m as access was not possible. Situated in a wooded garden the pond consisted of an open water body with well established aquatic vegetation.
WB4	Aldhurst Farm Pond	TM439639	WSA	-	Pond not present.
WB5	Spring Covert Pond	TM439641	100m, N	-	Pond not present.
WB6	Hill Farm Copse Pond	TM437644	451m, N	200	Still, supporting a range of aquatic plant life with 75% of the water surface being covered by pond weed. Overshaded on 80% of its margins with adjacent habitat consisting of a small woodland copse and hedgerows and field boundaries.
WB7	Hill Farm Field Pond	TM439643	400m, N	-	Access was not possible as on private land. Unable to make visual assessment.

Ref no.	Water body	Nat Grid Ref	Distance/direction from Study area (m) - (WSA = within study area)	Approximate Area (m ²)	Description
WB8	Hill Farm Pond	TM440644	432m, N	1200	A large farmyard pond with slurry running off into the water body. Waterfowl were present while macrophyte cover was limited to 5%. The pond was shaded around 15% of its margin by scrub.
WB9	Aldhurst Copse Pond 1	TM440635	146m, S	900	A large pond situated centrally within a large arable field and surrounded by a broadleaf copse. 65 % of the water body has macrophyte cover with 50% of the pond margin shaded.
WB10	Aldhurst Copse Pond 2	TM440634	230m, S	-	Pond not present.
WB11	Aldhurst Farm Field Pond	TM441635	275m, S	-	Pond not present.
WB12	Abbey Farm Pond 1	TM444643	386m, N	500	Assessed visually from 10m as access was not possible. Situated in a garden the pond consists of an open water body with well established aquatic vegetation and surrounding habitat including arable fields, amenity lawn and hedgerows.
WB13	Abbey Farm Pond 2	TM444642	400m, N	350	The pond is heavily over shaded by oak and willow trees with scrub under storey around 90% of its margins, with macrophyte cover dominating 70% of the waterbody. The surrounding vegetation consists of arable land with boundary hedgerows.

Ref no.	Water body	Nat Grid Ref	Distance/direction from Study area (m) - (WSA = within study area)	Approximate Area (m ²)	Description
WB14	Abbey Farm Garden Pond	TM444641	277m, N	250	The pond is over shaded by oak and willow trees with scrub under storey around 80% of its margins, with macrophyte cover present around 25% of the waterbody. The surrounding vegetation consists of arable land with boundary hedgerows.
WB15	Brick Kiln Garden Pond	TM447643	457m, SE	900	Located adjacent to Brick Kiln Farm this is a fishing pond stocked with fish with a number of wildfowl present. Minimal aquatic vegetation is present while the pond possesses a combination of sheer sides and deep water with fringing vegetation including common reed mace (<i>Typha latifolia</i>).
WB16	Brick Kiln Ditch Pond	TM446632	420m, SE	40	A ditch with no aquatic vegetation present and full of decaying leaf litter and heavily shaded fringes.



NNB Generation Company

Associated Development Site 1

DRAFT Bird Survey Report 2011-12

July 2012

AMEC Environment & Infrastructure UK Limited

Report for

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Associated Development Site 1

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July 2012

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Document Revisions

No.	Details	Date
1	Draft Report	July 2012

Contents

1. Introduction	1
1.1 Background	1
1.2 Site Context and Description	1
1.3 Purpose of this Report	2
1.4 Legislation related to Birds	2
2. Methods	3
2.1 Desk Study	3
2.2 Breeding Bird Surveys	3
2.3 Winter Bird Surveys	4
3. Results	6
3.1 Designated Sites of Ornithological Importance	6
3.1.1 European Designated Sites	6
3.1.2 Internationally Designated Sites	8
3.1.3 Nationally Designated Sites	8
3.1.4 Non-statutory Nature Conservation Sites	9
3.2 Agri-environment Schemes	9
3.3 Protected or Notable Species	9
3.4 Breeding Bird Surveys	10
3.5 Winter Bird Surveys	15
4. Conclusions and Recommendations	18
4.1 Breeding Bird Community	18
4.1.1 Highly Protected Breeding Species	18
4.1.2 UK BAP Priority and Red-Listed Species	19
4.1.3 Other Species	19
4.2 Wintering Bird Community	19
4.3 Recommendations	20
4.3.1 Further Survey Work	20
4.3.2 Nesting Birds	20

5. References

21

Table 3.1	Protected and Otherwise Notable Species Recorded within 1km of the Site	10
Table 3.2	Number of Breeding Bird Territories	12
Table 3.3	Birds Recorded within and adjacent to the site during Winter Walkover Survey	15
Figure 1.1	Site Location	After page 21
Figure 2.1	Winter Walkover Survey Area and Field Numbers	After page 21
Figure 3.1	Designated Sites of Ornithological Importance	After page 21
Figure 3.2a-b	Location of Breeding Bird Territories	After page 21
Appendix A	Desk Study Selection Criteria	
Appendix B	Desk Study Data	

1. Introduction

1.1 Background

An area of land directly north of Sizewell B Nuclear Power Station, which is located near Leiston in Suffolk, has been identified as having the potential to accommodate the proposed development of one or more new nuclear reactors. This proposed development is known as Sizewell C. NNB Generation Company (EDF) has identified a number of potential sites for a variety of developments associated with the new build proposals at Sizewell that will be located beyond the current EDF landholding. AMEC has been commissioned by EDF to undertake bird surveys on a number of these sites, to inform the site selection process and support any future planning submissions.

Aldhurst Farm West (referred to in this report as the site, or more specifically as AD Site 1), situated to the north of Leiston (National Grid Reference: TM 439 638), has been identified as a potential site for associated development (see **Figure 1.1** for site location).

1.2 Site Context and Description

The site (AD Site 1, which covers approximately 24 hectares) is bordered to the south, north and east by arable farmland and is situated within a rural setting on the north western extent of Leiston town. The site's northern boundary is formed by Abbey Lane, to the east by Abbey Road (where it adjoins AD Site 2), with residential housing along Abbey Road (forming part of Leiston town) situated adjacent to the south eastern corner of the site. Adjacent to the west of the site is the Cakes & Ale Caravan Park, an area of short grassland interspersed by tall hedgerows and blocks of mature trees. Gypsy Lodge (a residential property) and an area of dense scrub are also located immediately to the west of the site.

The site itself primarily comprises four large fields of arable farmland, two smaller fields of improved grassland and the farmstead of Aldhurst Farm. Due to the light, often sandy soils present in coastal Suffolk, the arable farmland is used to grow a variety of crops, including cereals, root crops and other vegetables. At the time of the surveys, the arable fields within the site contained winter-sown wheat or were left ploughed or to cereal stubble. Field margins around the arable fields consist of strips of rank semi-improved grassland, with occasional patches of bramble (*Rubus fruticosus* agg.) and tall ruderal vegetation. There are also sections of species-poor hedgerow in the northern half of the site. Dense sections of continuous mature hedgerow are present in the north western corner of the site and a discontinuous scattered hedgerow also stretches along the north eastern and eastern boundary of the site. There is no wetland habitat or watercourses running through the area, apart from a seasonally dry ditch along the southern boundary. The habitat surrounding the site to the north, east and south comprises more arable farmland divided by hedgerows, and interspersed by small blocks of mature deciduous woodland.

For further details of the habitats present within the site, please refer to the Phase 1 habitat survey report (AMEC, 2011).

1.3 Purpose of this Report

The primary purpose of this report is to provide baseline information on the numbers and distribution of bird species at the site and in the immediate surrounding area. The results of the desk study and surveys will provide environmental support information for progressing any development proposal of the site. This report details the methods for and findings from a desk study and programme of breeding and wintering bird surveys undertaken at the site in spring/summer 2011 and winter 2011-12 respectively, and, based upon the findings, makes recommendations for further bird survey work where appropriate.

1.4 Legislation related to Birds

With certain exceptions¹, all wild birds, their nests and eggs are fully protected by the Wildlife and Countryside Act (1981) as amended. Therefore, it is an offence, *inter alia*, to intentionally take, damage or destroy the nest of any wild bird while it is in use or being built, or to take or destroy the egg of any wild bird. It is also an offence to disturb any wild bird listed on Schedule 1 of the Act while it is nest building, or is at a nest containing eggs or young, or to disturb the dependent young of any such bird.

The European Union meets its obligations for bird species under the Bern Convention and Bonn Convention and more generally by means of Directive 2009/147/EC (Birds Directive) on the conservation of wild birds (the codified version of Council Directive 79/409/EEC as amended). This obliges national governments to identify and designate areas of critical importance to the conservation of the species – these areas are known as Special Protection Areas (SPAs). In addition, certain endangered, rare, or vulnerable bird species, which warrant special protection, are included on Annex 1 of the Birds Directive.

¹ Some species, such as game birds, are exempt in certain circumstances

2. Methods

2.1 Desk Study

A data-gathering exercise was undertaken in February 2011 to obtain information relating to statutory and non-statutory nature conservation sites, priority habitats and species, and legally protected and controlled species (see Box 1 and Box 2 in **Appendix A**).

The data was obtained from the Suffolk Biological Records Centre (SBRC) and that presented within this report includes:

- European and Ramsar sites on or within 5km, of the site;
- Non-statutory designated sites of nature conservation interest with an ornithological interest located on or within 1km of the site; and
- Records of legally protected and priority bird species to a distance of 1km from the site boundary, for 1990-2008.

Details of the location and reasons for designation of any nationally statutory designated sites with an ornithological interest on or within 2km of the site were obtained from the websites: www.magic.defra.gov.uk and www.jncc.defra.gov.uk. Details of any land within the site that is under agri-environment schemes was also obtained from www.magic.defra.gov.uk.

This contextual information is important as it may point to notable species that could occur on the site itself. A number of other primary sources of data were identified and used to inform the work. These include:

- Birds of Suffolk (Piotrowski, 2003); and
- Suffolk Birds 2000-2010 inclusive - the annual county bird reports, published by the Suffolk Naturalists' Society in collaboration with the Suffolk Ornithologists' Group.

2.2 Breeding Bird Surveys

Territory mapping surveys based on the BTO's Common Bird Census (CBC) methodology (Marchant, 1983) were carried out by Mike Raven (AMEC, senior ornithologist) across the site and in all areas within approximately 250m of it. Transects (no further than 50m apart) were walked across all open habitats, while all field boundaries and woodland/shelter belt edges were also walked. Surveys were undertaken from approximately 30-60 minutes after sunrise until midday (at the latest), and in appropriate weather conditions (not during periods of strong wind and/or heavy rain).

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 bird territories with reasonable accuracy. In the analysis of the survey data

collected, the presence of a singing/displaying bird, a pair of birds or an adult male or female bird in potential nesting habitat (on a single survey date) were all treated as a breeding territory being present. The term territory (as used within this report) denotes that a pair of breeding birds was present, or that a male was holding territory in that area; the survey does not aim to confirm breeding at any location.

Four survey visits were therefore undertaken across and within 250m of the site between late March and June (one visit each month). Each CBC visit of AD sites 1-9 (which form a single block of land north of Leiston) took three days to complete, and as a consequence of this, a visit for a single AD site was sometimes undertaken over more than one date. The dates in 2011 on which surveys were undertaken on and within 250m of the site were as follows:

- 24 March;
- 13 April;
- 20 May, and
- 9 June.

2.3 Winter Bird Surveys

A walkover survey was carried out in all areas within the survey area, which constituted the site, and land within 1km of its boundary, where access permitted. Birds tend to forage over larger distances during winter and are usually less tied to a particular area (such as a breeding territory) and therefore a wider search area for winter was employed. Access to the gardens and driveways of domestic properties and associated farm buildings, and other private areas such as the grounds of commercial buildings and schools was not usually possible. However, most parts of the survey area could be viewed from a publicly accessible area, and as such, the data collected is considered to be representative of the bird community present.

Within the site (and within the boundaries of other AD sites within 1km), access was unrestricted, and here all field boundaries were walked and the fields scanned at convenient vantage points with binoculars. All areas of grassland and woodland were walked through. Outside the site boundary, footpaths, tracks and roads were walked and all birds that were detected were recorded. Each block of habitat (including fields, blocks of woodland and scrub, and definable blocks of houses/buildings) were assigned a unique field/plot number. During the survey, details of each bird sighting were recorded, including: the species, time of sighting, plot number, habitat and activity (foraging, roosting, singing, etc.). Counts of all notable bird species and congregations of common species were made in each field/plot². Counts were not made of all BOCC amber and red listed species or all UK/Local BAP priority species, particularly those that are common and widespread in winter, and spend much of their time in dense undergrowth and are therefore not easily detected, such as dunnock. The survey area and field/plot numbers are shown on **Figure 2.1**.

² Notable species include: all seabirds, wildfowl, birds of prey, and species listed on Schedule 1 of the Wildlife & Countryside Act 1981 as amended and Annex 1 of the Birds Directive. Congregations (usually 10 or more birds, but sometimes more or less dependant on the species) of other species were also recorded (for example 10+ linnet, 20+ rooks).



Monthly visits were undertaken to the site from September 2011 to March 2012 inclusive. Each visit of AD sites 1-9 (which form a single block of land north of Leiston) took 3-5 days to complete, and as a consequence of this, a visit for a single AD site (including the 1km buffer) was usually undertaken over more than one date. The dates on which surveys were undertaken on and within 1km of the site were as follows:

- 16 and 19 September;
- 16, 17 and 19 October;
- 8, 11, 15 and 16 November;
- 1, 5 and 20 December;
- 17 and 19 January;
- 1, 15, 16 and 17 February, and
- 6, 12 and 15 March.

3. Results

3.1 Designated Sites of Ornithological Importance

The location of designated sites of European / international ornithological importance (within 5km of the site) and sites of national ornithological importance (within 2km of the site) are shown in **Figure 3.1**.

3.1.1 European Designated Sites

Walberswick to Minsmere Special Protection Area (SPA)

The Minsmere to Walberswick SPA is located approximately 3.2km to the north east of the site. The SPA was classified on the basis of its breeding and wintering bird interest, as follows:

Minsmere to Walberswick SPA qualifies under Article 4.1 of the EC Directive 2009/147/EC on the conservation of wild birds (codified version) by supporting populations of European importance of the following species listed on Annex 1 of the Directive:

During the breeding season:

- Avocet (*Recurvirostra avosetta*), 91 pairs representing at least 15.4% of the breeding population in Great Britain (Rare Breeding Birds Panel 1996);
- Bittern (*Botaurus stellaris*), 7 individuals representing at least 35.0% of the breeding population in Great Britain (5 year mean, 1993-1997);
- Little tern (*Sternula albifrons*), 28 pairs representing at least 1.2% of the breeding population in Great Britain (5 year mean, 1992-1996);
- Marsh harrier (*Circus aeruginosus*), 16 pairs representing at least 10.0% of the breeding population in Great Britain (5 year mean, 1993-1997); and
- Nightjar (*Caprimulgus europaeus*), 24 pairs representing at least 0.7% of the breeding population in Great Britain (Count, as at 1990).

Over winter:

- Hen harrier (*Circus cyaneus*), 15 individuals representing at least 2.0% of the wintering population in Great Britain (5 year peak mean, 1985/6-1989/90).

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*), 73 pairs representing 4.9% of the population in Great Britain (Count, 1990);

- Gadwall (*Anas strepera*), 24 pairs representing 3.1% of the population in Great Britain (Count, 1990); and
- Shoveler (*Anas clypeata*), 23 pairs representing 2.3% of the population in Great Britain (Count, 1990).

Over winter:

- Shoveler, 98 individuals representing 1% of the population in Great Britain (5 year peak mean 1991/92-1995/96);
- Gadwall, 93 individuals representing 1.1% of the population in Great Britain (5 year peak mean 1991/92-1995/96); and
- (Russian) White-fronted goose (*Anser albifrons albifrons*), 67 individuals representing 1.1% of the population in Great Britain (5 year peak mean 1991/92-1995/96).

Subsequent to the publication of the data above (as included in the Natura 2000 Standard Data Form), the following changes have been suggested by the SPA Review (Stroud *et al.*, 2001):

Removal of the following species that originally qualified under Article 4.2 of the Directive

- During breeding season: teal, gadwall and shoveler; and
- During winter: shoveler, gadwall and Russian white-fronted goose.

Addition of the following species that now qualify under Article 4.2 of the Directive by supporting populations of European importance:

During breeding season:

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

Over winter:

- Avocet, 278 individuals representing at least 21.9% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6); and
- Bittern, 14 individuals representing at least 14.0% of the wintering population in Great Britain (Count as at 1998).

The SPA Review has yet to be formally adopted, although in practice SPA Review information (regarding additional species) is given the same credence by nature conservation consultees as that contained on the Natura 2000 Data Sheets. JNCC states that the 2001 Review should be taken as the definitive list of qualifying species at the SPAs concerned – see <http://jncc.defra.gov.uk/page-5485>.

Sandlings SPA

The Sandlings SPA is located, at its closest, approximately 2.5km south east of the site. This SPA qualifies under Article 4.1 of the EC Directive 2009/147/EC on the conservation of wild birds (codified version) by supporting populations of the following species listed on Annex 1 of the Directive;

- Nightjar, 109 pairs representing 3.2% of the population in Great Britain (Count, 1992); and
- Woodlark, 154 pairs representing 10.3% of the population in Great Britain (Count, 1997).

Outer Thames Estuary SPA

The Outer Thames Estuary SPA covers much of the inshore waters from the Thames Estuary north along the Suffolk coast, and is located 3.1km east of the site. The SPA was classified on the basis of its wintering bird interest, and includes the following:

The Outer Thames Estuary SPA qualifies under Article 4.1 of the EC Directive 2009/147/EC on the conservation of wild birds (codified version) by supporting populations of European importance of the following species listed on Annex 1 of the Directive during the winter:

- Red-throated diver: 6,466 individuals representing 38% of the winter population in Great Britain (peak mean over the period 1989-2006/07).

3.1.2 Internationally Designated Sites

Walberswick to Minmere Ramsar Site

The Walberswick to Minmere Ramsar site is also located 3.2km north east of the site (it shares a common boundary with much of the Walberswick to Minmere SPA in this location). The site qualifies as a Ramsar site under Criterion 2 of the Ramsar Convention due to it supporting an important assemblage of rare breeding birds associated with marshland and reedbeds including: bittern, gadwall, teal, shoveler, marsh harrier, avocet and bearded tit (*Panurus biarmicus*).

3.1.3 Nationally Designated Sites

One nationally important site of ornithological importance is located within 2km of the site.

Sizewell Marshes SSSI

Sizewell Marshes SSSI is located 980m east of the site and covers an area of 104 hectares, entirely within the EDF Estate. The SSSI 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, Suffolk Wildlife Trust [SWT] Sizewell Site Manager, 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 Minsmere³ (Piotrowski, 2003). A review of the results of the annual breeding bird surveys that are conducted by SWT suggested that gadwall is the only species mentioned in the SSSI description that is likely to continue to breed with regularity (and in regionally, rather than nationally, important numbers).

3.1.4 Non-statutory Nature Conservation Sites

There are no non-statutory nature conservation sites with specific reference to birds as a key feature or reason for designation in their descriptions within 1km of the site. The Buckle's Wood County Wildlife Site (CWS), a small block of deciduous woodland, is located approximately 200m southwest of the site. The Sizewell Levels and Associated Areas CWS is located 800m to the east of the site, and within 1km of the site it primarily contains deciduous woodland and scrub (part of Leiston Carr). Both CWS's will provide some ornithological value, primarily to woodland bird species.

3.2 Agri-environment Schemes

None of the agricultural land within the site was under Department for Environment, Food and Rural Affairs (DEFRA) agri-environment schemes at the time of writing this report (website: www.defra.magic.gov.uk, access on 22 June 2012).

3.3 Protected or Notable Species

A number of protected or otherwise notable species (as defined in Boxes 1 and 2, in **Appendix A**) have been recorded within 1km of the site since 1990. Details of these records are provided in **Table B1** in **Appendix B**⁴. Details of the most recent record for each species potentially within 1km of the site are presented in **Table 3.1**⁵. The months of the records were not provided and so (for resident species) it is not possible to determine whether records refer to breeding or wintering periods.

³ 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.)

⁴ A review of the desk study records was carried out. The likelihood of each record occurring within 1km of the site was assessed taking account of the location description, grid reference and habitat present within the area. Records which were identified as not being within 1km of the site have then been excluded from Table B1.

⁵ For most of the desk study records provided, the location of the sightings are given as a 1km grid square reference, together with a broad description of the general locality (e.g. Leiston). Therefore, it is not possible to identify the exact location of the record.

Table 3.1 Protected and Otherwise Notable Species Recorded within 1km of the Site

Species common name	Species biological name	Number of records	Date (most recent)	Distance (m) and direction of nearest recording from site
Grey partridge	<i>Perdix perdix</i>	1	1998	Exact location unknown
Turtle dove	<i>Streptopelia turtur</i>	3	2004	Exact location unknown
Barn owl	<i>Tyto alba</i>	3	1999	380m NE
Wryneck	<i>Jynx torquilla</i>	1	1993	Exact location unknown
Lesser spotted woodpecker	<i>Dendrocopos minor</i>	1	1993	Exact location unknown
Woodlark	<i>Lullula arborea</i>	2	1999	Exact location unknown
Skylark	<i>Alauda arvensis</i>	4	2002	Exact location unknown
Song thrush	<i>Turdus philomelos</i>	3	2002	Exact location unknown
Grasshopper warbler	<i>Locustella naevia</i>	1	1992	Exact location unknown
Spotted flycatcher	<i>Muscicapa striata</i>	1	2002	Exact location unknown
Linnet	<i>Carduelis cannabina</i>	1	1999	Exact location unknown
Bullfinch	<i>Pyrrhula pyrrhula</i>	2	2002	Exact location unknown
Reed bunting	<i>Emberiza schoeniclus</i>	1	1991	Exact location unknown

3.4 Breeding Bird Surveys

A total of 33 species were recorded breeding or holding territory within 250m of the site (the survey area) in 2011, including:

- six UK Biodiversity Action Plan (BAP) Priority Species (of which three also feature on the Suffolk LBAP);
- five species that appear on the Birds of Conservation Concern red list (Eaton *et al.*, 2009)⁶ and a further
- six species that are on the BoCC amber list ⁷.

⁶ The criteria for assigning species to the red list include: if they are globally threatened; or if they have declined by 50% or more over the past 25 years; or 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 appear on the list due to considerable range contractions or rapid declines in their breeding populations.

⁷ Amber-listed species are those which have experienced moderate recent declines or range reductions (between 25 and 49%) over the past 25 years, or that are rare breeders (with a population of 1-300 pairs in the UK), or 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. The red and amber lists are updated periodically, the last update being in 2009 (Eaton *et al.*, 2009)



No species listed on Schedule 1 of the Wildlife and Countryside Act 1981 (as amended) or Annex 1 of the Birds Directive were recorded.

The species with the most territories recorded within the site boundary was robin (11 territories) followed by chaffinch and woodpigeon (each with 10 territories).

An additional four species were recorded for which there was no evidence of breeding within the survey area. Of these, stock dove and house martin breed in the local area (and potential nesting habitat is present within 250m of the site); black-headed gulls nest in large numbers on the scrape at the Minsmere RSPB nature reserve and the meadow pipit records probably relate to lingering winter visitors or passage migrant birds, although small numbers also breed on nearby heathland and rough grassland areas. No potential breeding habitat exists for black-headed gull or meadow pipit within the survey area.

The location of breeding territories is shown on **Figures 3.2a-b**. Results from the breeding bird surveys are provided in **Table 3.2**, with estimates of the number of breeding pairs/territories within the site boundary and within 250m of the site.

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 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.

**Table 3.2 Number of Breeding Bird Territories**

BTO Code	Species common name	Species biological name	Within site	Within 250m	UK BAP⁸	Suffolk LBAP	NERC S41⁹	BoCC¹⁰
RL	Red-legged partridge	<i>Alectoris rufa</i>	1	4				
PH	Pheasant	<i>Phasianus colchicus</i>	7	14				
K.	Kestrel	<i>Falco tinnunculus</i>	1	1				Amber
WP	Woodpigeon	<i>Columba palumbus</i>	10	22				
CD	Collared dove	<i>Streptopelia decaocto</i>	1	8				
G.	Green woodpecker	<i>Picus viridis</i>	0	1				Amber
GS	Great spotted woodpecker	<i>Dendrocopos major</i>	0	2				
S.	Skylark	<i>Alauda arvensis</i>	3	12	Yes	Yes	Yes	Red
SL	Swallow	<i>Hirundo rustica</i>	2	2				Amber
PW	Pied wagtail	<i>Motacilla alba</i>	1	1				
WR	Wren	<i>Troglodytes troglodytes</i>	9	21				
D.	Duncock	<i>Prunella modularis</i>	7	14	Yes		Yes	Amber
R.	Robin	<i>Erithacus rubecula</i>	11	28				

⁸ UK BAP list published 2007 (Biodiversity Reporting and Information Group, 2007)

⁹ In May 2008, Natural England and Defra published the Section 41 list of habitats and species of principal importance for the conservation of biodiversity in England. The list contains all UK Biodiversity Action Plan (BAP) priority habitats and species known to occur in England in addition to species of particular conservation significance in England. The production of the list is a requirement of the Natural Environment & Rural Communities (NERC) Act 2006 and it will be used to guide and prioritise future conservation action in England.

¹⁰ Red and amber list species: those listed as being of high or medium conservation concern in Eaton *et al.* (2009).



BTO Code	Species common name	Species biological name	Within site	Within 250m	UK BAP ⁸	Suffolk LBAP	NERC S41 ⁹	BoCC ¹⁰
B.	Blackbird	<i>Turdus merula</i>	4	21				
ST	Song thrush	<i>Turdus philomelos</i>	1	3	Yes	Yes	Yes	Red
M.	Mistle thrush	<i>Turdus viscivorus</i>	0	1				Amber
BC	Blackcap	<i>Sylvia atricapilla</i>	3	9				
WH	Whitethroat	<i>Sylvia communis</i>	8	11				Amber
CC	Chiffchaff	<i>Phylloscopus collybita</i>	1	4				
GC	Goldcrest	<i>Regulus regulus</i>	1	2				
LT	Long-tailed tit	<i>Aegithalos caudatus</i>	1	3				
BT	Blue tit	<i>Cyanistes caeruleus</i>	5	17				
GT	Great tit	<i>Parus major</i>	5	12				
J.	Jay	<i>Garrulus glandarius</i>	1	2				
MG	Magpie	<i>Pica pica</i>	2	2				
JD	Jackdaw	<i>Corvus monedula</i>	1	14				
C.	Carrion crow	<i>Corvus corone</i>	1	4				
HS	House sparrow	<i>Passer domesticus</i>	3	6	Yes		Yes	Red
CH	Chaffinch	<i>Fringilla coelebs</i>	10	26				
GR	Greenfinch	<i>Carduelis chloris</i>	7	15				
GO	Goldfinch	<i>Carduelis carduelis</i>	3	5				
LI	Linnet	<i>Carduelis cannabina</i>	0	1	Yes	Yes	Yes	Red
Y.	Yellowhammer	<i>Emberiza citrinella</i>	3	5	Yes		Yes	Red
Other species recorded, for which no evidence of breeding was obtained								
BH	Black-headed gull	<i>Chroicocephalus ridibundus</i>						Amber



BTO Code	Species common name	Species biological name	Within site	Within 250m	UK BAP⁸	Suffolk LBAP	NERC S41⁹	BoCC¹⁰
SD	Stock dove	<i>Columba oenas</i>						<i>Amber</i>
HM	House martin	<i>Delichon urbicum</i>						<i>Amber</i>
MP	Meadow pipit	<i>Anthus pratensis</i>						<i>Amber</i>

3.5 Winter Bird Surveys

A total of 65 species were recorded within 1km of the site during the winter walkover surveys undertaken from September 2011 to March 2012 inclusive. Of these, 40 species were noted inside the site boundary, or in adjacent fields, gardens and woodland. During the survey period, the fields within the site were either ploughed, or contained improved grassland, winter-sown wheat and cereal stubble. Some of the fields adjacent to the site were left fallow or contained game-cover crops.

Table 3.3 shows the monthly total of individuals of each species recorded within the site, or within adjacent fields/plots. A 'P' denotes that the species was recorded (present) that month but that no count was undertaken).

Table 3.3 Birds Recorded within and adjacent to the site during Winter Walkover Survey

Species common name	Species biological name	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Red-legged partridge	<i>Alectoris rufa</i>	1	11				9	2
Pheasant	<i>Phasianus colchicus</i>			P		P	P	
Kestrel	<i>Falco tinnunculus</i>					1		
Moorhen	<i>Gallinula chloropus</i>							1
Lapwing	<i>Vanellus vanellus</i>						17	
Black-headed gull	<i>Chroicocephalus ridibundus</i>					10	48	
Feral pigeon	<i>Columba livia</i>	20		1				
Woodpigeon	<i>Columba palumbus</i>		50	P	50	P	171	P
Collared dove	<i>Streptopelia decaocto</i>		P			P	P	P
Great spotted woodpecker	<i>Dendrocopos major</i>			1				
Skylark	<i>Alauda arvensis</i>					35	1	5
Meadow pipit	<i>Anthus pratensis</i>	1		1				
Pied wagtail	<i>Motacilla alba</i>		2					
Wren	<i>Troglodytes troglodytes</i>	P	P	P			P	P
Duncock	<i>Prunella modularis</i>	P	P	P		P	P	P
Robin	<i>Erithacus rubecula</i>	P	P	P		P	P	P
Blackbird	<i>Turdus merula</i>		P	P	P	P	P	P
Fieldfare	<i>Turdus pilaris</i>			3				
Redwing	<i>Turdus iliacus</i>			41			1	
Chiffchaff	<i>Phylloscopus collybita</i>	P						
Goldcrest	<i>Regulus regulus</i>			1		1		
Long-tailed tit	<i>Aegithalos caudatus</i>	P					P	P

Species common name	Species biological name	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Blue tit	<i>Cyanistes caeruleus</i>	P		P		P	P	P
Great tit	<i>Parus major</i>		P	P		P	P	P
Coal tit	<i>Pariparus ater</i>							1
Treecreeper	<i>Certhia familiaris</i>							1
Jay	<i>Garrulus glandarius</i>	1						
Magpie	<i>Pica pica</i>			P				
Jackdaw	<i>Corvus monedula</i>			60			20	P
Rook	<i>Corvus frugilegus</i>	5		60		50	70	20
Carrion crow	<i>Corvus corone</i>	P	P	P		P	P	
Starling	<i>Sturnus vulgaris</i>		25	2			1	
House sparrow	<i>Passer domesticus</i>	10		7		5	11	5
Chaffinch	<i>Fringilla coelebs</i>	P	P	P		P	P	P
Greenfinch	<i>Carduelis chloris</i>	P		P		P	P	P
Goldfinch	<i>Carduelis carduelis</i>			P	P			P
Bullfinch	<i>Pyrrhula pyrrhula</i>					1		
Yellowhammer	<i>Emberiza citronella</i>	3	1	3				

Two Schedule 1 species were recorded within or adjacent to the site (redwing and fieldfare), both of which are winter visitors and do not breed in Suffolk. Seven UK Biodiversity Action Plan (UK BAP) Priority Species were also recorded within or adjacent to the site: lapwing, skylark, dunnock, starling, house sparrow, bullfinch and yellowhammer.

Two bird of prey species (kestrel and sparrowhawk) were recorded within or close to the site, with single birds noted on one date each in January. Small numbers of gulls were seen feeding in the arable fields, with peak counts of 48 black-headed gulls within or adjacent to the site on 15 February. There were no large flocks of winter finches or other passerines recorded in the fields onsite, although a flock of 35 skylarks was flushed from a field of stubble (Field 59) on 17 January; 7 yellowhammer were in a hedgerow adjacent to Field 21 also on 17 January, and 25 starlings were foraging in a ploughed field (Field 39) on 17 October. A mixed flock of 120 jackdaws and rooks was feeding in stubble (Field 88) on 11 November, and the only sighting of lapwing was of 17 foraging in a ploughed field (Field 90) on 15 February. However, lapwings also forage at night, which would not have been recorded during these surveys. A bullfinch was seen in a hedgerow by Field 25 on 17 January and small numbers of redwing and fieldfare were noted, the largest number being 40 redwings in scrub in Field 53 on 8 November.

Further away from the site, but within 1km of its boundary, other notable records of birds included a marsh harrier (an Annex I species) hunting over Greenhouse Plantation (1km north of the site) on 15 February; eight crossbills flying over Field 300 (800-1000m southeast of the site) on 19 October, and a male stonechat on a hedgerow by Highbury Cottages (1km south of the site) on 8 November. The area of low-lying land and ditches running between Leiston Sewage Treatment Works and Sizewell Marshes SSSI (800-1000m southeast of the site)



attracted a number of wetland bird species, including 1-2 little egret, snipe, water rail, little grebe, mallard and moorhen and up to 15 teal were seen on a regular basis in the ditches from December to March. Very few birds were recorded at the sewage treatment works, with small numbers of gulls and pied wagtail seen and single grey wagtail on the 19 September and 11 November.

Also seen within 1km of the site, were single woodcock flushed from two sites (Fields 108 and 160 in January and February respectively), and a buzzard flying over Upper Abbey (800-900m northeast of the site) on 17 January. A male pintail was flushed from a wet field (Field 92, 300-400m west of the site) on 15 February, and there were a number of flocks of up to 50 redwing and fieldfare in fields and scrub, and up to 47 black-headed gulls seen foraging in the fields, although generally much lower numbers of these species were noted. Numbers of wintering farmland passerines were low, with generally 1-5 yellowhammer, reed bunting and meadow pipit recorded foraging in fields and hedgerows. Larger numbers included a flock of 20 linnets in Field 129 on 17 January and 12 March.

4. Conclusions and Recommendations

4.1 Breeding Bird Community

Results from the breeding bird surveys undertaken across and within 250m of the site indicate that the area supports a breeding bird community that is typical of farmland, hedgerows and woodland in the local area. The highest densities of bird territories were found in areas of scrub and woodland and around human habitation and gardens (such as those at Aldhurst Farm and in the gardens bordering Abbey Farm Road). Within the site, most territories were found along the hedgerows that form the field boundaries, with very few birds breeding in the open arable fields (typically skylark and pheasant).

4.1.1 Highly Protected Breeding Species

No highly protected species (i.e. those listed on Schedule 1 of the Wildlife & Countryside Act 1981, as amended) were recorded on or within 250m of the site during the breeding bird surveys undertaken in 2011. However, the desk study identified three records of barn owl potentially located within 1km of the site (details of the exact location for some of the records was not provided), the most recent of which was in 1999. Of these records the closest was of a barn owl seen near the Leiston Old Abbey (c.380m north-east of the site) in 1995. There are few mature trees and no buildings (which could potentially be used by nesting barn owls) within the site although suitable nesting habitat does occur just outside its boundary. Barn owls are however likely to hunt along the hedgerows within the site. .

There is also a record of woodlark (breeding woodlark are a designated feature of the Sandlings SPA and of the Minsmere-Walberswick SPA in the SPA Review), potentially within 1km of the site, relating to a 1km grid square that covers the town of Leiston. It is likely that the grid square is erroneous, and that the sighting came from nearby Leiston Common or Broom Covert (1-2km east of the site), or Aldringham Walks (2-3km south-east of the site) where the species is known to breed. Woodlark was not recorded within 250m of the site during the 2011 surveys. However, during years when the local population is high, there is the potential for woodlark to breed in nearby large, open arable fields, such as those to the east and north of the site.

Habitat within the site provides very limited opportunities for nesting stone-curlew (an Annex 1 species), which breeds along the Suffolk coast in very small but increasing numbers. The fields within the site are relatively small and the site is located next to a busy road (in the east) and the residential housing of Leiston town. Stone-curlews primarily forage at night and avoid areas disturbed by noise and light (Green, 2000). In view of this, stone-curlews are unlikely to attempt to breed within the survey area (within the site, and within 250m of it).

To conclude, species that are currently designated features of local SPAs were not recorded within 250m of the site in the desk study or during the surveys, and the site provides very limited foraging opportunities and breeding habitat for these birds.

4.1.2 UK BAP Priority and Red-Listed Species

A total of six UK BAP Priority or red-listed BoCC species were recorded holding territory within the survey area during the breeding bird surveys carried out in 2011. Species associated with open arable farmland and hedgerows were well represented, with skylark (12 territories), dunnock (14), song thrush (3), linnets (1) and yellowhammer (5) all recorded breeding. In addition, six territories of house sparrow were recorded breeding around houses and gardens within the survey area.

Dunnock is described in *Suffolk Birds 2010* (Mason [ed], 2011) as being a very common resident; skylark, house sparrow, linnets and yellowhammer as common, and song thrush as fairly common. The populations present within the survey area are likely to represent a very small proportion of the likely total for Suffolk. Population estimates for most common and widespread species are not available for the county of Suffolk. However, population estimates for the neighbouring county of Norfolk have been derived from the Norfolk Bird Atlas data collected during 1999-2007 (Taylor & Marchant, 2011). The Norfolk populations of these UK BAP/red-listed species (in pairs) are as follows: skylark (25,000-30,000), dunnock (20,000-50,000), song thrush (6,000-8,000), house sparrow (40,000-50,000), linnets (6,500-7,500) and yellowhammer (10,000-15,000). Even allowing for the fact that Suffolk only covers 70% of the land area of Norfolk (the two counties share similar habitat compositions – primarily open arable farmland with scattered blocks of woodland and limited areas of human habitation), the numbers breeding within the survey area will represent considerably less than 1%¹¹ of the county total.

4.1.3 Other Species

Of the other species recorded breeding within the survey area, all but mistle thrush are widespread and described as either common or very common in Mason [ed], 2011 and associated with farmland habitats in the local area. The numbers of these species were small in proportion to the likely Suffolk totals.

Mistle thrush is a widespread species across farmland and woodland in Suffolk, with 26 pairs reported from the area of North Warren alone in 2009 (Mason [ed], 2010). The Norfolk population is estimated to be 3,500-4,000 pairs (Taylor & Marchant, 2011) and the Suffolk total is likely to be of a similar order. In view of this, the single territory recorded within the survey area is unlikely to represent more than 1% of the Suffolk population.

4.2 Wintering Bird Community

The bird community recorded within or close to the site during winter contained many of the species that were noted there during the breeding season, indicating that much of the bird population is either resident, or contains largely the same composition of species throughout the year. The habitats within the site (primarily arable farmland and hedgerows) supported bird

¹¹ 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).

species that are common and widespread in Suffolk, and are typical of the habitats present. The site was not used on a regular basis by species that form the designated or cited interest of local SPAs and SSSIs. Very few species associated with wetland, or those largely restricted to woodland were recorded within or close to the site, a reflection of the lack of suitable habitat in the area. The site supported low numbers of winter passerines (finches, buntings and larks), lapwing, winter thrushes (redwing and fieldfare), gulls (black-headed and common gull) and corvids. No large concentrations of birds were recorded foraging in the fields within or close to the site, and those flocks that were seen were often associated with fallow land and cereal stubble, or seen in the adjacent hedgerows. Overall, within or adjacent to the site, the greatest diversity of birds was recorded in the hedgerows, small blocks of woodland and gardens. Further from the site, the low-lying area of fields and ditches between the sewage treatment works and Sizewell Marshes SSSI (Fields 92, 93, 94 and 300, 500-1000m southeast of the site boundary) attracted small numbers of a variety of wetland species.

4.3 Recommendations

4.3.1 Further Survey Work

At this stage, no further survey work is recommended at the site to establish the status of any protected or otherwise notable bird species present on site. However, given the potential for the site (and adjacent area) to support breeding barn owl, surveys for nesting barn owls should be undertaken prior to construction (if construction is to take place during the breeding season for barn owl (potentially February-September)).

4.3.2 Nesting Birds

All active bird nests are legally protected under the Wildlife and Countryside Act (1981, as amended). This means that, with certain exceptions, it is illegal to intentionally or recklessly destroy an active nest during the breeding season, which for most species is considered to be between March and August inclusive. However, consideration should be given to the potential occurrence of early or late nesting species such as barn owl which may start nesting in February and, in some years, may still be incubating in August/September.

In order to minimise this risk of contravening legislation, site clearance should be completed outside the breeding bird season when active nests are not present. Where site clearance outside the breeding bird season is not possible, an ecologist will need to carefully inspect vegetation prior to clearance to ensure that active nests are not present. Should an active nest be found, it will be left in-situ and undisturbed until the young have fledged.

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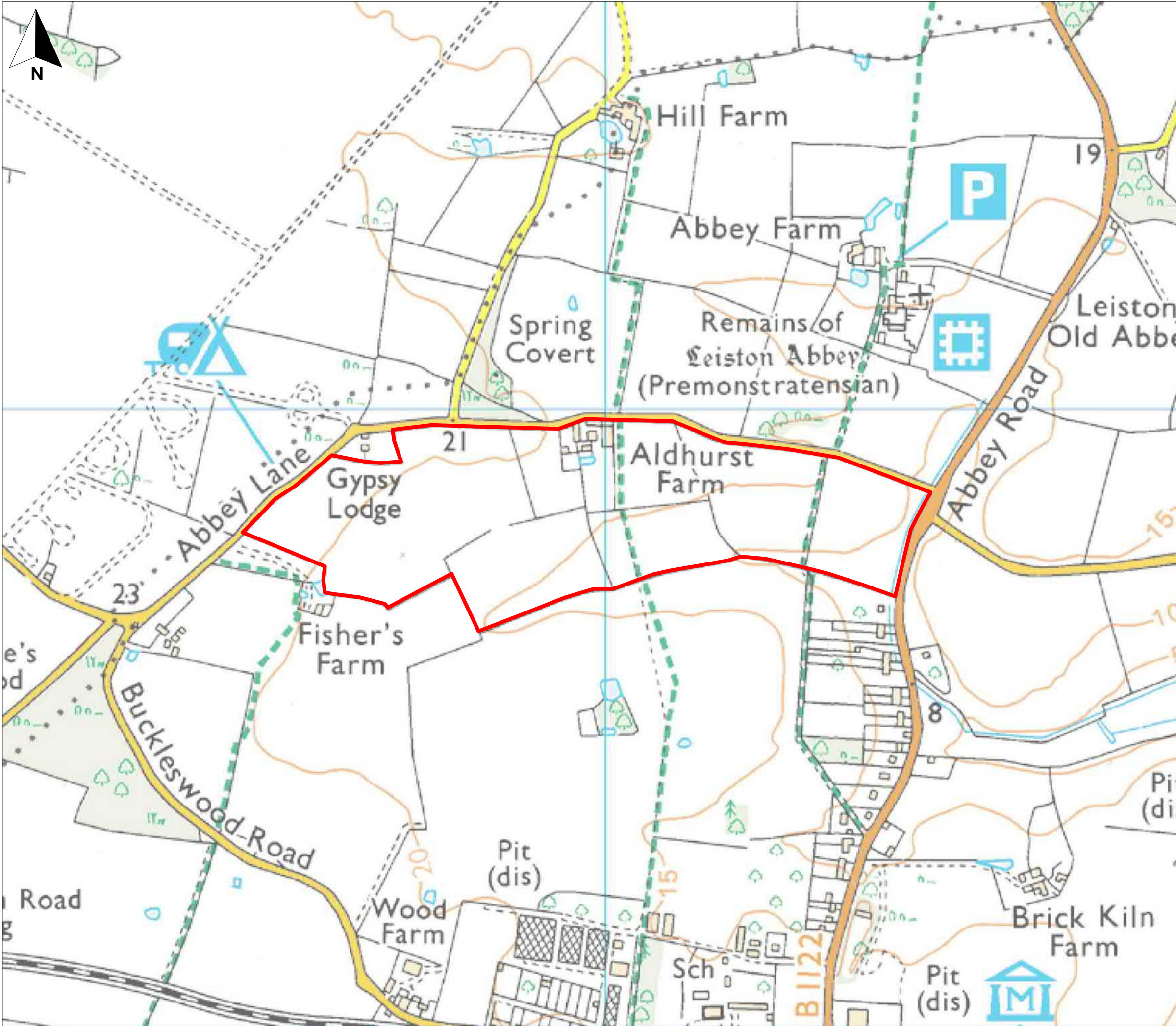
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Key
 Proposed development site boundary

0 m 300 m
 Scale 1:6000 @ A3


 EDF

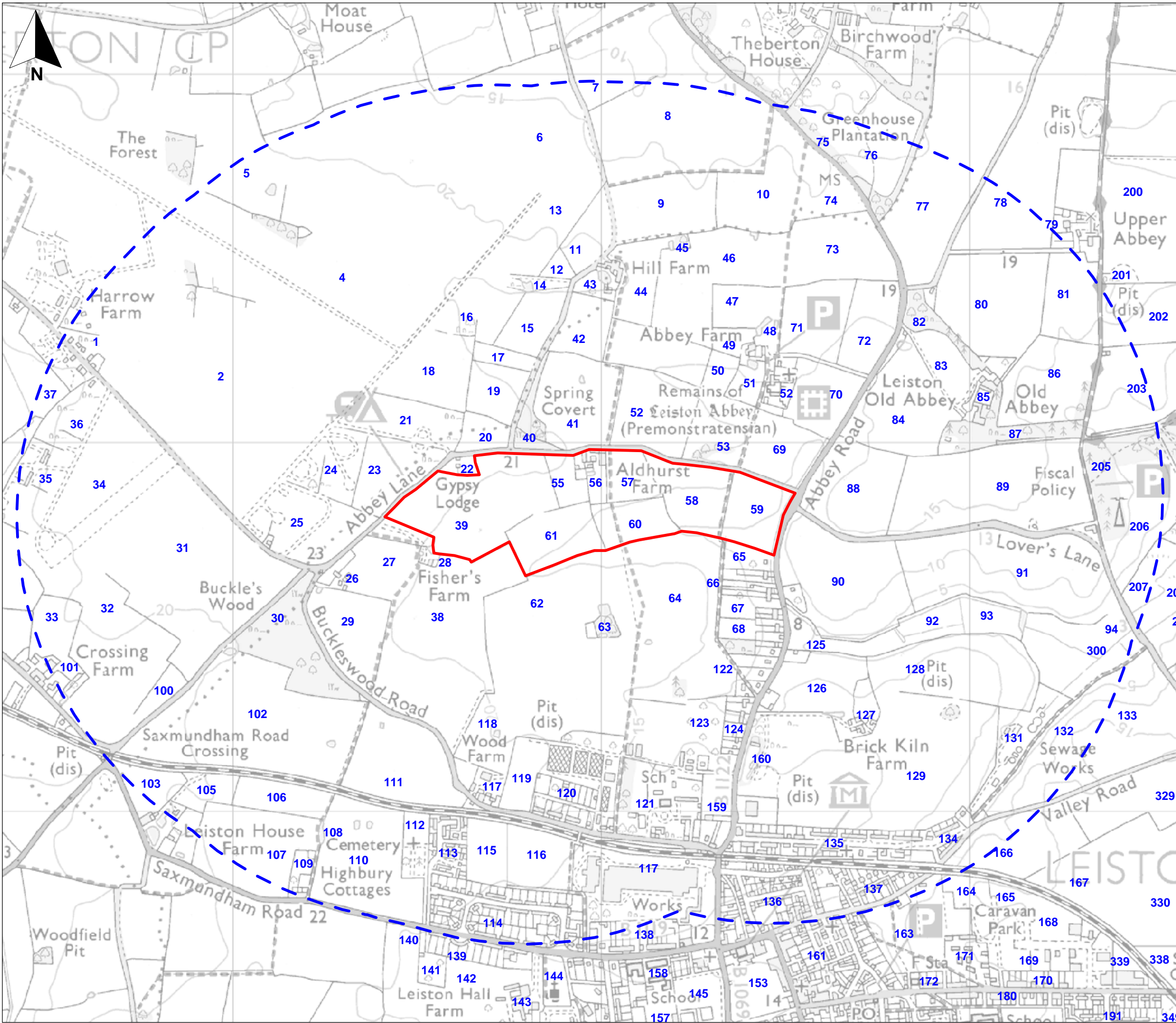
Sizewell Associate Development Site 1
 Bird Survey Report 2011-12

Figure 1.1
 AD site 1 location

September 2011
 28132-A153.wor tugwc

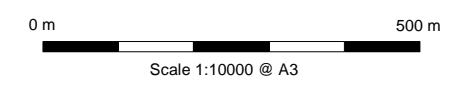

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Key

- Site boundary
- Survey area
- 1 Field numbers

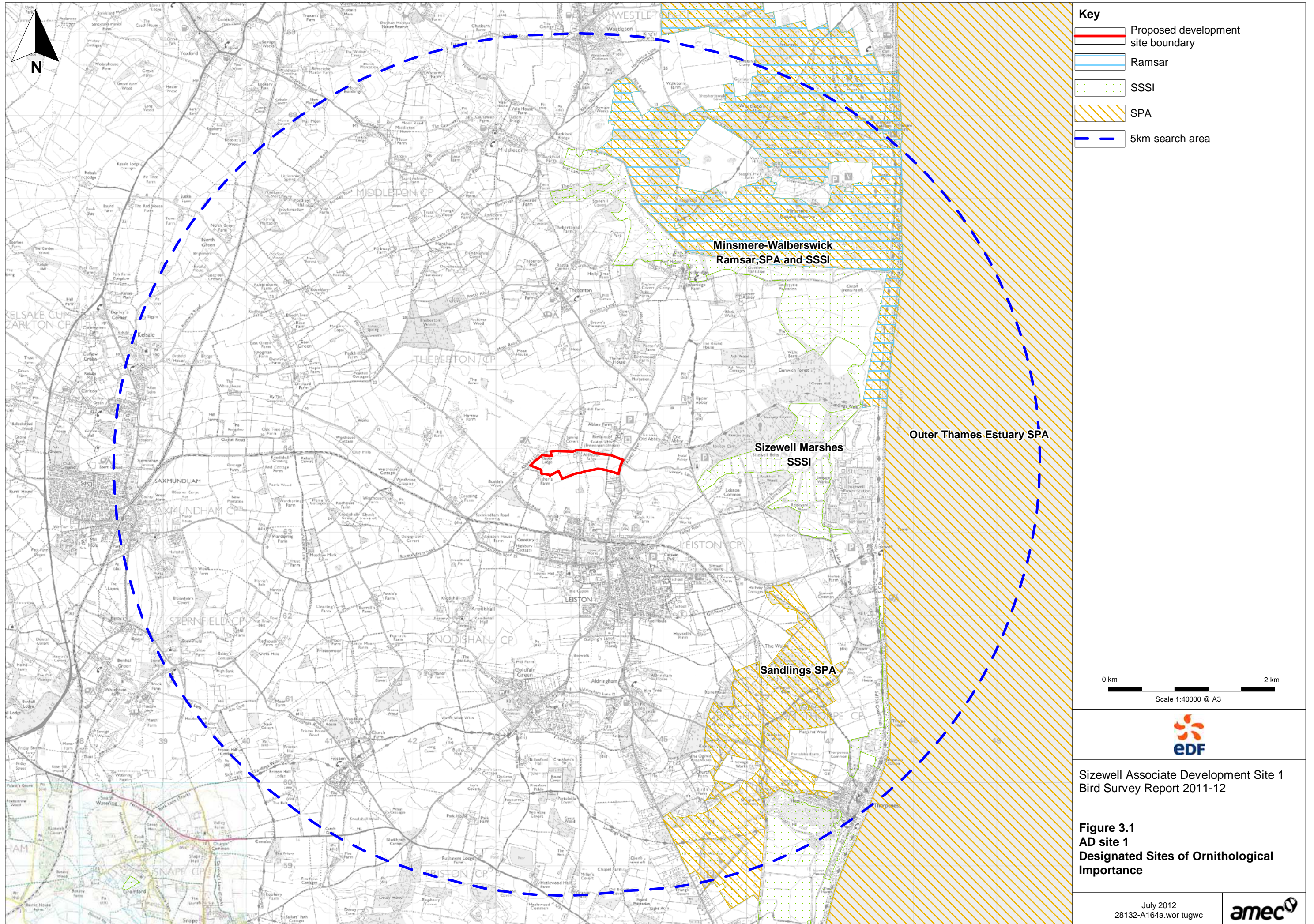


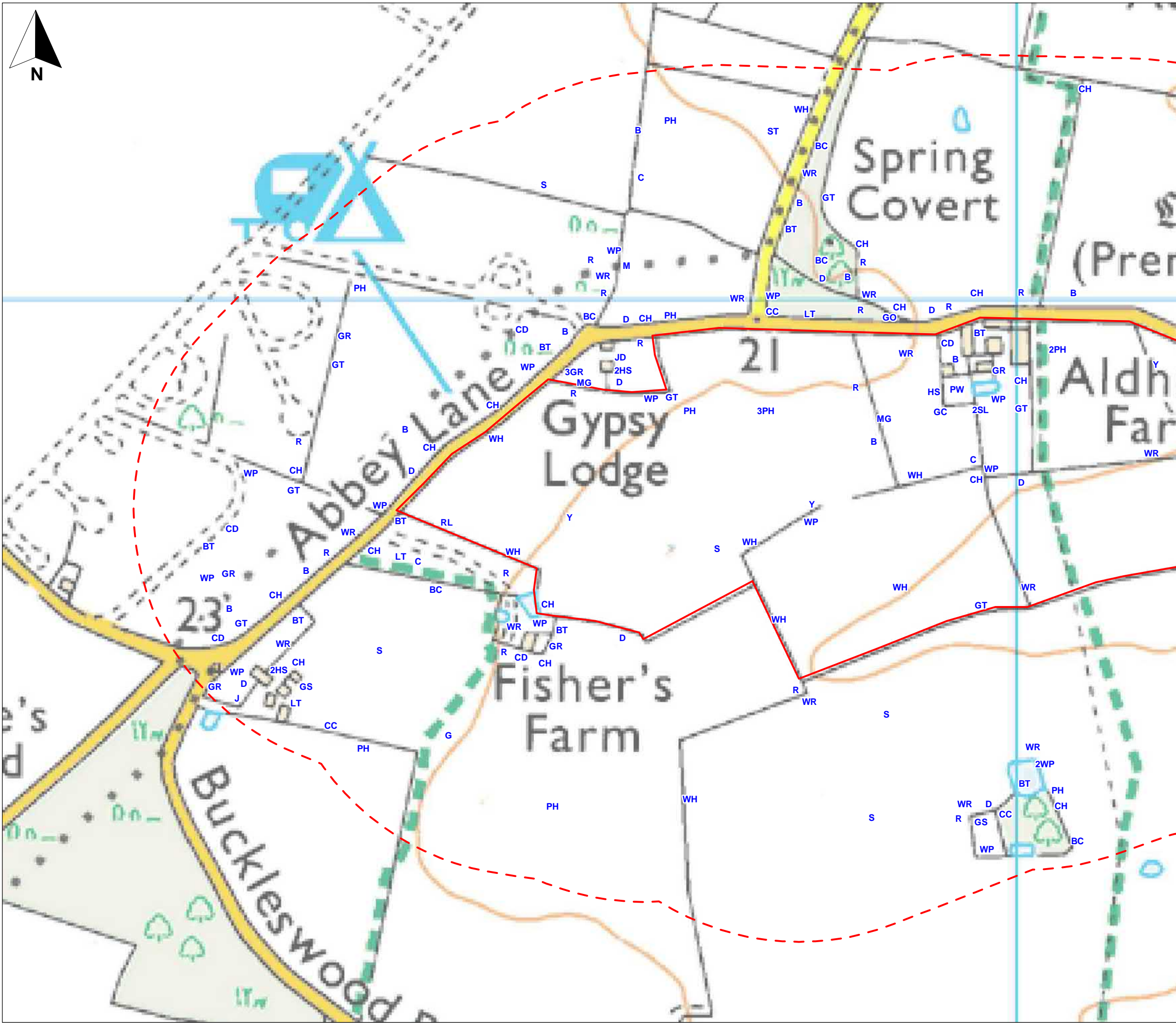
Sizewell AD Site 1
Bird Survey Report 2011-12

Figure 2.1
Sizewell AD Site 1
Bird Survey Report 2011-12
Winter walkover survey area and field numbers

March 2012
28132-A385.wor tugwc







Key

Proposed development site boundary

250m buffer

- Bird species codes
- RL - Red-legged Partridge
 - PH - Pheasant
 - WP - Wood Pigeon
 - CD - Collared Dove
 - G - Green Woodpecker
 - GS - Great Spotted Woodpecker
 - S - Skylark
 - SL - Swallow
 - PW - Pied Wagtail
 - WR - Wren
 - D - Dunnock
 - R - Robin
 - B - Blackbird
 - ST - Song Thrush
 - M - Mistle Thrush
 - BC - Blackcap
 - WH - Whitethroat
 - CC - Chiffchaff
 - GC - Goldcrest
 - LT - Long-tailed Tit
 - BT - Blue Tit
 - GT - Great Tit
 - J - Jay
 - MG - Magpie
 - JD - Jackdaw
 - C - Carrion Crow
 - HS - House Sparrow
 - CH - Chaffinch
 - GR - Greenfinch
 - GO - Goldfinch
 - Y - Yellowhammer

0 m 200 m

Scale 1:3500 @ A3



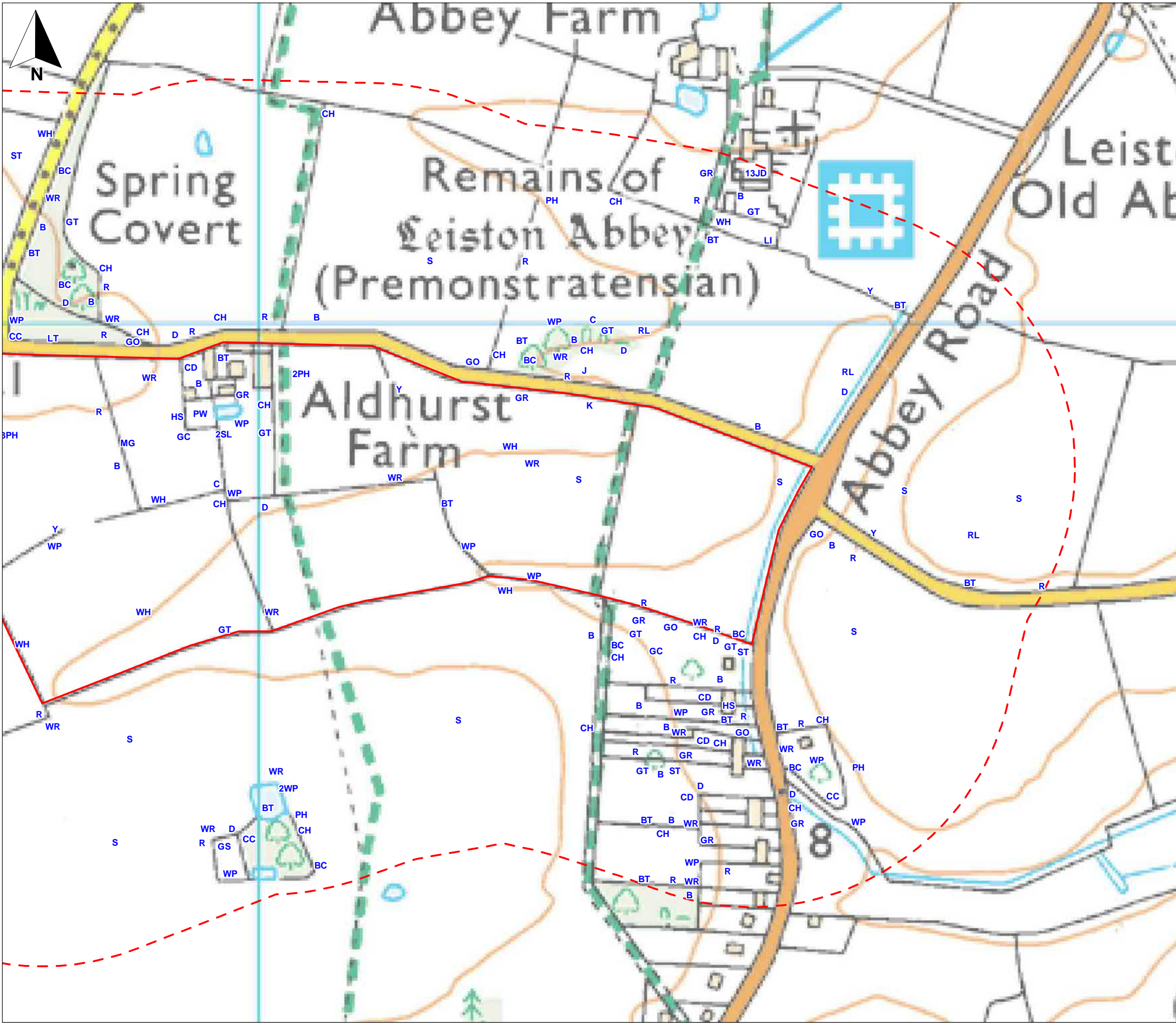
Sizewell Associate Development Site 1
Bird Survey Report 2011-12

Figure 3.2a
AD site 1 Breeding territory locations

September 2011
28132-A142a.wor tugwc



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Key

- Proposed development site boundary
- 250m buffer

- Bird species codes
- RL - Red-legged Partridge
 - PH - Pheasant
 - WP - Wood Pigeon
 - CD - Collared Dove
 - G - Green Woodpecker
 - GS - Great Spotted Woodpecker
 - S - Skylark
 - SL - Swallow
 - PW - Pied Wagtail
 - WR - Wren
 - D - Dunnock
 - R - Robin
 - B - Blackbird
 - ST - Song Thrush
 - M - Mistle Thrush
 - BC - Blackcap
 - WH - Whitethroat
 - CC - Chiffchaff
 - GC - Goldcrest
 - LT - Long-tailed Tit
 - BT - Blue Tit
 - GT - Great Tit
 - J - Jay
 - MG - Magpie
 - JD - Jackdaw
 - C - Carrion Crow
 - HS - House Sparrow
 - CH - Chaffinch
 - GR - Greenfinch
 - GO - Goldfinch
 - Y - Yellowhammer

0 m 200 m
Scale 1:3500 @ A3



Sizewell Associate Development Site 1
Bird Survey Report 2011-12

Figure 3.2b
AD site 1 Breeding territory locations

September 2011
28132-A142b.wor tugwc



Appendix A

Desk Study Selection Criteria

Box 1 Designated Wildlife Sites, and Priority Habitats and Species

Statutory nature conservation sites

Internationally important sites: Special Areas of Conservation (SACs) and candidate SACs, Special Protection Areas (SPAs) and proposed SPAs, Sites of Community Importance, Ramsar sites and European offshore marine sites.

Nationally important sites: Sites of Special Scientific Interest (SSSIs) that are not subject to international designations and National Nature Reserves (NNRs)

Local Nature Reserves (LNRs) are statutory sites that are of importance for recreation and education as well as nature conservation. Their level of importance is defined by their other statutory or any non-statutory designation (e.g. if an LNR is also an SSSI but is not an internationally important site, it will be of national importance). If an LNR has no other statutory or non-statutory designation it should be treated as being of district-level importance for biodiversity (although it may be of greater socio-economic value).

Non-statutory nature conservation sites

Sites of county importance: In Suffolk, County Wildlife Sites (CWS) are designated by the Suffolk CWS panel (which includes representatives from Suffolk County Council, Suffolk Biological Records Centre (SBRC), Suffolk Wildlife Trust and Natural England). Suffolk Wildlife Trust (SWT) monitors all planning applications for any potential impact on County Wildlife Sites.

Priority habitats and species

In this report, the geographic level at which a species/habitat has been identified as a priority for biodiversity conservation is referred to as its level of 'species/habitat importance'. For example, habitats and species of principal importance for the conservation of biological diversity in England (see the first bullet point below) are identified as of national species/habitat importance reflecting the fact that these species/habitats have been defined at a national level. The level of importance therefore pertains to the species/habitat as a whole rather than to individual areas of habitat or species populations, which cannot be objectively valued, other than for waterfowl, for which thresholds have been defined for national/international 'population importance'.

- National importance: Habitats and species of principal importance for the conservation of biological diversity in England. These are listed on: <http://www.defra.gov.uk/wildlife-countryside/pdf/biodiversity/s41-nerc-may2008species.pdf> and <http://www.defra.gov.uk/wildlife-countryside/pdf/biodiversity/s41-nerc-may2008habitats.pdf>. These include those UK Biodiversity Action Plan (UK BAP) priority habitats and species that occur in England.
- National importance: Species listed as being of conservation concern in the relevant UK Red Data Book (RDB) or the Birds of Conservation Concern¹² Red List.
- National importance: Nationally Scarce species, which are species recorded from 16-100 10x10km squares of the national grid.
- National importance: Ancient woodland (i.e. areas that have been under continuous woodland cover since at least 1600).
- County importance: Species listed in the Suffolk LBAP.

¹² Eaton et al. (2009). Birds of Conservation Concern 3: the population status of birds in the United Kingdom, Channel Islands and Isle of Man. *British Birds* **102**:296-341.

Box 2 Legally Protected and Controlled Species

Legal protection

Many species of animal and plant receive some degree of legal protection. For the purposes of this study, legal protection refers to:

- Species included on Schedules 1, 5 and 8 of the *Wildlife and Countryside Act 1981* (as amended), excluding species that are only protected in relation to their sale (see Section 9[5] and 13[2]), reflecting the fact that the proposed development does not include any proposals relating to the sale of species;
- Species included on Schedules 2 and 5 of The *Conservation of Habitats and Species Regulations 2010*; and
- Badgers, which are protected under the *Protection of Badgers Act 1992*.

Legal control

Schedule 9 of the *Wildlife and Countryside Act 1981* (as amended) lists species of animal that it an offence to release or allow to escape into the wild and species of plant that it is an offence to plant or otherwise cause to grow in the wild.

Appendix B Desk Study Data

Table B1 Records of protected and other notable bird species within 1km of the site

Species common name	Species biological name	Location	Within 1km of site (distance from site)	O.S. Grid Ref.	Year
Grey partridge	<i>Perdix perdix</i>	Leiston	Potentially	TM4462	1998
Turtle dove	<i>Streptopelia turtur</i>	Leiston	Potentially	TM4462	2004
Turtle dove	<i>Streptopelia turtur</i>	East Suffolk	Potentially	TM4464	2002
Turtle dove	<i>Streptopelia turtur</i>	East Suffolk	Potentially	TM4564	2002
Barn owl	<i>Tyto alba</i>	Leiston	Potentially	TM4262	1999
Barn owl	<i>Tyto alba</i>	Leiston	Potentially	TM4462	1995
Barn owl	<i>Tyto alba</i>	Leiston Old Abbey	Yes (380m NE)	TM449640	1995
Wryneck	<i>Jynx torquilla</i>	Southfield Drive	Potentially	TM4462	1993
Lesser spotted woodpecker	<i>Dendrocopos minor</i>	Old Abbey	Potentially	TM4462	1993
Woodlark	<i>Lullula arborea</i>	Leiston	Potentially	TM4462	1999
Woodlark	<i>Lullula arborea</i>	Leiston Common	Potentially	TM4563	1999
Skylark	<i>Alauda arvensis</i>	East Suffolk	Potentially	TM4364	2002
Skylark	<i>Alauda arvensis</i>	Leiston	Potentially	TM4462	1999
Skylark	<i>Alauda arvensis</i>	East Suffolk	Potentially	TM4464	2002
Skylark	<i>Alauda arvensis</i>	East Suffolk	Potentially	TM4564	2002
Song thrush	<i>Turdus philomelos</i>	Leiston	Potentially	TM4462	1998
Song thrush	<i>Turdus philomelos</i>	East Suffolk	Potentially	TM4464	2002
Song thrush	<i>Turdus philomelos</i>	East Suffolk	Potentially	TM4564	2002
Grasshopper warbler	<i>Locustella naevia</i>	Leiston Carr	Potentially	TM4462	1992
Spotted flycatcher	<i>Muscicapa striata</i>	East Suffolk	Potentially	TM4464	2002
Linnet	<i>Carduelis cannabina</i>	Leiston	Potentially	TM4462	1999
Bullfinch	<i>Pyrrhula pyrrhula</i>	East Suffolk	Potentially	TM4364	2002
Bullfinch	<i>Pyrrhula pyrrhula</i>	Churchyard	Potentially	TM4462	1993
Reed bunting	<i>Emberiza schoeniclus</i>	Leiston	Potentially	TM4462	1991

NNB Generation Company

Sizewell Associated Development Sites

Great Crested Newt Survey Report

April 2012

AMEC Environment & Infrastructure UK Limited

Report for

Christine Blythe
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April 2012

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Document Revisions

No.	Details	Date
1	Draft	April 2012

Contents

1.	Introduction	1
1.1	Background	1
1.2	Purpose of this Report	1
1.3	Legislation	1
2.	Methods	3
2.1	Desk Study	3
2.2	Screening	3
2.2.1	Desk Study	3
2.2.2	Field Study	3
2.3	Presence/Absence Surveys	4
2.4	Personnel	4
2.5	Constraints	4
3.	Results	7
3.1	Desk Study	7
3.2	Screening	7
3.2.1	Desk Study	7
3.2.2	Field Study	7
3.3	Presence/Absence Surveys	10
4.	Conclusions	13
Table 3.1	Records of Great Crested Newt within 1km of AD Sites	7
Table 3.2	Habitat Descriptions, HSI Scores and further Survey Requirements of Accessible Water Bodies	8
Table 3.2	Water Bodies Surveyed for Great Crested Newt Presence/Absence	10
Table 3.3	Water Body 3 Survey Results	10
Table 3.4	Water Body 17 Survey Results	11
Table 3.5	Water Body 23 Survey Results	11
Appendix A	Legislation relating to Great Crested Newt	
Appendix B	Water Bodies	
Appendix C	Figures	
Appendix D	References	

1. Introduction

1.1 Background

An area of land directly north of Sizewell B Nuclear Power Station, which is located near Leiston in Suffolk, has been identified as having the potential to accommodate the proposed development of one or more new nuclear reactors. This proposed development is known as Sizewell C. The site of the proposed development has an approximate central National Grid Reference (NGR) of TM473640. NNB Generation Company (EDF) has identified a number of additional sites for a variety of developments associated with the new build proposals at Sizewell that will be located beyond the current EDF landholding. AMEC Environment & Infrastructure UK Ltd ('AMEC') has been commissioned to provide ecological services in relation to these sites, in order to inform the site selection process and support any future planning submissions.

1.2 Purpose of this Report

The focus of the survey work was to establish presence/likely absence of great crested newt (*Triturus cristatus*) within water bodies on and within 500m of the sites. This report summarises the findings of great crested newt surveys carried out in 2011 and provides a summary of the great crested newt (GCN) interest of the Associated Development sites.

1.3 Legislation

Details of the legislation that relates to great crested newt are provided in Appendix A.



2. Methods

2.1 Desk Study

In 2007 and 2010 AMEC conducted survey work to establish the presence / likely absence of great crested newt within water bodies on and within 500m of the proposed development area for Sizewell C^{1,2}. The results from this study were used to inform the current survey.

The Suffolk Biological Records Centre (SBRC) was contacted for GCN records to a distance of 1km from the site boundaries of all associated development sites and water bodies within 500m of each site were identified using satellite imagery, and the relevant OS base maps.

2.2 Screening

2.2.1 Desk Study

During the desk study 61 water bodies were identified within 500m of all associated development sites (sites 1-19 inclusive). These were screened prior to conducting field surveys. The screening process used satellite imagery and OS base maps to identify which ponds were separated from associated development sites by barriers preventing great crested newt movement between water bodies and the site. Such barriers include major roads and large rivers. Ponds which were regarded as separated by barriers were 'screened out' from the need for further survey.

2.2.2 Field Study

29 water bodies identified during the desk study were visited in March 2011 during Extended Phase 1 Habitat Surveys¹, to determine their suitability to support great crested newt. Each water body was assessed using the Great Crested Newt Habitat Suitability Index (HSI). The HSI is a numerical index, derived by scoring a range of habitat variables, according to available guidance^{3,4}, where: <0.5= poor, 0.5-0.59=below average, 0.6-0.69=average, 0.7-0.79=good, and >0.8-1=excellent. The results from this exercise helped to inform which ponds had habitats suitable to support GCN and would therefore require a presence/absence survey, and which ponds were unsuitable to support GCN and could be screened out from further survey.

¹ Entec UK Ltd (2007) *Great Crested Newt Report: Sizewell*, Entec, Gosforth

² Entec UK Ltd (2010) *Great Crested Newt Report: Sizewell*, Entec, Gosforth

³ Oldham, R. S., Keeble, J., Swan, M. J. S., and Jeffcote, M. (2000). Evaluating the suitability of habitat for the great crested newt (*Triturus cristatus*). *Herpetological Journal*. **10**: 143-155.

⁴ Updated guidelines available from: <http://www.narrs.org.uk/naspack.htm>

2.3 Presence/Absence Surveys

Presence/absence surveys were carried out at 3 water bodies that were considered suitable for breeding great crested newt following the screening exercise. Each water body was surveyed four times in suitable weather conditions between mid-March and mid-June, (with two visits between mid-April and mid-May), during which at least three of the following methods were employed on each survey visit, according to best practice guidelines⁵.

- Bottle-trapping – bottle traps made from two-litre plastic bottles were secured to the substrate using a bamboo cane. The traps were set at a density of approximately one per two metres around accessible sections of the water body margins. The traps were set each evening between 1930 and 2130 hours and retrieved between 0600 and 0800 hours the following morning, with any amphibians captured recorded and released.
- Torch-light survey – accessible sections of water body margins were slowly walked, whilst shining the light of a 500,000-1,000,000 candle power torch into the water and recording any amphibians observed. This method was employed during the period between dusk and midnight.
- Egg search - marginal submerged macrophytes were inspected for the presence of great crested newt eggs.
- Netting survey – the perimeter of the water body was walked at dusk using a long-handled dip-net to sample the edge. The sampling effort aimed to involve a minimum of 15 minutes of netting per 50m of shoreline.

Suitable weather conditions for amphibian surveys occur under night-time air temperatures of more than 5°C. Torch surveys also require little/no wind and rain, and bottle trapping was avoided under high temperatures where oxygen levels in the water are reduced, therefore increasing the potential for causing harm to trapped animals.

2.4 Personnel

All surveys were led by AMEC Ecologists Katheryn Leggat (Natural England Licence No. 20113863) and Alastair Miller (Natural England Licence No. 20111647).

2.5 Constraints

It was not possible to gain access to survey every water body identified and screened in during the desktop study, owing to difficulty in obtaining landowner permission where ponds were located on private land. In total, 20 ponds which were screened in as potentially suitable to support GCN at the desk study stage could not be accessed in the field for a further assessment of the habitats. Also 12 ponds which were assessed at a distance from public rights of way during the field screening exercise as being suitable to support GCN could not be accessed for presence/absence surveys. All water bodies which could not be accessed for initial habitat

⁵ English Nature (2001). *Great crested newt mitigation guidelines*. Peterborough, English Nature.



assessments or further presence/absence surveys are detailed in Table B1 (Appendix B) and illustrated in Figures 3.1-3.7 (Appendix C).



3. Results

3.1 Desk Study

The Sizewell Great Crested Newt Surveys 2007 and 2010 found no evidence of great crested newt within the study area or in the immediate surrounding area.

The mapping exercise identified a total of 61 discrete water bodies within 500m of the associated development sites.

SBRC returned five records of great crested newt from within 1km of the AD sites as outlined in Table 3.1.

Table 3.1 Records of Great Crested Newt within 1km of AD Sites

AD Site reference	Number of records	Date (most recent)	Distance (m), direction of nearest record from site
Site 1	2	1998	400, E
Site 3	1	1998	1000, N
Site 10	2	2006	580m, N

3.2 Screening

3.2.1 Desk Study

12 water bodies were screened out from further survey; these water bodies were separated from the development sites by major rivers, roads or areas of development, these water bodies are detailed in Table B2 (Appendix B) and illustrated in Figures 3.1-3.7 (Appendix C).

3.2.2 Field Study

Table 3.2 presents the habitat descriptions and HSI scores for the 29 ponds that were assessed in the field during the screening process. Pond locations are illustrated on Figures 3.1-3.7. All figures are provided in Appendix C.

Table 3.2 Habitat Descriptions, HSI Scores and further Survey Requirements of Accessible Water Bodies

Pond ID ⁶	Description	HSI Score	Presence/absence survey required
WB1	Still, supporting a range of aquatic plant life with 90% of the water surface being covered by pond weed (<i>Potamogeton sp</i>). Shaded on 75% of its margins with adjacent habitat consisting of woodland and drainage ditches.	0.80 Excellent	Yes
WB2	A swimming pool.	-	-
WB3	Assessed visually from 20m as access was not possible. Situated in a wooded garden the pond consisted of an open water body with well established aquatic vegetation.	0.74 Good	Yes
WB4	Pond not present.	-	-
WB5	Pond not present.	-	-
WB6	Still, supporting a range of aquatic plant life with 75% of the water surface being covered by pond weed. Shaded on 80% of its margins with adjacent habitat consisting of a small woodland copse and hedgerows and field boundaries. Signs of wildfowl.	0.68 Average	Yes
WB8	A large farmyard pond with slurry running off into the water body. Waterfowl were present while macrophyte cover was limited to 5%. The pond was shaded around 15% of its margin by scrub.	0.44 Poor	No
WB9	A large pond situated centrally within a large arable field and surrounded by a broadleaf copse. 65 % of the water body has macrophyte cover with 50% of the pond margin shaded.	0.83 Excellent	Yes
WB10	Pond not present.	-	-
WB11	Pond not present.	-	-
WB12	Assessed visually from 10m as access was not possible. Situated in a garden the pond consisted of an open water body with well established aquatic vegetation, with adjacent hedges.	0.77 Good	Yes
WB13	The pond was heavily shaded by oak and willow trees with scrub understorey around 90% of its margins, with macrophyte cover dominating 70% of the water body. The surrounding vegetation consisted of arable land with boundary hedgerows.	0.79 Good	Yes
WB14	The pond was shaded by oak and willow trees with scrub understorey around 80% of its margins, with macrophyte cover present around 25% of the water body. The surrounding vegetation consisted of arable land with boundary hedgerows.	0.74 Good	Yes
WB15	Located adjacent to Brick Kiln Farm this was a fishing pond stocked with fish with a number of wildfowl present. Minimal aquatic vegetation was present while the pond possessed a combination of sheer sides and deep water with a covering of dense bramble and common reed mace (<i>Typha latifolia</i>).	0.35 Poor	No
WB16	Pond not present.	-	-
WB17 *	Shallow field pond with limited aquatic or emergent vegetation, prone to drying up during the summer.	0.44 Poor	Yes

⁶ Water body references correspond to those in Associated Development site Phase 1 Reports (AMEC, 2011).

Pond ID6	Description	HSI Score	Presence/absence survey required
WB17a	Pond not present.	-	-
WB17b	Pond not present.	-	-
WB18	A small pond located in a broadleaf copse in the centre of an arable field. The pond is shaded by mature oak trees and dominated by pond weed.	0.41 Poor	No
WB19	The pond is located in a private garden directly adjacent to the site boundary. The pond is shaded around 70% of its margin by mature trees and is littered with dead plant material. Surrounding habitat includes scrub, with nearby hedgerows and ditches.	Good 0.72	Yes
WB20	Assessed visually from 20m away as access was not possible. Situated in a wooded garden, the pond consisted of an open water body with well established aquatic vegetation.	Excellent 0.81	Yes
WB21	Assessed visually from 20m away as access was not possible. Small garden pond, with 60% shaded margins and 20% of the pond covered with aquatic vegetation. The surrounding habitat consists of hedgerows and amenity lawn.	Good 0.71	Yes
WB23	Located within broadleaf woodland along the western site boundary The pond is thought to be permanent and contains 25% cover of aquatic vegetation and is shaded around 75% of its margin by surrounding trees and scrub.	Average 0.63	Yes
WB24	A large still pond with shading over 50% of the margins and a 40% cover of aquatic vegetation. Terrestrial habitat consists of a surrounding woodland copse and arable fields with field margins and hedgerows.	Excellent 0.89	Yes
WB29	Pond situated in an arable field, Limited aquatic vegetation, multiple mallard ducks present; some fringing common reed mace).	Average 0.54	Yes
WB43	Pond not present.	-	-
WB44	Pond not present.	-	-
WB49	Scoped out - large reservoir, fish and waterfowl present	-	-
WB52	Large, fenced off urban water body, with steep sides and dominated by aquatic vegetation with surrounding amenity grassland. The surrounding landscape consists of busy roads and industrial parks.	Poor 0.49	No

* WB 17 received a poor HSI score, however was assessed as potentially suitable to support GCN.

Of the 29 ponds assessed during field surveys, 14 had terrestrial and aquatic habitats considered suitable to support great crested newt and were scoped in for further presence/absence surveys. 15 ponds were screened out as unsuitable, due to a lack of suitable aquatic and/or terrestrial habitat.

Only three water bodies which had habitats assessed as suitable to support great crested newt could be accessed for presence/absence surveys. These ponds are described in Table 3.2 and illustrated in Figures 3.1-3.4.

Table 3.2 Water Bodies Surveyed for Great Crested Newt Presence/Absence

Water body reference number (see Figures 3.1 and 3.2)	Description	AD Site within 500m	Grid reference	Distance (m), direction from site
3	Situated in a wooded garden the pond consists of an open water body with well established aquatic vegetation.	1	TM435637	51, SW
17	Shallow field pond with virtually no aquatic or emergent vegetation, prone to drying up during the summer.	4, 5, 9	TM461626	425, E
23	Located within broadleaf woodland along the western boundary of AD site 10. The pond is thought to be permanent and contains 25% cover of aquatic vegetation and is shaded around 75% of its margin by surrounding trees and scrub.	10	TM405703	0 (within site boundary)

3.3 Presence/Absence Surveys

The results of the presence/absence surveys conducted on water bodies 3, 17 and 23 and the conditions during the surveys are detailed in Tables 3.3-3.5.

Table 3.3 Water Body 3 Survey Results

Date	Survey conditions				Survey results			
	Precipitation	Turbidity	Air temp. (°C)	Water temp. (°C)	Torching	Trapping	Egg search*	Netting
11/5/2011	None	2.0	13	14	1PN	1F, 1PN	GCN and SM eggs	N/A
12/5/2011	None	2.5	12	13	0	0	N/A	N/A
1/6/2011	None	0	13	14	N/A	0	N/A	N/A
2/6/2011	None	0	15	15	0	0	N/A	N/A

Turbidity is measured on a scale of 1-3.

M = male great crested newt, F = female great crested newt, J = juvenile great crested newt, PN = palmate newt, SN = smooth newt, SM = small newt (palmate or smooth)

* = Once presence of great crested newt eggs had been confirmed egg searches were not continued to avoid unnecessary damage to eggs.

N/A = denotes survey method was not used.

Table 3.4 Water Body 17 Survey Results

Date	Survey conditions				Survey results			
	Precipitation	Turbidity	Air temp (°C)	Water temp (°C)	Torching	Trapping	Egg search*	Netting
12/5/2011	None	2.5	12	11	0	0	0	N/A
1/6/2011	None	1.0	13	15.7	0	Water levels too low	0	N/A
2/6/2011	None	1.5	14	17.7	0	Water levels too low	N/A	N/A

Pond dried up, further survey was not possible.

Footnotes: see Table 3.3.

Table 3.5 Water Body 23 Survey Results

Date	Survey conditions				Survey results			
	Precipitation	Turbidity	Air temp. (°C)	Water temp. (°C)	Torching	Trapping	Egg search*	Netting
14/4/2011	None	3.0	10	11	0	0	0	N/A
11/5/2011	None	3.0	13	14	0	0	0	N/A
12/5/2011	None	2.5	12	13	0	0	0	N/A
8/6/2011	None	2.5	14	15	0	0	0	N/A

Footnotes: see Table 3.3.

One adult female great crested newt was recorded in water body 3 on one occasion along with two records of female palmate newt (*Lissotriton helveticus*) in the same water body. An egg search of this pond revealed the presence of great crested newt and small newt eggs⁷. No other newts or signs indicating their presence were recorded at any other water body.

⁷ References to 'small newts' may refer to either smooth newts (*Lissotriton vulgaris*) or palmate newts, the females of which are difficult to tell apart from a torch survey; both the egg and the larval forms are also difficult to distinguish.



4. Conclusions

A total of 29 ponds within 500m of AD Sites 1, 3, 9, 10, 11, 16 and 18 were assessed in the field for their suitability to support great crested newts. It is considered that 14 of these ponds had habitats suitable to support this species. During the desk study an additional 20 ponds were identified as potentially suitable to support great crested newts; however, their habitats could not be assessed in the field due to their location on private property.

Owing to difficulties with obtaining permission to access private land, only three ponds were subject to presence/absence surveys for great crested newt. Single records of great crested newt and palmate newt were recorded in water body 3 only. Water body 3 is located 51m to the southwest of AD Site 1, and is well connected to the site via a wooded garden and hedgerow. The habitats within Site 1 provide limited habitat suitability for great crested newt, with no water bodies offering breeding habitat, and the majority of the site comprising intensively farmed arable fields. Nevertheless, field margins provide ruderal vegetation, tussocky grassland and scrub suitable to support newts, while a small woodland copse and pile of earth covered rubble in the centre of the site may provide hibernation opportunities. Great crested newt may therefore be present on the site.



Appendix A

Legislation relating to Great Crested Newt

Great Crested Newt

Great crested newt is listed in Schedule 5 of *The Wildlife and Countryside Act 1981* (as amended). The Act transposes into UK law the Convention on the Conservation of European Wildlife and Natural Habitats (commonly referred to as the 'Bern Convention'). Great crested newt is listed on Schedule 5 of the Act in respect of Section 9, which makes it an offence, *inter alia*, to:

- intentionally or recklessly kill, injure, or take (handle) a great crested newt;
- intentionally or recklessly damage, destroy or obstruct access to any structure or place that a great crested newt uses for shelter or protection; or
- intentionally or recklessly disturb a great crested newt while it is occupying a structure or place that it uses for shelter or protection.

Great crested newt receives further protection under Regulation 41 of *The Conservation of Habitats and Species Regulations 2010*, which make provision for the purpose of implementing European Union Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora 1992. Great crested newt is listed on Annex IV of the Directive, which means that member states are required to put in place a system of strict protection as outlined in Article 12, and this is done through inclusion on Schedule 2 of the Regulations, which makes it an offence, *inter alia*, to:

- deliberately capture, injure or kill any great crested newt;
- deliberately disturb a great crested newt, in particular any disturbance which is likely:
 - (a) to impair their ability:
 - (i) to survive, to breed or reproduce, or to rear or nurture their young; or
 - (ii) to hibernate or migrate
 - (b) to affect significantly the local distribution or abundance of great crested newt;
or
- damage or destroy a breeding site or resting place of a great crested newt.

Appendix B Water Bodies

Table B.1 Water Bodies Potentially Suitable to Support Great Crested Newts, which were Inaccessible for Preliminary Habitat Assessment or Presence/Absence Surveys

Water body reference Number*	Water body name	Surveys carried out	AD site within 500m	Distance (m), direction to nearest AD Site
WB1	Buckleswood Road Pond	HSI conducted; no access for presence/absence survey	1	276, SW
WB6	Hill Farm Copse Pond	HSI conducted; no access for presence/absence survey	1	451, N
WB7	Hill Farm Field Pond	No access for any field surveys.	1	400, N
WB9	Aldhurst Copse Pond 1	HSI conducted; no access for presence/absence survey	1,2,3	146, S
WB12	Abbey Farm Pond 1	HSI conducted; no access for presence/absence survey	1,2	386, N
WB13	Abbey Farm Pond 2	HSI conducted; no access for presence/absence survey	1,2	400, N
WB14	Abbey Farm Garden Pond	HSI conducted; no access for presence/absence survey	1,2	277, N
WB18	Field Copse Pond	HSI conducted; no access for presence/absence survey	10,11	120, SW
WB19	Moate Hall Pond	HSI conducted; no access for presence/absence survey	10,11	3, E
WB20	Moate Hall Garden Pond 1	HSI conducted no access for presence/absence survey	10,11	50, E
WB21	Moate Hall Garden Pond 2	HSI conducted; no access for presence/absence survey	10,11	50, E
WB22	White House Farm Pond	No access for any field surveys.	10,11	67 E
WB24	Sillett's Wood Pond	HSI conducted; no access for presence/absence survey	10	473, N
WB25	Willow Marsh Pond 1	No access for any field surveys.	10	413, N

Water body reference Number*	Water body name	Surveys carried out	AD site within 500m	Distance (m), direction to nearest AD Site
WB26	Willow Marsh Pond 2	No access for any field surveys.	10	365, N
WB27	Willow Marsh Pond 3	No access for any field surveys.	10	331, N
WB28a	Oak Spring Pond	No access for any field surveys.	10,11	250, E
WB29	Hall Farm Track Pond	HSI conducted; no access for presence/absence survey	11	40m, E
WB29a	Hall Farm Pond	No access for any field surveys.	10,11	220, SE
WB30	Darsham Old Hall Pond 1	No access for any field surveys.	10,11	125, SE
WB31	Darsham Old Hall Pond 2	No access for any field surveys.	10,11	122, SE
WB32	Darsham Old Hall Pond 3	No access for any field surveys.	10,11	118, SE
WB39	Oak Ground Pond	No access for any field surveys.	17	387, W
WB40	Carlton Hall Wood Pond 1	No access for any field surveys.	17	278, N
WB41	Carlton Hall Wood Pond 2	No access for any field surveys.	17	278, N
WB45	Palant's Grove Pond	No access for any field surveys.	13	350, SW
WB46	Friday Street Pond	No access for any field surveys.	13	175, SW
WB47a	Manor Farm Pond	No access for any field surveys.	13	275, E
WB48	Pettistree Pylons Pond	No access for any field surveys.	16	400, NE
WB50	Wonder Grove Pond 1	No access for any field surveys.	14	197, NE
WB51	Wonder Grove Pond 2	No access for any field surveys.	14	197, NE
WB51a	Borrow Pit Pond	No access for any field surveys.	14	50, E

Key: HSI: Habitat Suitability Index

*: Water bodies are illustrated in Figures 3.1- 3.7

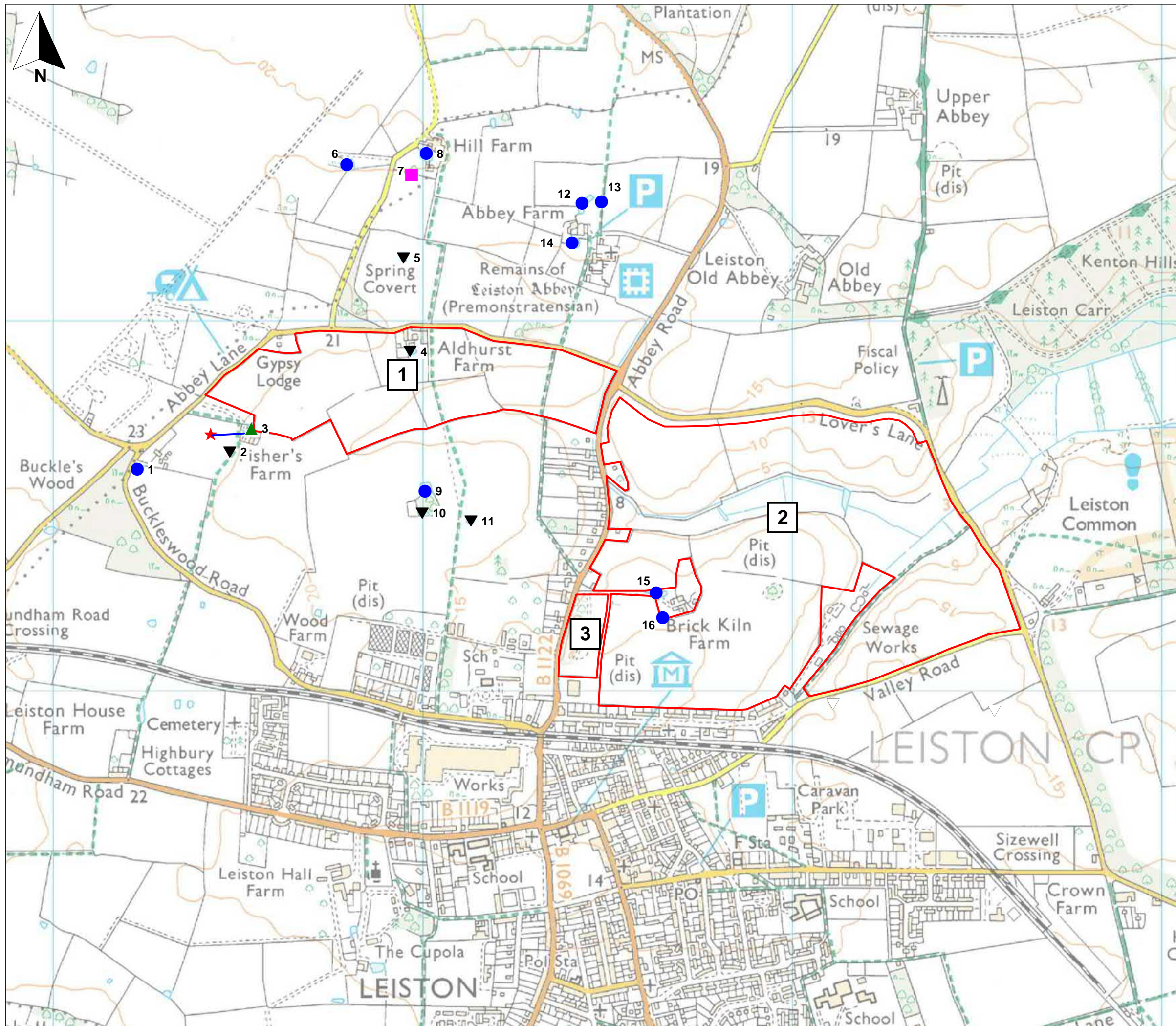
Table B.2 Water Bodies Scoped Out from Survey Due to Severance from Associated Development Sites

Water body reference Number	Water body name	AD site within 500m	Reason for scoping decision
WB28	The Street Pond	10	Pond severed from Site 10 due to main road, and beyond 500m from Site 11.
WB32a	Park Farm Field Pond	12	Severed from Site 12 due to main road.
WB33	Park Farm Covert Pond	12	Severed from Site 12 due to main road.
WB34	Hill House Farm Field Pond 1	12	Severed from Site 12 due to main road.
WB35	Hill House Farm Field Pond 2	12	Severed from Site 12 due to main road.
WB36	Hill House Farm Field Pond 3	12	Severed from Site 12 due to main road.
WB37	Burnt House Farm Field Pond 1	12	Severed from Site 12 due to main road.
WB38	Burnt House Farm Field	12	Severed from Site 12 due to main road.
WB42	Carlton Rookery Field Pond	17	Pond severed from Site 17 due to two roads and industrial estate.
WB47	Benhall Lodge Park Pond	13	Severed from Site 13 by A12.
WB53	Square Covert Pond	18,19	Pond severed from Sites 18 and 19 due to main road.
WB54	Square Covert Reservoir	18,19	Pond severed from Sites 18 and 19 due to main road.

*: Water bodies are illustrated in Figures 3.1- 3.7

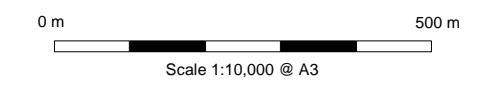
Appendix C

Figures



Key

1	Associated development site
	Site boundary
 1	Water body - no access for HSI
● 1	Water body - HSI conducted
▲ 1	Water body - HSI and presence/absence survey conducted
★	Great crested newt recorded
▼ 1	Water body - not present

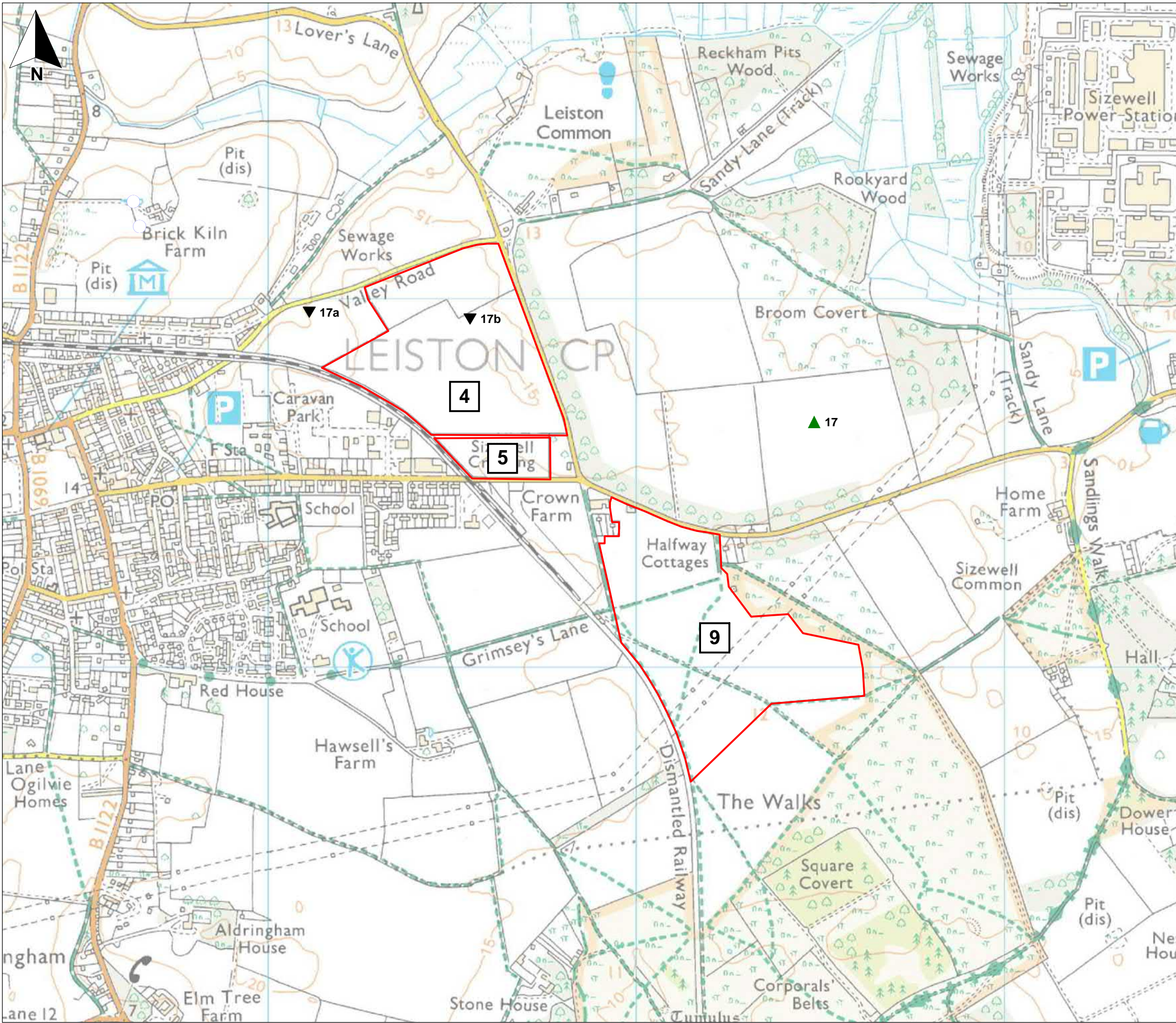


Sizewell Associated Development Sites
Great Crested Newt Survey Report

Figure 3.1
Water bodies 1-16

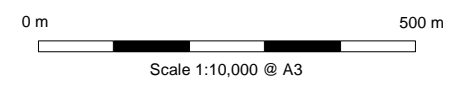
April 2012
28130-A333.wor tugwc





Key

- 1 Associated development site
- Site boundary
- ▲ 1 Water body - HSI and presence/absence survey conducted
- ▼ 1 Water body - not present

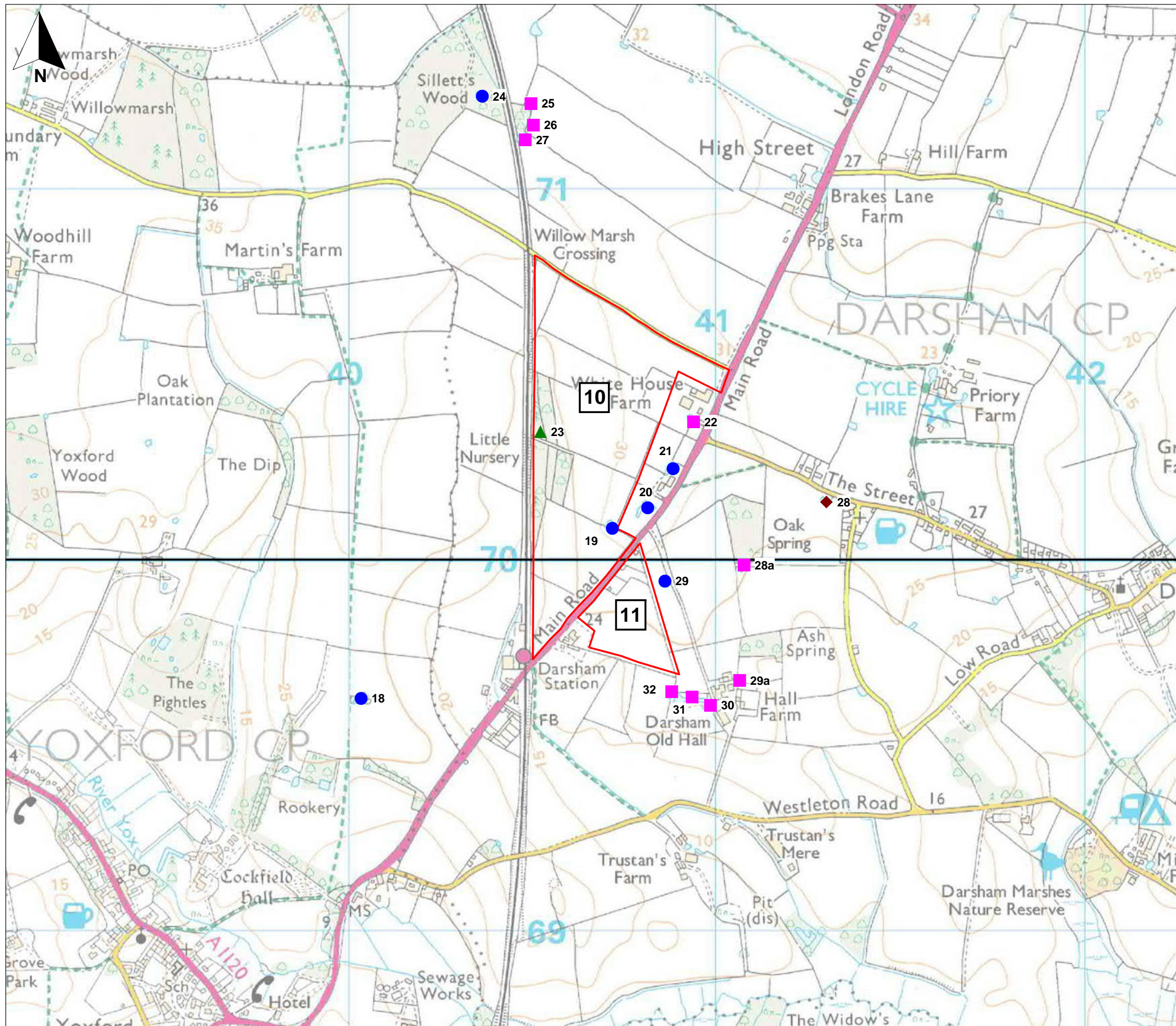


Sizewell Associated Development Sites
Great Crested Newt Survey Report

Figure 3.2
Water body 17-17b

April 2012
28130-A405.wor tugwc





- Key**
- 1 Associated development site
 - Site boundary
 - 1 Water body - no access for HSI
 - 1 Water body - HSI conducted
 - ▲ 1 Water body - HSI and presence/absence survey conducted
 - ◆ 1 Water body - severed from site

0 m 500 m
Scale 1:10,000 @ A3

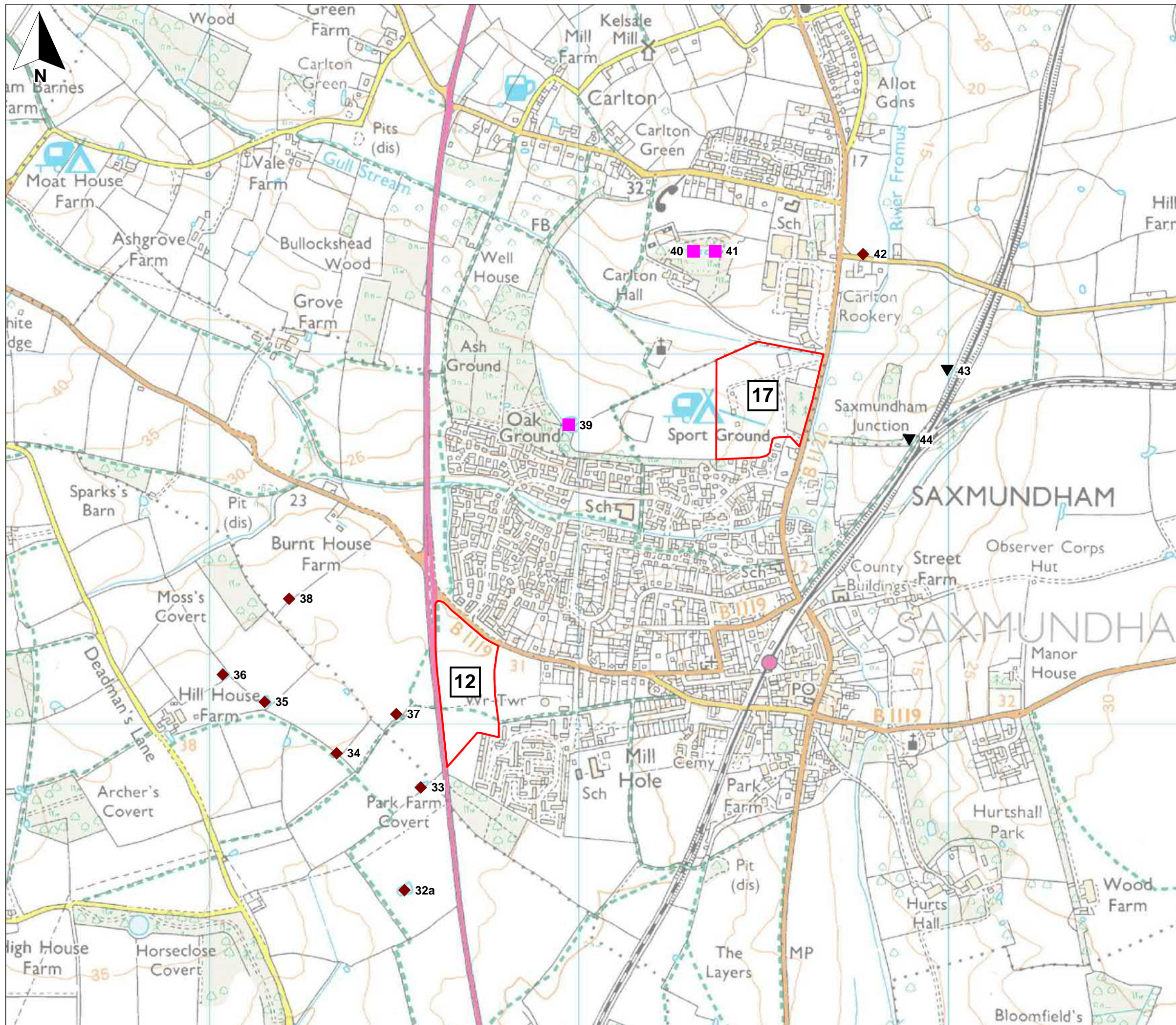


Sizewell Associated Development Sites
Great Crested Newt Survey Report

Figure 3.3
Water bodies 18-32

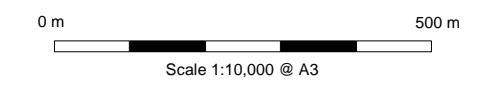
April 2012
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Key

- 1 Associated development site
- Site boundary
- 1 Water body - no access for HSI
- ◆ 1 Water body - severed from site
- ▼ 1 Water body - not present

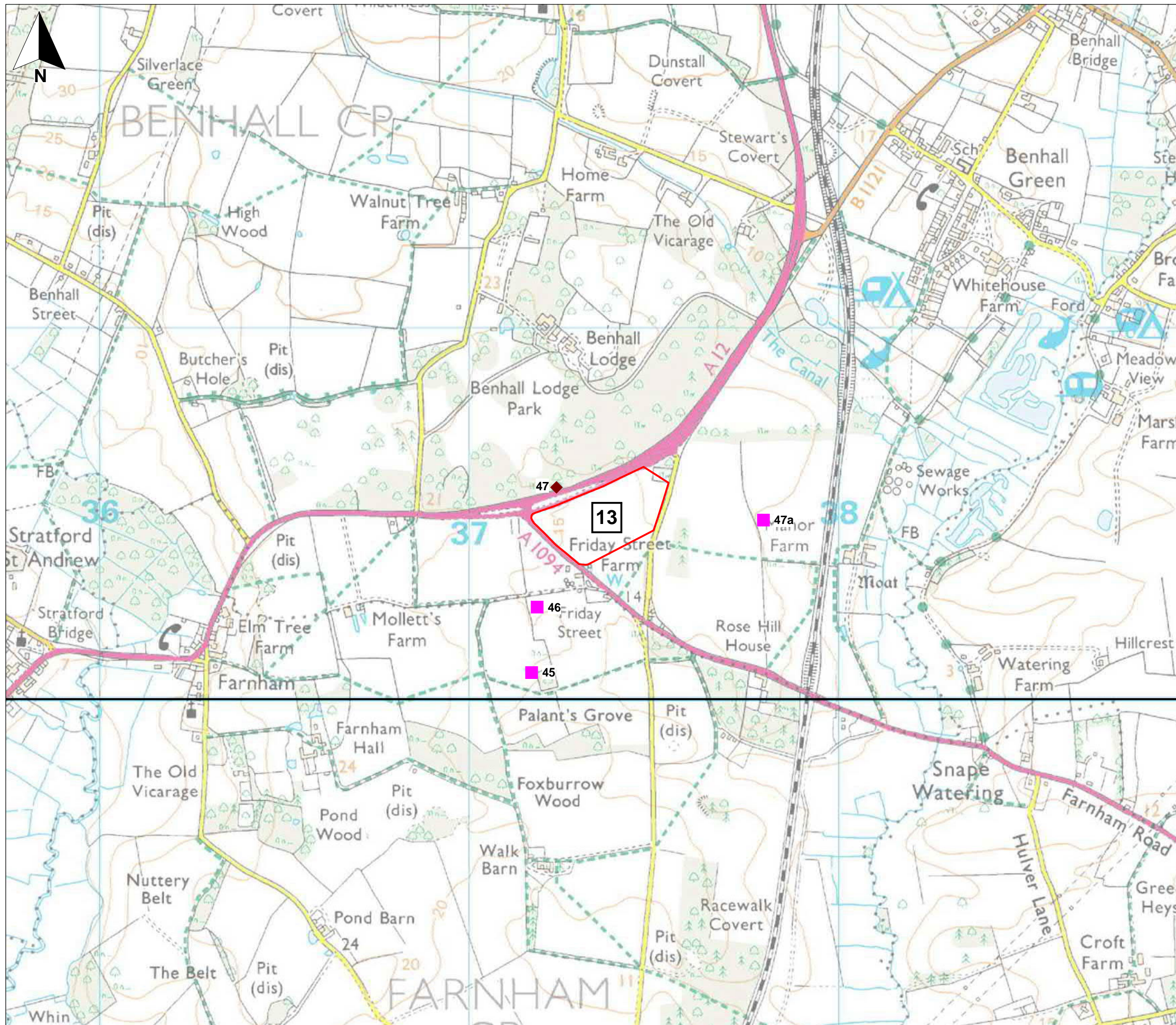


Sizewell Associated Development Sites
Great Crested Newt Survey Report

Figure 3.4
Water bodies 32a - 44

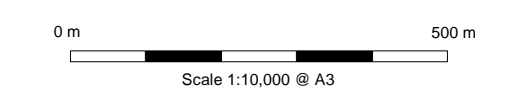
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Key

- 1 Associated development site
- Site boundary
- 1 Water body - no access for HSI
- ◆ 1 Water body - severed from site

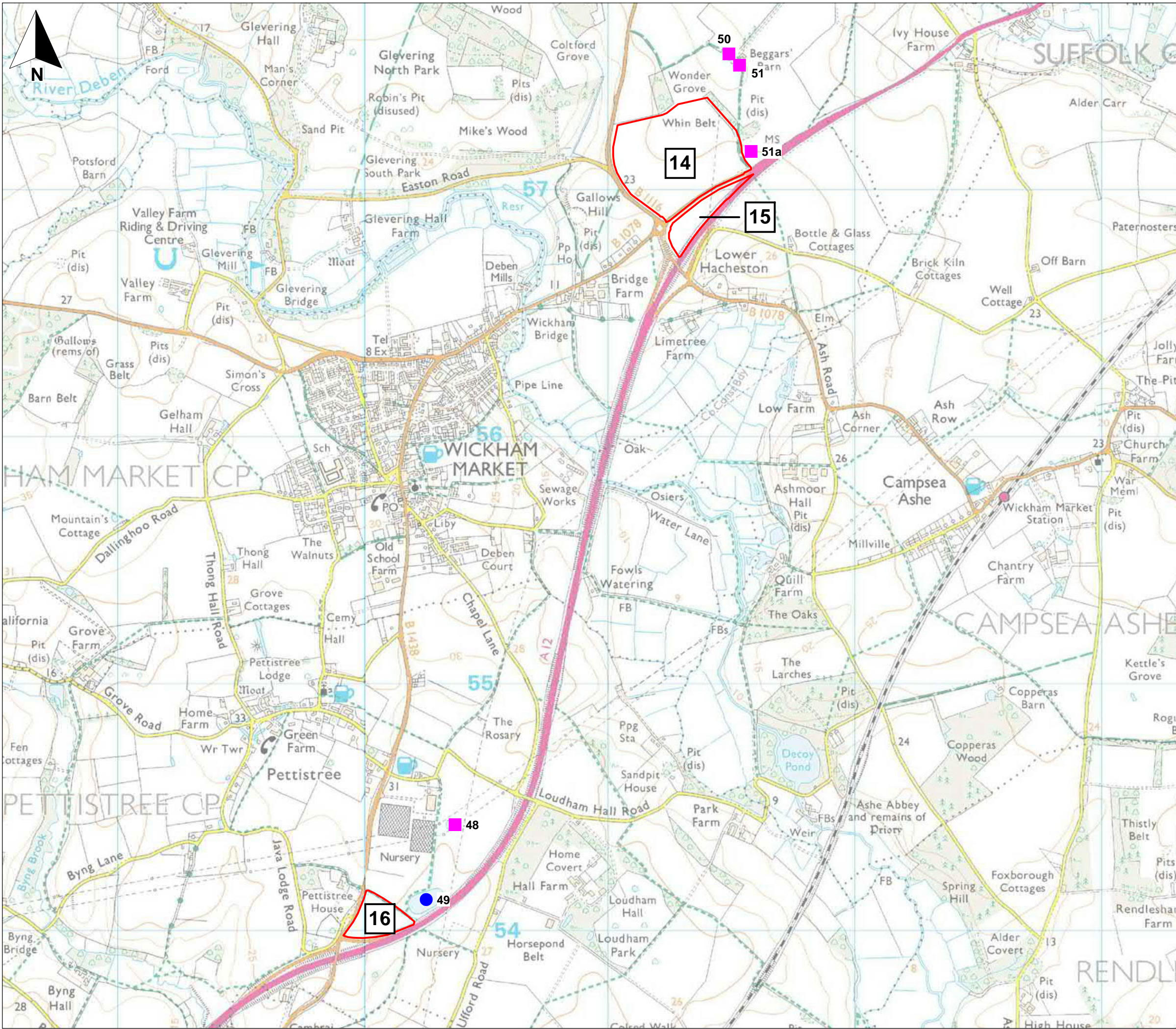


Sizewell Associated Development Sites
Great Crested Newt Survey Report

Figure 3.5
Water bodies 45 - 47a

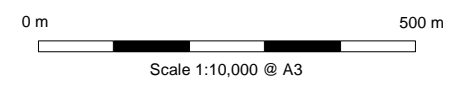
April 2012
28130-A407.wor tugwc





Key

- 1 Associated development site
- Site boundary
- 1 Water body - no access for HSI
- 1 Water body - HSI conducted

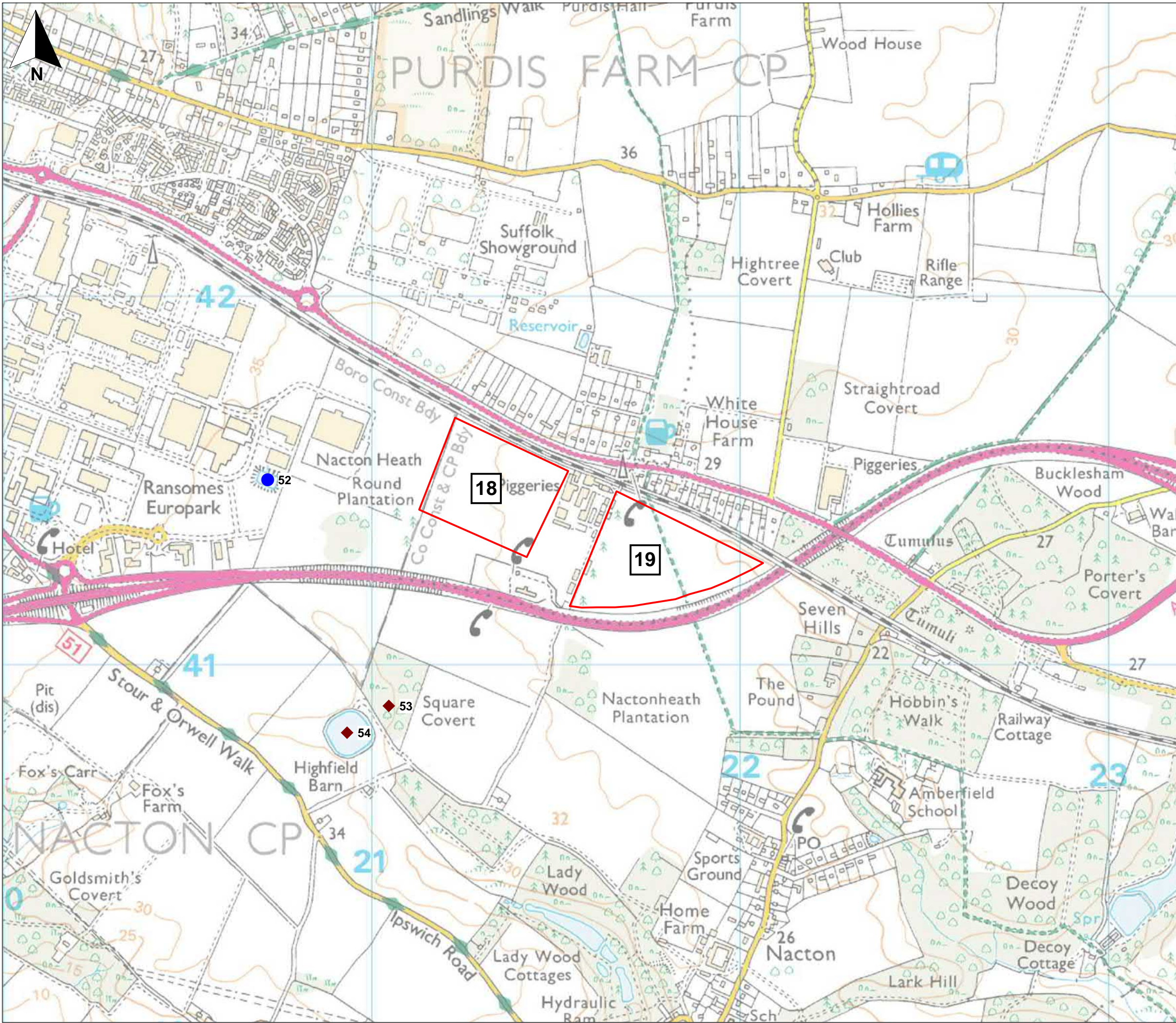


Sizewell Associated Development Sites
Great Crested Newt Survey Report

Figure 3.6
Water bodies 48 - 51a

April 2012
28130-A408.wor tugwc





Key

- 1 Associated development site
- Site boundary
- 1 Water body - HSI conducted
- ◆ 1 Water body - severed from site

0 m 500 m
Scale 1:10,000 @ A3



Sizewell Associated Development Sites
Great Crested Newt Survey Report

Figure 3.7
Water bodies 52 - 54

April 2012
28130-A409.wor tugwc



Appendix D References

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VOLUME 9: CHAPTER 7, APPENDIX 7A:
ANNEX 7A.4: PRIMARY DATA

Contents

1	Annex 7A.4 Primary Data	1
1.1	Introduction	1
1.2	Plants and Habitats.....	2
1.3	Amphibians.....	12
1.4	Ornithology	73
1.5	Bats	78
	References	94

Tables

Table 1.1:	Woody species recognised by Hedgerows Regulations (Ref 1.3)	4
Table 1.2:	Explanation of terms used on the Hedgerows Regulations record sheet.....	5
Table 1.3:	Valuable ground flora species with regard to the Hedgerows Regulations (Ref 1.3)	6
Table 1.4:	Species codes for other species often found in hedgerows	7
Table 1.5:	Extended Phase 1 habitat and protected species survey Target Notes from 2014	9
Table 1.6:	Hedgerow Regulations record sheets	11
Table 1.7:	Proposed rail extension route ponds identified in 2014	15
Table 1.8:	Habitat Suitability Index for Ponds 2, 3, 4, 23, 25 and 26	16
Table 1.9:	Habitat Suitability Index for Ponds 27, 28, 30, 54, 55, 56 and 57	16
Table 1.10:	Pond descriptions	18
Table 1.11:	Amphibian survey results.....	34
Table 1.12:	eDNA survey results for ponds surveyed in 2016	72
Table 1.13:	Breeding bird survey visits timings and weather conditions	74
Table 1.14:	Wintering bird survey visits timings and weather conditions	74
Table 1.15:	All bird species recorded, and peak counts recorded during the breeding and wintering bird surveys	75
Table 1.16:	Static detector survey periods in 2014	79
Table 1.17:	Summary of all activity recorded during activity Transect 1 in 2014	81
Table 1.18:	Summary of all activity recorded during activity Transect 2 in 2014	82
Table 1.19:	Summary of static detector results on the site in 2014	85
Table 1.20:	Results of tree assessment surveys in 2016.....	88

Plates

None provided.

Figures (refer to Annex 7A.1)

Figure 7.1: Location of Statutory Designated Sites within 5km of Green Rail Route

Figure 7.2: Location of Non-statutory Designated Sites within 2km of Green Rail Route

Figure 7.3: Green Rail Route Phase 1 Habitat Survey

Figure 7.4: Green Rail Route Great Crested Newt Surveys

Figure 7.5: Red and NERC Species Recorded on Green Rail Route during the Breeding Bird Surveys in April – June 2014

Figure 7.6: Schedule 1 Bird Species Recorded on the Green Rail Route during Winter Bird Surveys in November 2014 – March 2015

Figure 7.7: Red Listed and NERC Listed Bird Species Recorded on the Green Rail Route during Winter Bird Surveys in November 2014 – March 2015

Figure 7.8: Green Rail Route Bat Tree Assessment Results 2015

Figure 7.9: Green Rail Route Activity Transect Routes and SM2 Locations

Figure 7.10: Location of Common Pipistrelle Passes Recorded during Green Rail Route Activity Transect Routes 1 and 2, May – October 2014

Figure 7.11: Location of Soprano Pipistrelle Passes Recorded during Green Rail Route Activity Transect Routes 1 and 2, May – October 2014

Figure 7.12: Location of Barbastelle Passes Recorded during Green Rail Route Activity Transect Routes 1 and 2, May – October 2014

Figure 7.13: Location of Big Bat Passes Recorded during Green Rail Route Activity Transect Routes 1 and 2, May – October 2014

Figure 7.14: Location of *Myotis* spp. Passes Recorded during Green Rail Route Activity Transect Routes 1 and 2, May – October 2014

Figure 7.15: Location of Statutory Designated Sites within 5km and Non-statutory Designated Sites within 2km of the Saxmundham to Leiston branch line upgrades – Bratt's Black House

Figure 7.16: Ponds within 500m of Saxmundham to Leiston branch line upgrades – Bratt’s Black House

1 Annex 7A.4 Primary Data

1.1 Introduction

1.1.1. This Annex provides details of the primary data collected for

- the part of the green rail route comprising a temporary rail extension of approximately 1.7km from the existing Saxmundham to Leiston branch line to the proposed B1122 (Abbey Road) level crossing (the 'proposed rail extension route'); and
- Saxmundham to Leiston branch line upgrades (including track replacement and level crossing upgrades) (the 'proposed rail improvement works');
- (together the 'proposed development').

1.1.2. Detailed descriptions of the proposed development sites (referred to throughout this volume as the 'site; as relevant to the location of the works) the proposed development and different construction, operation and removal and reinstatement phases are provided in **Chapter 2** of this volume of the ES. A glossary of terms and list of abbreviations used in this chapter is provided in **Volume 1** of the ES.

1.1.3. As detailed in **Table 7.4** of **Chapter 7** of **Volume 9** of the **ES**, Bratt's Black House is the only level crossing improvement of the proposed rail improvement works to be screened in for further assessment. Access has not been granted for baseline surveys.

1.1.4. This Annex therefore only provides the primary data collected for the proposed rail extension route.

1.1.5. No targeted surveys were undertaken for invertebrates, reptiles and terrestrial mammals because, from the extended Phase 1 habitat survey, no evidence for the potential presence of these taxa of conservation interest was identified. As such these taxa are not considered within this Annex.

1.2 Plants and Habitats

a) Methodology

i. Extended Phase 1 habitat and protected species survey

1.2.1 An extended Phase 1 habitat and protected species survey was undertaken by Arcadis Consulting (UK) Limited (Arcadis) on 10 April 2014. The survey area consisted of the entire alignment of the site, with a 100m buffer either side of the alignment where access was possible (see **Figure 7.3** in **Annex 7.1**).

1.2.2 The survey involved identifying and mapping the dominant habitat types following the Phase 1 habitat survey methodology recommended by Natural England (Joint Nature Conservation Committee (Ref 1.1)). Dominant plant species were noted, as were any uncommon species or species indicative of particular habitat types. Botanical names follow 'New Flora of the British Isles' (Ref 1.2). Particular attention was paid to the hedgerows and trees, and the status of each hedge with regard to the Hedgerows Regulations (Ref 1.3) was also assessed using the Wildlife and Landscape Criteria. In addition, any non-native invasive species present within and adjacent to the site (for example Japanese Knotweed (*Fallopia japonica*)) were also recorded.

1.2.3 Particular attention was paid to the hedgerows and trees, and the status of each hedge with regard to the Hedgerows Regulations (Ref 1.3) was also assessed using the Wildlife and Landscape Criteria. Further detail of the assessment of hedgerows is detailed in **Section 2.1b**.

1.2.4 The survey was extended to involve a critical assessment of the value of the habitats present for their use by protected species or species of conservation interest, as outlined below:

- The value of the site for invertebrates was assessed and any habitats or features of particular value were identified.
- The value of the site for reptiles was assessed and any habitats or features of particular value for reptiles were identified.
- The value of the site for breeding birds was assessed.
- An external inspection of all trees on site was carried out to assess their suitability for occupancy by roosting and/or hibernating bats. The likely value of the various habitat features for foraging and commuting bats was also critically assessed.

- The site was investigated for its use by badgers (*Meles meles*) by searching for the characteristic signs of badger activity including setts, latrines, paths, footprints, hairs, and feeding signs. The survey area was extended where necessary in order to search adjacent areas for badger setts.
- The site was assessed for its potential to be used by dormice (*Muscardinus avellanarius*) and the connectivity of the site to areas of woodland habitat in the surrounding area.

ii. Hedgerow Regulations

1.2.5 These Hedgerows Regulations (Ref 1.3) only apply to hedgerows adjacent to land in agricultural/horticultural use. A hedgerow may be classified as ‘important’ for archaeological/historical reasons, or according to the Wildlife and Landscape criteria. To be classified as ‘important’ under the Wildlife and Landscape criteria, the hedgerow must be over 30 years old and should comprise one of the following:

- at least seven woody species/30m¹;
- at least six woody species/30m and at least three features¹;
- at least six woody spp/30m including any one of Pn/Sot/Tic/Tip (see **Table 1.1**)¹;
- *at least five woody species and at least four features; and
- or if adjacent to a bridleway/footpath, at least four woody species and at least two features.

1.2.6 Note that a hedgerow may also be classified as ‘important’ due to the presence/recorded presence of particular animal and plant species (see Criteria 6 sub-paragraphs (1)-(4) of the Hedgerows Regulations for details (Ref.1.**Error! Bookmark not defined.**)).

¹ If the hedgerow is situated wholly or partly in one of the counties listed in Criteria 7 sub-paragraph (2) of the Hedgerows Regulations, the number of woody species should be reduced by one. Note that Suffolk is not one of the counties listed in Criteria 7 sub-paragraph (2) of the Hedgerow Regulations and therefore is not subject to this reduction.

1.2.7 The woody species ‘recognised’ by the Hedgerows Regulations (Ref 1.3) are listed in **Table 1.1** below, along with the species codes to be used on the record sheet:

Table 1.1: Woody species recognised by Hedgerows Regulations (Ref 1.3)

Spp code	Latin name	English name	Spp code	Latin name	English name
Ac	<i>Acer campestre</i>	Field Maple	Pa	<i>Prunus avium</i>	Wild Cherry
Ag	<i>Alnus glutinosa</i>	Alder	Pp	<i>Prunus padus</i>	Bird Cherry
Bpe	<i>Betula pendula</i>	Silver Birch	Ps	<i>Prunus spinosa</i>	Blackthorn
Bpu	<i>Betula pubescens</i>	Downy Birch	Pyc	<i>Pyrus communis</i>	Pear
Bxs	<i>Buxus sempervirens</i>	Box	Qp	<i>Quercus petraea</i>	Sessile Oak
Cb	<i>Carpinus betulus</i>	Hornbeam	Qr	<i>Quercus robur</i>	Pedunculate Oak
Cos	<i>Cornus sanguinea</i>	Dogwood	Rc	<i>Rhamnus catharticus</i>	Buckthorn
Ca	<i>Corylus avellana</i>	Hazel	Ruv	<i>Ribes uva-crispa</i>	Gooseberry
Cla	<i>Crataegus laevigata</i>	Midland Hawthorn	Ros	<i>Rosa</i> sp(p)	Rose
Cm	<i>Crataegus monogyna</i>	Hawthorn	Rac	<i>Ruscus aculeatus</i>	Butcher’s-broom
Cys	<i>Cytisus scoparius</i>	Broom	Sx	<i>Salix</i> sp(p)	Willow
DI	<i>Daphne laureola</i>	Spurge-laurel	Sxv	<i>Salix viminalis</i>	Osier
Ee	<i>Euonymus europaeus</i>	Spindle	Sn	<i>Sambucus nigra</i>	Elder
Fs	<i>Fagus sylvatica</i>	Beech	Sac	<i>Sorbus aucuparia</i>	Rowan
Fa	<i>Frangula alnus</i>	Alder Buckthorn	Sor	<i>Sorbus</i> sp(p)	Whitebeam
Fe	<i>Fraxinus excelsior</i>	Ash	Sot	<i>Sorbus torminalis</i>	Wild Service-tree
Hr	<i>Hippophae rhamnoides</i>	Sea-buckthorn	Tb	<i>Taxus baccata</i>	Yew
la	<i>Ilex aquifolium</i>	Holly	Tic	<i>Tilia cordata</i>	Small-leaved Lime
Jr	<i>Juglans regia</i>	Walnut	Tip	<i>Tilia platyphyllos</i>	Large-leaved Lime
Jc	<i>Juniperus communis</i>	Common Juniper	Ue	<i>Ulex europaeus</i>	Gorse
Liv	<i>Ligustrum vulgare</i>	Wild Privet	Ug	<i>Ulex gallii</i>	Western Gorse
Ms	<i>Malus sylvestris</i>	Crab Apple	Umi	<i>Ulex minor</i>	Dwarf Gorse

Spp code	Latin name	English name	Spp code	Latin name	English name
Pal	<i>Populus alba</i>	White Poplar	Um	<i>Ulmus</i> sp(p)	Elm
Pn	<i>Populus nigra sub-species betulifolia</i>	Black-poplar	VI	<i>Viburnum lantana</i>	Wayfaring-tree
Pot	<i>Populus tremula</i>	Aspen	Vop	<i>Viburnum opulus</i>	Guelder Rose
an	<i>Populus canescens</i> x	Grey Poplar			

1.2.8 The presence of several features along a hedgerow influences the classification under the Hedgerows Regulations (Ref 1.3). The terms used to describe these features, and other additional terms, on the record sheet are explained in **Table 1.2**, and their presence in the hedgerow is indicated by a ‘✓’ on the record sheet.

Table 1.2: Explanation of terms used on the Hedgerows Regulations record sheet

Term	Description
Bank/wall	The hedgerow is supported along at least half of its length by a bank/wall.
Bridleway/path	The hedgerow runs parallel to a designated bridleway/footpath.
Connections ≥4 points	A hedgerow must score four or more ‘connections points’, where connections with an adjoining hedgerow(s) score one point each, and a connection with a pond or woodland (in which the majority of the trees are broad-leaved) scores two points each. A hedgerow is connected if it meets the feature, or if it has a point within 10m of it and would meet it if the line of the hedgerow continued.
Ditch	There is a ditch along at least half of the length of the hedgerow.
Ground flora spp.	A list of the dominant and any notable ground flora species recorded along the hedgerow.
Hedge No.	Hedgerow number (within survey area/site).
Important	Would the hedgerow be classified as ‘important’ under the Hedgerows Regulations?
Intact	The hedgerow contains less than 10% gaps along its length.
Parallel hedge	A parallel hedgerow is present within 15m.
Pn/Sot/Tic/Tip	The presence of these trees within the hedgerow influences the classification. An explanation of the species codes is given above.
Three flora spp.	The hedgerow supports at least three of the valuable ground flora species defined by the Hedgerows Regulations. The hedgerow is considered to support a plant if it is rooted within 1m (in any direction) of the hedgerow.
Trees	The hedgerow supports at least one standard tree per 50m length of hedgerow (standard trees are defined as those which when measured at 1.3m above ground level have a diameter of at least 20cm, or 15cm for multi-stemmed trees).

Term	Description
Woody species	A list of the woody species found along the hedgerow (this is likely to list more species than are present along 30m length(s)).

1.2.9 **Table 1.3** details valuable ground flora species with regard to the Hedgerows Regulations (Ref 1.3), while **Table 1.4** details species codes for other species often found in hedgerows.

Table 1.3: Valuable ground flora species with regard to the Hedgerows Regulations (Ref 1.3)

Spp code	Latin name	English name
Amos	<i>Adoxa mochatellina</i>	Moschatel
Ajr*	<i>Ajuga reptans</i>	Bugle
Alu*	<i>Allium ursinum</i>	Ramsons
An*	<i>Anemone nemorosa</i>	Wood Anemone
Amac	<i>Arum maculatum</i>	Lord's-and-Ladies
Aff*	<i>Athyrium filix-femina</i>	Lady-fern
Bsp*	<i>Blechnum spicant</i>	Hard-fern
Bs*	<i>Brachypodium sylvaticum</i>	False Brome
Bram	<i>Bromopsis ramosa</i>	Hairy Brome
Clat	<i>Campanula latifolia</i>	Giant Bellflower
Ctra	<i>Campanula trachelium</i>	Nettle-leaved Bellflower
Cxsy	<i>Carex sylvatica</i>	Wood Sedge
Cl*	<i>Circaea lutetiana</i>	Enchanter's Nightshade
Cmaj	<i>Conopodium majus</i>	Pignut
Daff	<i>Dryopteris affinis</i>	Scaly Male-fern
Dcar	<i>Dryopteris carthusiana</i>	Narrow Buckler-fern
Dfm	<i>Dryopteris filix-mas</i>	Male-fern
Ehel	<i>Epipactis helleborine</i>	Broad-leaved Helleborine
Esyl	<i>Equisetum sylvaticum</i>	Wood Horsetail
Eamy	<i>Euphorbia amygdaloides</i>	Wood Spurge
Fgig	<i>Festuca gigantea</i>	Giant Fescue
Fv*	<i>Fragaria vesca</i>	Wild Strawberry
Godo	<i>Galium odoratum</i>	Woodruff
Gsx*	<i>Galium saxatile</i>	Heath Bedstraw
Gro*	<i>Geranium robertianum</i>	Herb-Robert
Gu*	<i>Geum urbanum</i>	Wood Avens
Hn*	<i>Hyacinthoides non-scripta</i>	Bluebell

Spp code	Latin name	English name
Lgal	<i>Lamiastrum galeobdolon</i>	Yellow Archangel
Lsqu	<i>Lathraea squamaria</i>	Toothwort
Ls*	<i>Luzula sylvatica</i>	Greater Wood-rush
Lnem	<i>Lysimachia nemorum</i>	Yellow Pimpernel
Mpra	<i>Melampyrum pratense</i>	Common Cow-wheat
Msyl	<i>Melampyrum sylvaticum</i>	Small Cow-wheat
Muni	<i>Melica uniflora</i>	Wood Melick
Mp*	<i>Mercurialis perennis</i>	Dog's Mercury
Meff	<i>Milium effusum</i>	Wood Millet
Omas	<i>Orchis mascula</i>	Early –purple Orchid
Oxa*	<i>Oxalis acetosella</i>	Wood Sorrel
Pqua	<i>Paris quadrifolia</i>	Herb Paris
PSCO	<i>Phyllitis scolopendrium</i>	Hart's-tongue
Pnem	<i>Poa nemoralis</i>	Wood Meadow-grass
Pvul	<i>Polypodium vulgare</i>	Polypody
Pacu	<i>Polystichum aculeatum</i>	Hard Shield-fern
Pset	<i>Polystichum setiferum</i>	Soft Shield-fern
Pere	<i>Potentilla erecta</i>	Tormentil
Pste	<i>Potentilla sterilis</i>	Barren Strawberry
Pela	<i>Primula elatior</i>	Oxlip
Pvul	<i>Primula vulgaris</i>	Primrose
Raur	<i>Ranunculus auricomus</i>	Goldilocks Buttercup
Sne*	<i>Sanicula europaea</i>	Sanicle
Tsn*	<i>Teucrium scorodonia</i>	Wood Sage
Vmon	<i>Veronica montana</i>	Wood Speedwell
Vodo	<i>Viola odorata</i>	Sweet Violet
Vrei	<i>Viola reichenbachiana</i>	Early Dog-violet
Vriv	<i>Viola riviniana</i>	Common Dog-violet

*Denotes code taken from Phase 1 handbook.

Table 1.4: Species codes for other species often found in hedgerows

Spp code	Latin name	English name
Ae	<i>Arrhenatherum elatius</i>	False Oat-grass
Agt	<i>Agrostis stolonifera</i>	Creeping Bent
Apet	<i>Alliaria petiolata</i>	Garlic Mustard
Aste	<i>Anisantha sterilis</i>	Barren Brome

NOT PROTECTIVELY MARKED

Spp code	Latin name	English name
Asy*	<i>Anthriscus sylvestris</i>	Cow Parsley
At	<i>Agrostis capillaris</i>	Common Bent
Car*	<i>Cirsium arvense</i>	Creeping Thistle
Cha	<i>Chamerion angustifolium</i>	Rosebay willowherb
Cop*	<i>Chrysosplenium oppositifolium</i>	Opposite-leaved Golden-saxifrage
Cxrm	<i>Carex remota</i>	Remote Sedge
Cyc	<i>Cynosurus cristatus</i>	Crested dog's-tail
Ddl*	<i>Dryopteris dilatata</i>	Broad Buckler-fern
Dp*	<i>Digitalis purpurea</i>	Foxglove
Ephir	<i>Epilobium hirsutum</i>	Greater Willowherb
Fu*	<i>Filipendula ulmaria</i>	Meadowsweet
Gap*	<i>Galium aparine</i>	Cleavers
Gh*	<i>Glechoma hederacea</i>	Ground-ivy
Gmol	<i>Galium mollugo</i>	Hedge Bedstraw
Gro	<i>Geranium robertianum</i>	Herb-Robert
Hh*	<i>Hedera helix</i>	Ivy
HI*	<i>Holcus lanatus</i>	Yorkshire-fog
Hlup	<i>Humulus lupulus</i>	Hop
Ig*	<i>Impatiens glandulifera</i>	Indian Balsam
Lped	<i>Lotus pedunculatus</i>	Greater Bird's-foot-trefoil
Lpc*	<i>Lonicera periclymenum</i>	Honeysuckle
Ocro	<i>Oenanthe crocata</i>	Hemlock Water-dropwort
Oreg	<i>Osmunda regalis</i>	Royal Fern
Pt*	<i>Pteridium aquilinum</i>	Bracken
Pver	<i>Primula veris</i>	Cowslip
Rf*	<i>Rubus fruticosus</i> agg.	Bramble
Sd	<i>Solanum dulcemare</i>	Bittersweet
Shol	<i>Stellaria holostea</i>	Greater Stitchwort
Ssyl	<i>Stachys sylvatica</i>	Hedge Woundwort
So	<i>Smyrniolum olusatrum</i>	Alexanders
Hand	<i>Hypericum androsaemum</i>	Tutsan
Ud*	<i>Urtica dioica</i>	Common Nettle
Vio	<i>Viola</i> spp	Violet species

Spp code	Latin name	English name
Vm	<i>Vaccinium myrtillus</i>	Bilberry
Vriv	<i>Viola riviniana</i>	Common Dog-violet

*Denotes code taken from Phase 1 handbook.

b) Results

i. Extended Phase 1 habitat and protected species survey

1.2.10 **Table 1.5** details the Target Notes of the 2014 extended Phase 1 habitat and protected species survey. The results of the extended Phase 1 habitat and protected species survey and Target Notes are on **Figure 7.3, Annex 7.1**.

Table 1.5: Extended Phase 1 habitat and protected species survey Target Notes from 2014

Target note number	Description
1	Buckle’s Wood County Wildlife Site (CWS), which comprised an area of ancient semi-natural broadleaved woodland. The canopy was dominated by Ash and Oak, with an understory of Hazel; Holly and Hawthorn. The ground flora was dominated by Bluebell and Dog’s Mercury. Some of the semi-mature trees had the potential for roosting bats, and supported features including holes and splits. Note – Woodland viewed from the field to the west, as permission to access was not given.
2	Mature Oak tree on route alignment, with some dieback. The tree had limited bat roost potential.
3	H1. A mature hedgerow, approximately 3-4 metres high which was considered to provide good foraging and commuting opportunities for bats.
4	Six mature Oak trees within hedgerow. All had potential to support roosting bats, with dense ivy, knot holes and split limbs.
5	Semi-mature Oak tree within H2. As with most other trees found within this hedgerow, this tree was semi-mature with no obvious bat roost potential, although the hedgerow itself was considered to provide good foraging and commuting opportunities for bats.
6	A small wooded copse approximately 30 metres in width. Tree species present included Oak, Field Maple, Hazel, and Sycamore (<i>Acer pseudoplatanus</i>). The ground flora comprised Greater Stitchwort; Dog’s Mercury; White Dead-nettle (<i>Lamium album</i>); False Brome and Moschatel (<i>Adoxa moschatellina</i>). The copse had limited bat roost potential, but was considered to provide good bat foraging habitat.
7	Mature Oak tree with high potential to support roosting bats.
8	Two mature Oak trees within hedgerow with limited potential for roosting bats. The hedgerow was considered to provide good foraging and commuting opportunities for bats.
9	A small copse of ancient semi-natural woodland. Trees present within the woodland included Ash, Oak, Field Maple and Elm, with an understory of Hazel; Hawthorn and Elder. The woodland had a diverse ground flora, with species present including

Target number	note	Description
		Bluebell, Moschatel, Lesser Celandine (<i>Ranunculus ficaria</i>) and Dog’s Mercury. A number of mature trees within the woodland had potential for supporting roosting bats, with rot holes and flaking bark. There were two ponds within the woodland; a small (dry) pond to the south of the copse and a large pond to the north. This has been previously scoped, and found to have potential for supporting great crested newts (<i>Triturus cristatus</i>).

ii. Hedgerow Regulations

1.2.11 All hedgerows assessed under the Hedgerows Regulations (Ref 1.3) are target-noted with green ‘hedgerow numbers’ on **Figure 7.3 (Annex 7.1)**. Species abbreviations follow the ‘Handbook for Phase 1 habitat survey’ (Ref 1.1). **Table 1.6** details the Hedgerow Regulations record sheets.

Table 1.6: Hedgerow Regulations record sheets

Hedge No.	H1	H2	H3	H4	H5	H6	H7	H8
Important	✓	✓	x	✓	x	x	x	x
Bridleway/path	✓	✓	✓	x	x	x	✓	x
Pn/Sot/Tic/Tip	x	x	x	x	x	x	x	x
No. woody spp./30m	5	8	4	6	5	3	4	1
Bank/wall	X	x	x	x	x	x	x	x
Intact	✓	✓	✓	✓	x	X	x	X
Trees	✓	✓	X	✓	✓	X	✓	X
3 flora spp.	x	x	x	x	X	x	X	x
Ditch	✓	✓	✓	✓	✓	✓	✓	x
Connect >4 points	3	3	3	3	3	3	3	2
Parallel hedge	x	x	x	x	x	x	x	x
Woody ssp present	Cm	Fe	Um	Fe	Cm	Sn	Ps	Sn
	Qr	Sn	Ac	Cm	Ps	Cm	Ac	Qr
	Ac	Liv	Ros	Ac	Ros	Um	Cm	Um
	Sn	Sx	Cm	Ps	Ash		Um	
	Um	Qr		Ee	Qr			
		Ac		Cos				
Ground flora (dominant)		Ca						
Other ground flora (including notable species)								
Notes								

1.3 Amphibians

a) Methodology

i. 2014 surveys

- 1.3.1 A review of Ordnance Survey (OS) maps and aerial photos (from the Bing maps website) of land associated with each of the associated development sites was carried out to identify any waterbodies within 500m of the boundaries of the site (see **Figure 7.4** in **Annex 7.1**). Additional ponds beyond this 500m boundary were also surveyed in relation to an alternative proposed rail route (subsequently not taken forward) and the results from these ponds are discussed where relevant
- 1.3.2 A site visit to each pond was made by Arcadis ecologists between 1 April and 15 April 2014, for each pond where access was granted. During these visits, detailed site descriptions were taken for each water body, including photographs, measurements of the area and depth, descriptions of marginal, aquatic and surrounding vegetation, and a note was made of suitable survey methods for the water body.
- 1.3.3 Where appropriate, a Habitat Suitability Index for great crested newts (*Triturus cristatus*) (Ref 1.4) was calculated for each water body. The Habitat Suitability Index scores a water body against ten habitat suitability indices, which include water quality and the likely presence/absence of fish and aquatic plant cover. From these ten suitability indices, a geometric mean is calculated, which gives an overall numerical index ranging between zero and one. A score of near zero indicates highly sub-optimal habitat, whilst a score near one represents optimal habitat.
- 1.3.4 The Habitat Suitability Index for each pond was used to compare the general suitability of the ponds present for great crested newts. However, the Habitat Suitability Index is not a substitute for undertaking newt surveys and, if a water body is awarded a high Habitat Suitability Index score, this does not guarantee that great crested newts will be present, only that they are likely to be present.
- 1.3.5 Targeted great crested newt surveys were undertaken at ponds identified as being potentially suitable for breeding amphibians during the scoping surveys. Four survey visits to each pond were carried out in suitable weather conditions between 15 April and 2 June 2014. Where great crested newts were recorded, an additional two surveys were undertaken (making a total of six surveys) before mid-June to allow an estimate of population size class to be made. The survey methods used depended on the different characteristics of each pond (such as turbidity, or abundance of aquatic

vegetation), following Natural England's 'Great Crested Newt Mitigation Guidelines' (Ref 1.5).

- 1.3.6 The three preferred standard survey methods (torchlight survey, bottle-trapping and egg search) were carried out on each visit to the ponds although, in some cases, fewer survey techniques (the most appropriate to the pond) could be used. Netting was used as a last resort on a single individual pond, and only once all other options had proved ineffective.
- 1.3.7 Each torchlight survey comprised a single walk around the pond at a measured pace, using a 500,000 candle-power torch to locate and identify amphibians. During the survey, all amphibians observed were counted, sexed and identified to species where possible (female smooth (*Lissotriton vulgaris*) and palmate (*L. helveticus*) newts are not always distinguishable by torch surveys). Survey timings and weather conditions were also recorded.
- 1.3.8 Bottle-trapping surveys used ridged 1.5 litre mineral water bottles (with the top end cut off and inverted inside the main body of the bottle). These were submerged in the pond on canes wedged into the pond sediment. Traps were set in the evening and checked early the following morning. All amphibians captured overnight were identified to species and life stage, and sexed where possible. Suitable aquatic vegetation at the pond margins was also checked at this time for the presence/absence of newt eggs.
- 1.3.9 For ponds found to contain great crested newts, populations were classified as 'small' for maximum counts up to ten, 'medium' for maximum counts between 11 and 100, and 'large' for maximum counts over 100 (Ref 1.5).
- 1.3.10 Appropriate biosecurity measures were adopted whilst undertaking the surveys, in order to avoid the inadvertent spreading of chytridiomycosis. This is a fungal disease which can have a devastating effect on amphibian populations. Measures implemented included the thorough drying of traps between surveys, and the application of Virkon antiseptic solution to survey equipment, wading poles and surveyor's waders between visits, where ponds are separated by a distance of over 1km.
- 1.3.11 The water bodies occasionally exhibited conditions rendering certain survey methods impractical or unsafe. For example, a pond with heavy duckweed cover may not be effectively torched, and certain ponds had banks too steep to safely allow the deployment of bottle traps. For this reason, although effort was made to use three survey methods for each pond, occasionally this was not possible. Occasionally, bank vegetation and conditions restricted access to sections of the water body, rendering surveying the entire perimeter of a pond impossible. In the event of accidental trapping of water shrew (*Neomys fodiens*), no further bottle trapping surveys were undertaken.

ii. 2016 surveys

- 1.3.12 Four ponds, Ponds, 20, 21, 28 and 37 (see **Figure 7.4** in **Annex 7A.1**), were sampled for great crested newt environmental DNA (eDNA) on 9 June 2016. During these visits, pond descriptions and photographs were taken as described above so that Habitat Suitability Index could be calculated.
- 1.3.13 Sampling methodologies followed details in Briggs *et al.* 'Analytical and methodological development for improved surveillance of Great Crested Newt, Appendix 5, Technical advice note for field and laboratory sampling of great crested newt environmental DNA' (Ref 1.6). As required by Natural England, samples were collected by a licensed surveyor and took place between 15 April and 30 June 2016.
- 1.3.14 The samples were sent to Fera's eDNA testing service for analysis. The analysis method detects pond occupancy from great crested newts using traces of eDNA shed into the pond environment. The detection of great crested newt eDNA is carried out using real-time polymerase chain reaction to amplify part of the cytochrome 1 gene found in mitochondrial DNA. The method followed details in Briggs *et al.* (Ref 1.6).
- 1.3.15 There are a number of limitations with this method as follows: (1) any variation between the characteristics of the sample and a batch will depend on the sampling procedure used; (2) the method is qualitative and therefore the levels given in the score are for information only, they do not constitute the quantification of great crested newt DNA against a calibration curve; (3) a 'not detected' result does not exclude the presence at levels below the limit of detection.

b) Results

- 1.3.16 Twenty-eight waterbodies were identified within 500m of the boundary of the site, while an additional three were identified just outside 500m (**Table 1.7**). **Figure 7.4** (**Annex 7.1**) shows the locations of these ponds classified as follows: ponds which were scoped out as requiring further surveys (e.g. no longer extant, or dry at the time of survey); ponds where access was not granted for scoping or survey; ponds where access was granted for scoping, but not for subsequent survey; ponds where great crested newt surveys were carried out; and ponds that were found to contain great crested newt populations.

Table 1.7: Proposed rail extension route ponds identified in 2014

Pond ID*	Amec ID	Scoped In/out		Access	Surveyed
		In	Out		
2		Yes		Yes	Yes
3		Yes		Yes	Yes
4		Yes		Yes	Yes
6		Yes		No	No
7			Yes	Yes	No
17		Yes		No	No
18		Yes		No	No
20*		Yes		No (2014), Yes (2016) for eDNA	Yes (eDNA)
21		Yes		No (2014), Yes (2016) for eDNA	Yes (eDNA)
22*		Yes		No	No
23		Yes		Yes	Yes
24			Yes	Yes	No
25		Yes		Yes	Yes
26		Yes		Yes	Yes
27		Yes		Yes	Yes
28	Pond 3	Yes		Yes (Habitat Suitability Index only)	Yes (Habitat Suitability Index and eDNA)
29			Yes	Yes	No
30		Yes		Yes	Yes
31			Yes	Yes	No
32		Yes		No	No
33			Yes	Yes	No
36		Yes		No	
37		Yes		No (2014), Yes (2016) for eDNA	Yes (eDNA)
39			Yes	Yes	No
40			Yes	Yes	No
41			Yes	Yes	No
42			Yes	Yes	No
54		Yes		Yes	Yes
55		Yes		Yes	Yes
56		Yes		Yes	Yes
57*		Yes		Yes	Yes

*Located just outside 500m.

1.3.17 Access was not granted in 2014 to nine ponds (Ponds 6, 17, 18, 20, 21, 22, 32, 36 and 37) for either scoping or survey work. Ten ponds were scoped out for further survey work: Ponds 29 and 33 were not extant; Ponds 7, 24, 31, and 39-42 were dry at the time of survey. Thirteen ponds (Ponds 2, 3, 4, 23, 25, 26, 27, 28, 30, 54, 55, 56 and 57) were found to have potential for supporting great crested newts. Further surveys for great crested newts were undertaken at twelve of these ponds; consent for access to Pond 28 for further surveys was withheld.

1.3.18 **Table 1.8** and **Table 1.9** presents the results of the Habitat Suitability Index assessments carried out for ponds.

Table 1.8: Habitat Suitability Index for Ponds 2, 3, 4, 23, 25 and 26

Feature	Pond ID	Pond ID	Pond ID	Pond ID	Pond ID	Pond ID
	2	3	4	23	25	26
Location	1	1	1	1	1	1
Pond area	0.2	0.2	0.2	1	0.5	0.4
Pond drying	1	0.5	0.9	0.9	0.9	1
Water quality	0.67	0.33	1	0.3	0.67	1
Shade	0.6	0.2	1	1	1	0.8
Fowl	0.67	0.67	0.67	0.67	1	1
Fish	0.67	1	0.67	0.33	1	1
Ponds	0.95	0.95	0.95	0.95	1	0.95
Terrestrial habitat	1	1	1	0.33	0.67	0.67
Macrophytes	0.8	0.3	1	0.35	0.33	0.8
Habitat Suitability Index Score	0.7	0.51	0.77	0.6	0.76	0.83
Suitability for Great Crested Newt	Good	Below average	Good	Average	Good	Excellent

Table 1.9: Habitat Suitability Index for Ponds 27, 28, 30, 54, 55, 56 and 57

Feature	Pond ID	Pond ID	Pond ID	Pond ID	Pond ID	Pond ID	Pond ID
	27	28	30	54	55	56	57
Location	1	1	1	1	1	1	1
Pond area	0.4	0.55	1	0.7	0.5	1	0.48
Pond drying	0.9	0.9	0.9	0.5	0.9	0.9	0.9
Water quality	0.33	0.67	1	0.3	0.67	0.33	0.67

NOT PROTECTIVELY MARKED

Feature	Pond ID	Pond ID	Pond ID	Pond ID	Pond ID	Pond ID	Pond ID
	27	28	30	54	55	56	57
Shade	0.4	1	1	0.4	1	1	1
Fowl	1	0.67	0.67	0.67	1	0.67	0.67
Fish	1	0.67	1	1	1	0.01	1
Ponds	1	0.95	0.98	1	1	1	1
Terrestrial habitat	1	0.67	0.67	0.67	0.67	0.33	0.67
Macrophytes	0.3	0.35	0.55	0.8	0.33	0.3	0.35
Habitat Suitability Index Score	0.65	0.71	0.86	0.66	0.64	0.43	0.73
Suitability for Great Crested Newt	Average	Good	Excellent	Average	Average	Poor	Good

1.3.19 Ponds 2, 3 and 4 were close together in the Leiston Abbey grounds. Ponds 2 and 4 were described as of ‘good’ suitability for great crested newts; Pond 3 was of ‘below average’ suitability, being limited by size, shade, poor water quality, and macrophyte cover.

1.3.20 Ponds 54 and 55 were described as of ‘average’ suitability for great crested newts. Pond 54 was a shallow pond surrounded by trees, with arable field close by to two sides, horse-grazed pasture on one side, and rough grassland on the final side. Pond 55 was in a tree-lined depression with gardens (mostly to lawn) on three sides, and scrub and small trees on the other side; there are arable fields to the south and east of the garden and horse-grazed pasture to the west.

1.3.21 Pond 56 was a large farm pond, surrounded by farmyard, garden and horse-grazed pasture. It was of ‘poor’ suitability. Pond 57 was surrounded by a small ring of scrub, with woodland on one side and arable fields on the remaining sides, and of ‘good’ suitability.

1.3.22 Pond 23 was a large farm pond, described as of ‘average’ suitability, being limited by water quality, the presence of fish and limited availability of terrestrial habitat. Pond 25 was a small pond bordered by woodland and arable fields, described as of ‘good’ suitability. Pond 26 was located in a large hedge/tree line between arable fields, described as of ‘excellent’ suitability. Pond 27 was a small pond by woodland and arable fields, described as of ‘average’ suitability, being limited by its small size, poor water quality, high shade and lack of macrophyte cover. Pond 28 was a garden pond in a small wooded area, with arable fields beyond the garden, and


described as of ‘good’ suitability. Pond 30 was in a woodland covert, surrounded by arable fields, and described as of ‘excellent’ suitability.


1.3.23 Ponds 20, 21 and 37 (to which no access was granted) comprised a group of three adjacent ponds heavily shaded by the surrounding scrub and trees with reed beds and small areas of open water, close to Crossing Farm.

1.3.24 Detailed pond descriptions are presented in **Table 1.10**.

1.3.25 Great crested newts were confirmed by conventional survey methodologies in 2014 in Ponds 2, 4, 26, 27, 30, 55 and 57, with evidence of breeding (from eggs) in 2, 4, 30 and 55. Ponds 28 and 36 had evidence of great crested newts during 2011 surveys and Ponds 2 and 4 also had desk-study records of great crested newts. Detailed survey results are presented in **Table 1.11**.

Table 1.10: Pond descriptions

Pond 2	
	
Grid reference	TM441645
Description	A pond surrounded by trees in Leiston Abbey grounds, with arable fields to the north and scrub/rough grass to south.
Area	90m ²
Depth	70m
Perimeter	2m
Scoped in/out	In

Pond 3	
	
Grid reference	TM444643
Description	A shallow tree-lined pond in an area of woodland, with arable fields to the north, and scrub/rough grass to south.
Area	90m ²
Depth	70m
Perimeter	0.7m
Scoped in/out	In

Pond 4





Grid reference	TM444642
Description	An open pond full of emergent vegetation, surrounded by improved grassland and buildings to the north and east, and arable fields to the south-west.
Area	90m ²
Depth	70m
Perimeter	0.7m
Scoped in/out	In

Pond 20



Grid reference	TM 42550 63394
Description	A large pond within dense hawthorn scrub and trees. The pond is heavily shaded by the surrounding scrub and trees on three sides, excluding the northern side which has a large reed bed area. On the southern edge of the pond, there is very little bankside or emergent vegetation due to shading.
Area	150m ²
Depth	30cm
Perimeter	50m
Scoped in/out	In


Pond 21	
	
Grid reference	TM 42517 63312
Description	A large pond within dense hawthorn scrub and trees which is connected to Pond 37 by small channels to the north and west. Along the eastern edge of the pond there is a thick hedgerow, which borders an arable field. To the south of the pond is another large hedgerow which runs adjacent to the road. The pond is heavily shaded by the surrounding scrub and trees on three sides, excluding the western side which has a large reed bed area.
Area	200m ²
Depth	45cm
Perimeter	60m
Scoped in/out	In


Pond 23	
	
Grid reference	TM427629
Description	A large farm pond in the yard of Leiston House Farm. Bordered by the paved farmyard and access drive on three sides (North, West, East) with Saxmundham Road to the south, separated by a low hedge and small strip of mown grass. Well stocked with fish (carp and rudd), and a minor waterfowl presence at the site. Little aquatic flora aside from isolated flag iris patches on the northern bank. Limited hedgerow connectivity and availability of suitable terrestrial habitat around the pond, although there are arable fields beyond the farmyard and road, and a garden to the east, consisting of mown grass and some large trees.
Area	810m ²
Depth	2m
Perimeter	140m
Scoped in/out	In

Pond 25



Grid reference	TM429634
Description	Pond at the edge of Buckle’s Wood, with broadleaf woodland to the south and east, and arable crop bordering to the south-west. Abbey Lane borders to the NW bank, with arable fields beyond. Foraging opportunities within Buckle’s Wood, with further connectivity via woodland and ditches. Total duckweed cover, with limited emergent vegetation.
Area	260m ²
Depth	100m
Perimeter	1.5m
Scoped in/out	In


Pond 26	
	
Grid reference	TM432629
Description	A pond between two arable fields, alongside a public footpath. Well vegetated banks and abundant emergent vegetation. Surrounding terrestrial habitat provides opportunities for newt foraging and hibernacula, with scrub and woodland in an overgrown garden to the south, and good connectivity via ditch and hedges.
Area	200m ²
Depth	2m
Perimeter	75m
Scoped in/out	In


Pond 27	
	
Grid reference	TM432635
Description	Deep, steep banked pond at the edge of a small copse with arable fields bordering to two sides (south + east). Highly shaded with deep silt and leaf litter, and little emergent vegetation. There are opportunities for foraging by newts immediately around the pond itself, and within gardens and pasture towards the north, while Buckle's Wood is over the road to the west. Hibernacula within exposed tree roots around pond and in woodland. The site is well connected via hedgerows and woodland.
Area	170m ²
Depth	>2m
Perimeter	55m
Scoped in/out	In

Pond 28



Grid reference	TM435636
Description	A pond within a garden of mown grass and scattered trees, with pasture beyond a hedge to the north. There are good foraging/hibernating opportunities nearby, and various wooden outbuildings which may provide hibernacula/shelter underneath. There are minor impacts of fish and waterfowl at the site, and the pond has a heavy duckweed covering, with little other vegetation noted.
Area	275m ²
Depth	1.5m
Perimeter	110m
Scoped in/out	In – no further access

Pond 30	
	
Grid reference	TM440635
Description	A large pond in a slight depression at the northern edge of a broadleaf woodland, with arable fields bordering on three sides. The pond is well vegetated, with large patches of tall rush and sedges, though there is a minor waterfowl presence at the site. Good foraging and hibernating opportunities from large earthen banks around pond, as well as within woodland. Otherwise poor connectivity; an isolated wood within arable fields with no immediate hedgerow connections.
Area	500m ²
Depth	>2m
Perimeter	100m
Scoped in/out	In

Pond 37	
	
Grid reference	TM 42563 63357
Description	A large pond surrounded by extensive areas of dense hawthorn scrub and trees which is connected to Pond 21 via small channels to the south. To the north and east of the pond there is an area of housing and a large garden area, with patches of dense scrub, trees and ditches. There is very little emergent or bankside vegetation around the eastern edge of the pond due to over-shading from surrounding scrub and trees.
Area	100m ²
Depth	30cm
Perimeter	40
Scoped in/out	

Pond 54




Grid reference	TM438644
Description	A shallow, highly shaded pond within a copse between four fields. Very heavy duckweed cover, with little other emergent vegetation noted. There are opportunities for hibernation and foraging within the copse itself, including within shallow tree-lined earthen banks which line the pond, as well as within a patch of scrub and rough grassland to the north of the pond. Grazed sheep pasture to the east, with arable fields to the south and west. Good hedgerow connectivity to other nearby ponds.
Area	340m ²
Depth	0.5m
Perimeter	80m
Scoped in/out	In

Pond 55



Grid reference	TM439643
Description	A small, shaded pond within the garden of Hill Farm. Some small patches of flag iris, otherwise little emergent vegetation noted. Steep banks are heavily vegetated with scrub and small trees. Short, grazed pasture lies to the south and west beyond the garden, with arable fields to the east. Good connectivity via hedges.
Area	150m ²
Depth	1.5m
Perimeter	50m
Scoped in/out	In

Pond 56	
	
Grid reference	TM440644
Description	A large pond within a farmyard. The pond is well stocked with fish, including roach and carp, and is occasionally visited by waterfowl. Amenity grassland and grazed pasture borders to the west, with paved farm yard to the north and east. Little emergent vegetation was present, likely limited by heavy fish presence. Suitable terrestrial habitat for great crested newt nearby is limited.
Area	650m ²
Depth	2m
Perimeter	100m
Scoped in/out	In

Pond 57



Grid reference	TM441645
Description	A large pond on the western edge of a copse, with arable fields to three sides (north, west, south) beyond a 10m buffer of short grass. Connectivity via hedgerows and woodland, which also provide some opportunities for foraging and shelter. Small amount of flag iris and <i>Typha</i> spp. along the banks, otherwise little emergent vegetation present. Occasionally used by waterfowl.
Area	250m ²
Depth	2m
Perimeter	80m
Scoped in/out	In

Table 1.11: Amphibian survey results

Key to tables:

Wind speed: (1 = no wind; 2 = light wind; 3 = strong wind)

Rain: (heavy/light/none)

Turbidity score (0-5): (0 = completely clear, 5 = very turbid)

Vegetation cover score (0-5): (0 = no vegetation obscuring water, 5 = water completely obscured by vegetation)

Pond 2								
Visit 1	15/04/14							
Temperature:	7°C			Rain	None			
Wind speed	Light			Cloud cover	None			
Turbidity score	-			Vegetation cover	-			
Survey constraints	No access for trapping; too much debris in pond for netting; deep water and steep banks limits access to perimeter for H&S reasons							
% of perimeter surveyed	75%			Other amphibians	None			
Species	Egg search	Torchlight survey						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt	None						1	1
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0

Pond 2								
Visit 2	23/04/14							
Temperature:	10°C			Rain	None			
Wind speed	Light			Cloud cover	None			
Turbidity score	2			Vegetation cover	1			
Survey constraints	No access for trapping; too much debris in pond for netting; deep water and steep banks limits access to perimeter for H&S reasons							
% of perimeter surveyed	30%			Other amphibians	None			
Species	Egg search	Torchlight survey						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	

Pond 2								
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None				1			1
Palmate newt								0
Smooth/palmate newt								0

Pond 2								
Visit 3	30/04/14							
Temperature:	11°C			Rain		None		
Wind speed	Light			Cloud cover		Overcast		
Turbidity score	3			Vegetation cover		2		
Survey constraints	No access for trapping; too much debris in pond for netting; deep water and steep banks limits access to perimeter for H&S reasons							
% of perimeter surveyed	-			Other amphibians		None		
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None					1		1
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0

Pond 2							
Visit 4	13/05/14						
Temperature:	11°C			Temperature:		11°C	
Wind speed	Light			Wind speed		Light	
Turbidity score	3			Turbidity score		3	
Survey constraints	No access for trapping; too much debris in pond for netting; deep water and steep banks limits access to perimeter for H&S reasons						
% of perimeter surveyed	-			Other amphibians		None	
Species	Egg search	Torchlight survey					
		Larvae	Eft	Immature	Adult		

Pond 2								
					Male	Female	Unknown	
Great crested newt	None				1			1
Smooth newt	None							
Palmate newt								
Smooth/palmate newt								

Pond 2								
Visit 5	27/05/14							
Temperature:	16°C			Rain		Heavy		
Wind speed	No wind			Cloud cover		Overcast		
Turbidity score	-			Vegetation cover		-		
Survey constraints	No access for trapping; too much debris in pond for netting; deep water and steep banks limits access to perimeter for H&S reasons							
% of perimeter surveyed	-			Other amphibians		None		
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	Yes							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0

Pond 2								
Visit 6	29/05/14							
Temperature:	16°C			Rain		None		
Wind speed	No wind			Cloud cover		Overcast		
Turbidity score	-			Vegetation cover		-		
Survey constraints	No access for trapping; too much debris in pond for netting; deep water and steep banks limits access to perimeter for H&S reasons							
% of perimeter surveyed	-			Other amphibians		None		

Pond 2								
Species	Egg search	Torchlight survey						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt	None					1		1
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0

Pond 3								
Visit 1	15/04/14							
Temperature:	7°C			Rain			None	
Wind speed	Light			Cloud cover			None	
Turbidity score	2			Vegetation cover			1	
Survey constraints	No access for trapping; too much debris in pond for netting							
% of perimeter surveyed	100%			Other amphibians			None	
Species	Egg search	Torchlight survey						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0

Pond 3								
Visit 2	23/04/14							
Temperature:	10°C			Rain			None	
Wind speed	No wind			Cloud cover			None	
Turbidity score	2			Vegetation cover			1	
Survey constraints	No access for trapping; too much debris in pond for netting							
% of perimeter surveyed	65%			Other amphibians			None	

Pond 3								
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None						0	
Smooth newt	None						0	
Palmate newt							0	
Smooth/palmate newt							0	

Pond 3								
Visit 3	30/04/14							
Temperature:	-			Rain	None			
Wind speed	Light wind			Cloud cover	Overcast			
Turbidity score	1			Vegetation cover	0			
Survey constraints	No access for trapping; too much debris in pond for netting							
% of perimeter surveyed	-			Other amphibians	None			
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None						0	
Smooth newt	None						0	
Palmate newt							0	
Smooth/palmate newt							0	

Pond 3							
Visit 4	13/05/14						
Temperature:	-			Rain	Light		
Wind speed	Light wind			Cloud cover	-		
Turbidity score	2			Vegetation cover	2		
Survey constraints	No access for trapping; too much debris in pond for netting						
% of perimeter surveyed	-			Other amphibians	None		

Pond 3								
Species	Egg search	Torchlight survey						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0

Pond 4								
Visit 1	15/04/14							
Temperature:	7°C			Temperature:	7°C			
Wind speed	Light			Wind speed	Light			
Turbidity score	0			Turbidity score	0			
Survey constraints	No access for trapping							
% of perimeter surveyed	90% torched			% of perimeter surveyed	90% torched			
Species	Egg search	Torchlight survey						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt	Yes					2		2
Smooth newt	None							
Palmate newt								
Smooth/palmate newt								

Pond 4								
Visit 2	23/04/14							
Temperature:	10°C	Rain		None				
Wind speed	No wind	Cloud cover		None				
Turbidity score	0	Vegetation cover		2				
Survey constraints	No access for trapping							
% of perimeter surveyed	100% torched	Other amphibians		None				
Species	Egg search	Torchlight survey						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt	na				2		2	
Smooth newt	None				1		1	
Palmate newt							0	
Smooth/palmate newt					3	1	4	

Pond 4								
Visit 3	30/04/14							
Temperature:	11°C	Rain		None				
Wind speed	Light	Cloud cover		Overcast				
Turbidity score	0	Vegetation cover		4				
Survey constraints	No access for trapping							
% of perimeter surveyed	-	Other amphibians		None				
Species	Egg search	Torchlight survey						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt	na				1	3	4	
Smooth newt	None				1	1	2	
Palmate newt							0	
Smooth/palmate newt							0	

Pond 4								
Visit 4	13/05/14							
Temperature:	11°C			Rain		None		
Wind speed	Light wind			Cloud cover		Overcast		
Turbidity score	0			Vegetation cover		5		
Survey constraints	No access for trapping							
% of perimeter surveyed	-			Other amphibians		None		
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	na					2		2
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt						1	1	1

Pond 4								
Visit 5	27/05/14							
Temperature:	16°C			Rain		Heavy rain		
Wind speed	No wind			Cloud cover		Overcast		
Turbidity score	-			Vegetation cover		-		
Survey constraints	No access for trapping							
% of perimeter surveyed	-			Other amphibians		None		
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	na				11	20	5	36
Smooth newt	None				3	2		5
Palmate newt								0
Smooth/palmate newt								0

Pond 4								
Visit 6	29/05/14							
Temperature:	12°C			Rain		None		
Wind speed	Light wind			Cloud cover		Overcast		
Turbidity score	0			Vegetation cover		2		
Survey constraints	No access for trapping							
% of perimeter surveyed	-			Other amphibians		None		
Species	Egg search	Torchlight survey						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt	Yes		4		14	30		48
Smooth newt	None				2	1		3
Palmate newt								0
Smooth/palmate newt						3		3

Pond 23								
Visit 1	16/04/14							
Temperature:	6°C			Rain		None		
Wind speed	Light			Cloud cover		None		
Turbidity score	4			Vegetation cover		0		
Survey constraints	Torching difficult – turbid water							
% of perimeter surveyed	50%			Other amphibians		Common toad		
Species	Egg search	Torchlight survey						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None				0	0		0
Palmate newt								0
Smooth/palmate newt								0
Species		Trap						

Pond 23								
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt								0
Smooth newt								0
Palmate newt								0
Smooth/palmate newt								0

Pond 23								
Visit 2	30/04/14							
Temperature:	11°C			Rain		None		
Wind speed	Light			Cloud cover		Overcast		
Turbidity score	4			Vegetation cover		0		
Survey constraints	Torching difficult – turbid water							
% of perimeter surveyed	50%			Other amphibians		Common toad		
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0
Species	Egg search	Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0

Pond 23								
Visit 3	14/05/14							
Temperature:	10°C	Rain			None			
Wind speed	Light	Cloud cover			None			
Turbidity score	4	Vegetation cover			0			
Survey constraints	Torching difficult – turbid water							
% of perimeter surveyed	33%			Other amphibians		None		
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt								0
Smooth newt								0
Palmate newt								0
Smooth/palmate newt								0

Pond 23								
Visit 4	27/05/14							
Temperature:	12°C	Rain			Heavy			
Wind speed	No wind	Cloud cover			Overcast			
Turbidity score	5	Vegetation cover			1			
Survey constraints	Very turbid water due to heavy rainfall - torching suspended							
% of perimeter surveyed	80%			Other amphibians		None		
Species		Trap						

Pond 23							
	Larvae	Eft	Immature	Adult			Total
				Male	Female	Unknown	
Great crested newt							0
Smooth newt							0
Palmate newt							0
Smooth/palmate newt							0

Pond 25								
Visit 1	16/04/14							
Temperature:	8°C		Rain		None			
Wind speed	Light		Cloud cover		None			
Turbidity score	3		Vegetation cover		4			
Survey constraints	Difficult to torch and trap due to steep banks, rapidly deepening water, silt and heavy algal and duckweed cover							
% of perimeter surveyed	25%		Other amphibians		None			
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt							1	
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt								0
Smooth newt					3	1		4
Palmate newt								0

Pond 25								
Smooth/palmate newt								0

Pond 25								
Visit 2	28/04/14							
Temperature:	12°C			Rain			None	
Wind speed	No wind			Cloud cover			Overcast	
Turbidity score	n/a			Vegetation cover			2	
Survey constraints	Heavy duckweed – torching ineffective. Steep banks							
% of perimeter surveyed	25%			Other amphibians			None	
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt								0
Smooth newt				2				2
Palmate newt								0
Smooth/palmate newt								0

Pond 25			
Visit 3	14/05/14		
Temperature:	10°C		Rain: None
Wind speed	Light		Cloud cover: None

Pond 25								
<i>Turbidity score</i>	1			<i>Vegetation cover</i>	4			
<i>Survey constraints</i>	Heavy duckweed cover, deep silt, steep banks							
<i>% of perimeter surveyed</i>	20%			<i>Other amphibians</i>	None			
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt								0
Smooth newt				1				1
Palmate newt					1			1
Smooth/palmate newt								0

Pond 25								
<i>Visit 4</i>	15/05/14							
<i>Temperature:</i>	9°C			<i>Rain</i>	None			
<i>Wind speed</i>	Light			<i>Cloud cover</i>	None			
<i>Turbidity score</i>	3			<i>Vegetation cover</i>	4			
<i>Survey constraints</i>	Water shrew found drowned in previous survey – cannot trap, heavy duckweed							
<i>% of perimeter surveyed</i>	20%			<i>Other amphibians</i>	None			
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	

NOT PROTECTIVELY MARKED

Pond 25								
Great crested newt	None							0
Smooth newt	None				1	1		2
Palmate newt								0
Smooth/palmate newt								0

Pond 26								
Visit 1	16/04/14							
Temperature:	6°C			Rain		None		
Wind speed	No wind			Cloud cover		None		
Turbidity score	2			Vegetation cover		3		
Survey constraints	Can only survey southern section of pond and bank by footpath due to lack of access to eastern bank, and deep water.							
% of perimeter surveyed	15%			Other amphibians		None		
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt						0		0
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt								0
Smooth newt					0	0		0
Palmate newt								0
Smooth/palmate newt								0

Pond 26								
Visit 2	28/04/14							
Temperature:	10°C	Rain			None			
Wind speed	No wind	Cloud cover			Overcast			
Turbidity score	3	Vegetation cover			3			
Survey constraints	Can only survey southern section of pond and bank by footpath due to lack of access to eastern bank, and deep water.							
% of perimeter surveyed	20%	Other amphibians			None			
Species	Egg search	Torchlight survey						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt	None						0	
Smooth newt	None						0	
Palmate newt							0	
Smooth/palmate newt							0	
Species		Trap						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt							0	
Smooth newt				2	2		4	
Palmate newt							0	
Smooth/palmate newt							0	

Pond 26			
Visit 3	14/05/14		
Temperature:	10°C	Rain	
Wind speed	Light	Cloud cover	
Turbidity score	2	Vegetation cover	
Survey constraints	Can only survey southern section of pond and bank by footpath due to lack of access to eastern bank, and deep water.		

Pond 26								
% of perimeter surveyed	20%			Other amphibians			None	
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt								0
Smooth newt				3				3
Palmate newt								0
Smooth/palmate newt								0

Pond 26								
Visit 4	28/05/14							
Temperature:	11°C			Rain			None	
Wind speed	No wind			Cloud cover			Overcast	
Turbidity score	2			Vegetation cover			3	
Survey constraints	Can only survey southern section of pond and bank by footpath due to lack of access to eastern bank, and deep water.							
% of perimeter surveyed	20%			Other amphibians			None	
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None					1		1
Smooth newt	None							0

NOT PROTECTIVELY MARKED

Pond 26								
Palmate newt								0
Smooth/palmate newt						1		0
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt								0
Smooth newt								0
Palmate newt								0
Smooth/palmate newt								0

Pond 26								
Visit 5	28/05/14							
Temperature:	13°C			Rain			None	
Wind speed	Light			Cloud cover			Overcast	
Turbidity score	3			Vegetation cover			4	
Survey constraints	Can only survey southern section of pond and bank by footpath due to lack of access to eastern bank, and deep water.							
% of perimeter surveyed	20%			Other amphibians			None	
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	

Pond 26								
Great crested newt								0
Smooth newt					5	1		6
Palmate newt								0
Smooth/palmate newt								0

Pond 26								
Visit 6	02/06/14							
Temperature:	15°C			Rain		None		
Wind speed	Light			Cloud cover		Overcast		
Turbidity score	4			Vegetation cover		3		
Survey constraints	Can only survey southern section of pond and bank by footpath due to lack of access to eastern bank, and deep water.							
% of perimeter surveyed	20%			Other amphibians		None		
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt								0
Smooth newt				3	1			4
Palmate newt								0
Smooth/palmate newt								0

Pond 27								
Visit 1	16/04/14							
Temperature:	6°C	Rain		None				
Wind speed	Light	Cloud cover		None				
Turbidity score	2	Vegetation cover		0				
Survey constraints	Trapping limited due to dangerous deep silt, access to most of perimeter limited due to dense scrub							
% of perimeter surveyed	40% torched		Other amphibians		Common frog			
Species	Egg search	Torchlight survey						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt	None						0	
Smooth newt	None						0	
Palmate newt							0	
Smooth/palmate newt							0	
Species		Trap						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt							0	
Smooth newt				1	2		0	
Palmate newt							0	
Smooth/palmate newt							0	

Pond 27			
Visit 2	24/04/14		
Temperature:	10°C	Temperature:	10°C
Wind speed	Light	Wind speed	Light
Turbidity score	5	Turbidity score	5
Survey constraints	Too turbid to torch, trapping limited due to dangerous deep silt, too much debris in pond to net, access to most of perimeter limited due to dense scrub		
% of perimeter surveyed	20% torched	% of perimeter surveyed	20% torched
Species	Trap		

Pond 27								
	Egg search	Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0

Pond 27								
Visit 3	14/05/14							
Temperature:	10°C			Rain		None		
Wind speed	No wind			Cloud cover		None		
Turbidity score	1			Vegetation cover		0		
Survey constraints	Too turbid to torch, trapping limited due to dangerous deep silt, too much debris in pond to net, access to most of perimeter limited due to dense scrub							
% of perimeter surveyed	20% torched			Other amphibians		None		
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None					1		1
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt								0
Smooth newt								0
Palmate newt								0
Smooth/palmate newt								0

Pond 27								
Visit 4	15/05/14							
Temperature:	11°C	Rain		None				
Wind speed	Light	Cloud cover		None				
Turbidity score	2	Vegetation cover		0				
Survey constraints	Silt too deep to safely trap – trapping suspended. Silt and leaf litter obscure view, steep banks, access to most of perimeter limited due to dense scrub.							
% of perimeter surveyed	40% torched		Other amphibians		None			
Species	Egg search	Torchlight survey						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt	None						0	
Smooth newt	None						0	
Palmate newt							0	
Smooth/palmate newt							0	

Pond 27								
Visit 5	27/05/14							
Temperature:	13°C	Rain		None				
Wind speed	Light	Cloud cover		Overcast				
Turbidity score	1	Vegetation cover		0				
Survey constraints	Silt too deep to safely trap – trapping suspended. Silt and leaf litter obscure view, steep banks, access to most of perimeter limited due to dense scrub.							
% of perimeter surveyed	40% torched		Other amphibians		None			
Species	Egg search	Torchlight survey						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt	None						0	
Smooth newt	None				1		1	
Palmate newt							0	

Smooth/palmate newt								0
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Pond 27								
Visit 6	30/05/14							
Temperature:	15°C			Rain			None	
Wind speed	Light			Cloud cover			Overcast	
Turbidity score	2			Vegetation cover			0	
Survey constraints	Silt too deep to safely trap – trapping suspended. Silt and leaf litter obscure view, steep banks, access to most of perimeter limited due to dense scrub.							
% of perimeter surveyed	40% torched			Other amphibians			Common toad	
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0

Pond 30								
Visit 1	15/04/14							
Temperature:	6°C			Rain			None	
Wind speed	No wind			Cloud cover			Light	
Turbidity score	3			Vegetation cover			3	
Survey constraints	Steep banks limit access to much of perimeter							
% of perimeter surveyed	25% torched			Other amphibians			None	
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	Yes				2			2
Smooth newt	None							0
Palmate newt								0

Smooth/palmate newt									0
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Pond 30									
Species		Trap							
		Larvae	Eft	Immature	Adult			Total	
					Male	Female	Unknown		
Great crested newt					3				3
Smooth newt						2			2
Palmate newt									0
Smooth/palmate newt									0

Pond 30									
Visit 2	30/04/14								
Temperature:	11°C			Rain			None		
Wind speed	Light			Cloud cover			Overcast		
Turbidity score	3			Vegetation cover			3		
Survey constraints	Steep banks limit access to much of perimeter								
% of perimeter surveyed	25% torched			Other amphibians			Common frog		
Species	Egg search	Torchlight survey							
		Larvae	Eft	Immature	Adult			Total	
					Male	Female	Unknown		
Great crested newt	n/a								0
Smooth newt	None								0
Palmate newt									0
Smooth/palmate newt						2			2
Species		Trap							
		Larvae	Eft	Immature	Adult	Total	Unknown	Total	
					Male				Female
Great crested newt			1	7	4			12	
Smooth newt								0	
Palmate newt								0	

Pond 30								
Smooth/palmate newt								0

Pond 30								
Visit 3	13/05/14							
Temperature:	11°C			Rain			None	
Wind speed	Light			Cloud cover			Overcast 90%	
Turbidity score	3			Vegetation cover			3	
Survey constraints	Steep banks limit access to much of perimeter							
% of perimeter surveyed	25% torched			Other amphibians			None	
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	n/a							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt						1		1
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt								0
Smooth newt					1	3		4
Palmate newt								0
Smooth/palmate newt								0

Pond 30								
Visit 4	14/05/14							
Temperature:	8°C			Rain			None	
Wind speed	Light			Cloud cover			None	
Turbidity score	3			Vegetation cover			3	

NOT PROTECTIVELY MARKED

Pond 30			
Survey constraints	Steep banks limit access to much of perimeter		
% of perimeter surveyed	25% torched	Other amphibians	None

Pond 30								
Species	Egg search	Torchlight survey						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt	n/a						0	
Smooth newt	None						0	
Palmate newt							0	
Smooth/palmate newt							0	
Species		Trap						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt				1	3		4	
Smooth newt							0	
Palmate newt							0	
Smooth/palmate newt							0	

Pond 30						
Visit 5	28/05/14					
Temperature:	13°C	Rain	None			
Wind speed	Light	Cloud cover	Overcast			
Turbidity score	2	Vegetation cover	3			
Survey constraints	Steep banks limit access to much of perimeter					
% of perimeter surveyed	25% torched	Other amphibians	None			
Species	Egg search	Torchlight survey				Total
		Larvae	Eft	Immature	Adult	

NOT PROTECTIVELY MARKED

					Male	Female	Unknown	
Great crested newt	n/a				1	1		0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0

Pond 30								
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt					5	3		8
Smooth newt								0
Palmate newt								0
Smooth/palmate newt								0

Pond 30								
Visit 6	29/05/14							
Temperature:	13°C			Rain		None		
Wind speed	Light			Cloud cover		Overcast		
Turbidity score	3			Vegetation cover		3		
Survey constraints	Steep banks limit access to much of perimeter							
% of perimeter surveyed	25% torched			Other amphibians		Common frog		
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	n/a							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0
Species		Trap						
				Immature	Adult			Total

		Larvae	Eft		Male	Female	Unknown	
Great crested newt					3	1		4
Smooth newt								0
Palmate newt								0
Smooth/palmate newt								0

Pond 54								
Visit 1	15/04/14							
Temperature:	7°C			Rain			None	
Wind speed	No wind			Cloud cover			None	
Turbidity score	0			Vegetation cover			4	
Survey constraints	Torching difficult due to heavy duckweed cover. Unsafe to trap all of pond due to deep silt.							
% of perimeter surveyed	75%			Other amphibians			None	
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt								0
Smooth newt								0
Palmate newt								0

Pond 54	
Visit 2	24/04/14

NOT PROTECTIVELY MARKED

Pond 54								
Temperature:	10°C	Rain	None					
Wind speed	Light	Cloud cover	None					
Turbidity score	3	Vegetation cover	5					
Survey constraints	Torching not effective due to total duckweed cover, unsafe to trap all of pond due to deep silt.							
% of perimeter surveyed	60%	Other amphibians	None					
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	

Pond 54								
Great crested newt	None						0	
Smooth newt	None						0	
Palmate newt							0	
Smooth/palmate newt							0	
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt							0	
Smooth newt							0	
Palmate newt							0	

Pond 54							
Visit 3	13/05/14						
Temperature:	13°C	Rain	None				
Wind speed	Light	Cloud cover	Light				
Turbidity score	5	Vegetation cover	5				
Survey constraints	Torching suspended due to turbid water and total duckweed cover, unsafe to trap all of pond due to deep silt.						
% of perimeter surveyed	60%	Other amphibians	None				
Species		Trap					
		Larvae	Eft	Immature	Adult		

NOT PROTECTIVELY MARKED

					Male	Female	Unknown	
Great crested newt								0
Smooth newt								0
Palmate newt								0
Smooth/palmate newt								0

Pond 54								
Visit 4	15/05/14							
Temperature:	11°C			Rain		-		
Wind speed	-			Cloud cover		-		
Turbidity score	-			Vegetation cover		-		
Survey constraints	Steep banks limit access to much of perimeter							
% of perimeter surveyed	25%			Other amphibians		None		
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt								0
Smooth newt								0
Palmate newt								0
Smooth/palmate newt								0

Pond 55								
Visit 1	15/04/14							
Temperature:	7°C			Rain		None		
Wind speed	No wind			Cloud cover		Light		
Turbidity score	3			Vegetation cover		2		
Survey constraints	Difficult to torch due to quite turbid water, heavy vegetation on banks so survey possible only from within pond.							
% of perimeter surveyed	50%			Other amphibians		None		
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total

NOT PROTECTIVELY MARKED

					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0

Pond 55								
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt					1	2		3
Smooth newt					1			1
Palmate newt								0
Smooth/palmate newt								0

Pond 55								
Visit 2	24/04/14							
Temperature:	10°C			Rain			None	
Wind speed	Light			Cloud cover			Light	
Turbidity score	3			Vegetation cover			1	
Survey constraints	Difficult to torch due to quite turbid water, heavy vegetation on banks so survey possible only from within pond.							
% of perimeter surveyed	50%			Other amphibians			None	
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None				1			1
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0

NOT PROTECTIVELY MARKED

Species		Trap						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt						1		1
Smooth newt								0
Palmate newt								0
Smooth/palmate newt								0

Pond 55								
Visit 3	13/05/14							
Temperature:	14°C			Rain		None		
Wind speed	Light			Cloud cover		Overcast		
Turbidity score	-			Vegetation cover		-		
Survey constraints	Torching suspended due to turbid water, survey possible only from within pond due to heavy vegetation on banks.							
% of perimeter surveyed	50%			Other amphibians		None		
Species		Trap						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt						4		4
Smooth newt								0
Palmate newt								0
Smooth/palmate newt								0

Pond 55							
Visit 4	15/05/14						
Temperature:	11°C			Rain		-	
Wind speed	-			Cloud cover		-	
Turbidity score	-			Vegetation cover		-	
Survey constraints	Torching suspended due to turbid water, survey possible only from within pond due to heavy vegetation on banks.						

NOT PROTECTIVELY MARKED

% of perimeter surveyed	50%	Other amphibians				None		
Species		<i>Trap</i>						
		Larvae	Eft	Immature	Adult			Tota
					Male	Female	Unknown	
Great crested newt						1		1
Smooth newt								0
Palmate newt								0
Smooth/palmate newt								0

Pond 55								
Visit 5	27/05/14							
Temperature:	12°C			Rain		Heavy		
Wind speed	None			Cloud cover		Overcast		
Turbidity score	5			Vegetation cover		2		
Survey constraints	Torching suspended due to turbid water, survey possible only from within pond due to heavy vegetation on banks.							
% of perimeter surveyed	50%			Other amphibians			None	
Species		<i>Trap</i>						
		Larvae	Eft	Immature	Adult			Tota
					Male	Female	Unknown	
Great crested newt				5	1			6
Smooth newt								0
Palmate newt								0
Smooth/palmate newt								0

Pond 55								
Visit 6	29/05/14							
Temperature:	13°C			Rain		-		
Wind speed	-			Cloud cover		-		
Turbidity score	5			Vegetation cover		2		
Survey constraints	Torching suspended due to turbid water, survey possible only from within pond due to heavy vegetation on banks.							

Pond 55								
% of perimeter surveyed	50%			Other amphibians		None		
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt				0	2		2	
Smooth newt							0	
Palmate newt							0	
Smooth/palmate newt							0	

Pond 56								
Visit 1	15/04/14							
Temperature:	7°C			Rain		None		
Wind speed	No wind			Cloud cover		None		
Turbidity score	4			Vegetation cover		1		
Survey constraints	Torching difficult due to turbid water, trap locations limited by gravel substrate.							
% of perimeter surveyed	80%			Other amphibians		None		
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None						0	
Smooth newt	None						0	
Palmate newt							0	
Smooth/palmate newt							0	
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt							0	
Smooth newt							0	
Palmate newt							0	

Smooth/palmate newt								0
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Pond 56							
Visit 2	24/04/14						
Temperature:	10°C		Rain		None		
Wind speed	Light		Cloud cover		Light		
Turbidity score	4		Vegetation cover		2		
Survey constraints	Difficult to torch due to turbid water. Trap locations limited by gravel substrate.						
% of perimeter surveyed	80%		Other amphibians		None		

Pond 56								
Species	Egg search	Torchlight survey						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt	None						0	
Smooth newt	None						0	
Palmate newt							0	
Smooth/palmate newt							0	
Species		Trap						Total
		Larvae	Eft	Immature	Adult			
					Male	Female	Unknown	
Great crested newt							0	
Smooth newt							0	
Palmate newt							0	
Smooth/palmate newt							0	

Pond 56							
Visit 3	13/05/14						
Temperature:	14°C		Rain		None		
Wind speed	Light		Cloud cover		Overcast		
Turbidity score	5		Vegetation cover		1		

Pond 56								
Survey constraints	Torching not effective due to very turbid water. Trap locations limited by gravel substrate.							
% of perimeter surveyed	20%			Other amphibians			None	
Species	Egg search	Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0

Pond 56								
Visit 4	14/05/14							
Temperature:	8°C			Rain			None	
Wind speed	Light			Cloud cover			Light	
Turbidity score	4			Vegetation cover			1	
Survey constraints	Difficult to torch due to turbid water. Trap locations limited by gravel substrate.							
% of perimeter surveyed	80%			Other amphibians			None	
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0
Species	Egg search	Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None							0
Smooth newt	None							0
Palmate newt								0

Smooth/palmate newt									0
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Pond 57			
Visit 1	14/04/14		
Temperature:	7°C	Rain	None
Wind speed	Light	Cloud cover	None
Turbidity score	3	Vegetation cover	1
Survey constraints	Access to pond perimeter limited by steep bramble covered banks.		
% of perimeter surveyed	33%	Other amphibians	None

Pond 57								
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None					2		2
Smooth newt	None							0
Palmate newt								0
Smooth/palmate newt								0
Species		Trap						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt								0
Smooth newt								0
Palmate newt							1	1
Smooth/palmate newt								0

Pond 57			
Visit 2	22/04/14		
Temperature:	10°C	Rain	None
Wind speed	Light	Cloud cover	None
Turbidity score	2	Vegetation cover	1

NOT PROTECTIVELY MARKED

<i>Survey constraints</i>	Access to pond perimeter limited by steep bramble covered banks.							
<i>% of perimeter surveyed</i>	33%			<i>Other amphibians</i>	None			
Species	<i>Egg search</i>	<i>Torchlight survey</i>						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None						0	
Smooth newt	None						0	
Palmate newt							0	
Smooth/palmate newt							0	

Pond 57								
Species		<i>Trap</i>						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt					1		1	
Smooth newt					2		2	
Palmate newt							0	
Smooth/palmate newt							0	

Pond 57								
<i>Visit 3</i>	29/04/14							
<i>Temperature:</i>	12°C			<i>Rain</i>	-			
<i>Wind speed</i>	-			<i>Cloud cover</i>	-			
<i>Turbidity score</i>	5			<i>Vegetation cover</i>	1			
<i>Survey constraints</i>	Torching not effective due to very turbid water, access to pond perimeter limited by steep bramble covered banks.							
<i>% of perimeter surveyed</i>	33%			<i>Other amphibians</i>	None			
Species		<i>Trap</i>						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt								

Smooth newt					1	1		2
Palmate newt								
Smooth/palmate newt								

Pond 57			
Visit 4	14/05/2014		
Temperature:	8°C	Rain	None
Wind speed	Light	Cloud cover	None
Turbidity score	4	Vegetation cover	1
Survey constraints	Difficult to torch due to very turbid water, trapping suspended due to drowned water shrew recorded in visit 3. Access to pond perimeter limited by steep bramble covered banks.		
% of perimeter surveyed	33%	Other amphibians	None

Pond 57								
Species	Egg search	Torchlight survey						
		Larvae	Eft	Immature	Adult			Total
					Male	Female	Unknown	
Great crested newt	None						0	
Smooth newt	None						0	
Palmate newt							0	
Smooth/palmate newt							0	

1.3.26 **Table 1.12** presents the results of the eDNA sampling from 2016. Great crested newt eDNA was detected in Ponds 20, 21, 28 and 37.

Table 1.12: eDNA survey results for ponds surveyed in 2016

Pond	Date sampled	Fera reference	GCN detection	GCN score	Inhibition	Degradation
20	09/06/16	S16-012039	Positive	7	n/a	n/a
21	09/06/16	S16-012044	Positive	9	n/a	n/a
28	09/06/16	S16-012029	Positive	3	n/a	n/a
37	09/06/16	S16-012043	Positive	12	n/a	n/a

1.3.27 Analysis was conducted in the presence of the following controls: (1) extraction blank; and, 20 appropriate positive and negative polymerase chain

reaction controls for each of the TaqMan assays (GCN, Inhibition and Degradation). All controls performed as expected.

1.4 Ornithology

a) Methodology

1.4.1 To establish the bird assemblage supported by the site, bird surveys were undertaken during both the breeding and wintering seasons. Bird surveys were undertaken on a monthly basis during the breeding season between April and June 2014 (inclusive) and between November 2014 and March 2015 (inclusive) for the wintering season. The surveys aimed to identify any important breeding/wintering birds of nature conservation interest within the site and its surroundings using transect based bird surveys.

1.4.2 The surveys were undertaken in accordance with best practice survey guidance (Ref 1.7). The same methodology (detailed below) was used for both the breeding and wintering bird surveys.

1.4.3 The surveys extended along field boundaries, tractor-tracks, woodland edges and woodland tracks within the site boundary (where land access was permitted). Particular focus was placed upon species of nature conservation importance (Schedule 1 species of the Wildlife and Countryside Act (Ref 1.8)), Red and Amber List species of Birds of Conservation Concern (BoCC) (Ref 1.9) and National Environment and Rural Communities (NERC) Act (Ref 1.10) listed species), with these species being mapped and recorded using standard British Trust for Ornithology species and behaviour codes. All other species (Green List species on BoCC) were recorded and an inventory was produced, but these records were not mapped.

1.4.4 The surveys were timed to take place during the morning, commencing approximately one hour after sunrise, with each transect lasting for approximately two hours. The surveys were timed to avoid poor weather conditions (i.e. heavy rain, mist/fog and strong winds), wherever possible. Further details regarding the timing and frequency of transect surveys, as well as the associated weather conditions, are presented below.

b) Survey timings and weather conditions

1.4.5 **Table 1.13** and **Table 1.14** provide the survey timing and weather conditions for the breeding bird and wintering bird surveys respectively.

Table 1.13: Breeding bird survey visits timings and weather conditions

Date	Start	Finish	Duration of Survey (Hours)	Weather	Wind speed (beaufort)	Wind direction	Cloud cover (octares)
16/04/2014	5:30	8:00	2:30	Fine	2	Southeast	3
01/05/2014	6:20	8:30	2:10	Sunny, overcast	0-1	Southwest	2-7
03/06/2014	5:30	7:45	2:15	Overcast, humid	1	South	8

Table 1.14: Wintering bird survey visits timings and weather conditions

Date	Start	Finish	Duration of Survey (Hours)	Weather	Wind speed (beaufort)	Wind direction	Cloud cover (octares)
11/11/14	08:25	10:10	95 MINS	Warm, overcast, windy when out of the shelter of the trees	3-4	S	8/8
05/12/14	8:10	9:35	85mins	Drizzle	0	n/a	8/8
23/1/15	8:00	9:25	85mins	Sunny, cold	0	n/a	2/8
5/2/15	7:40	9:25	85mins	Sunny	2	NE	3/8
19/3/15	6:30	8:15	90mins	Overcast	2-3	NE	8/8

c) Results

1.4.6 The results of both the breeding bird survey and the wintering bird surveys are detailed in **Table 1.15**.

Table 1.15: All bird species recorded, and peak counts recorded during the breeding and wintering bird surveys

Species	Schedule 1	Conservation status (BoCC)	NERC listed	Present in breeding season	Breeding season peak count	Present in wintering season	Wintering season peak count
Fieldfare	✓	Red List	✓			✓	3
Redwing	✓	Red List	✓			✓	7
Peregrine	✓	Green List				✓	1
Herring gull		Red List	✓			✓	30
Lapwing		Red List	✓	✓	1	✓	1
Skylark		Red List	✓	✓	9	✓	5
Song thrush		Red List	✓	✓	1	✓	2
Yellowhammer		Red List	✓	✓	4	✓	6
Bullfinch		Amber List	✓		1		
Dunnock		Amber List	✓	✓	3	✓	6
Black-headed gull		Amber List				✓	102
Common gull		Amber List				✓	44
Kestrel		Amber List				✓	1
Lesser black-backed gull		Amber List		✓	1	✓	5
Meadow pipit		Amber List				✓	1
Stock dove		Amber List				✓	1

Species	Schedule 1	Conservation status (BoCC)	NERC listed	Present breeding season	in Breeding season peak count	Present wintering season	in Wintering season peak count
Willow warbler		Amber List			2		
Blackbird		Green List		✓	4	✓	16
Blackcap		Green List		✓	3		
Blue tit		Green List		✓	4	✓	35
Buzzard		Green List				✓	1
Carrion crow		Green List		✓	1	✓	7
Chaffinch		Green List		✓	9	✓	7
Chiffchaff		Green List		✓	3	✓	23
Collared dove		Green List		✓	1	✓	1
Goldcrest		Green List		✓	1	✓	3
Goldfinch		Green List				✓	13
Great tit		Green List		✓	4	✓	23
Great spotted woodpecker		Green List		✓	2	✓	2
Greenfinch		Green List		✓	1	✓	13
Jackdaw		Green List		✓	2	✓	1
Jay		Green List		✓	1		1
Long-tailed tit		Green List				✓	10
Magpie		Green List		✓	1	✓	3

Species	Schedule 1	Conservation status (BoCC)	NERC listed	Present in breeding season	Breeding season peak count	Present in wintering season	Wintering season peak count
Moorhen		Green List				✓	2
Pheasant		Not listed		✓	2	✓	3
Pied wagtail		Green List				✓	6
Red-legged partridge		Not listed		✓	2	✓	3
Robin		Green List		✓	1	✓	16
Rook		Green List		✓	20		
Swallow		Green List		✓	4		
Whitethroat		Green List		✓	3		
Woodpigeon		Green List		✓	12	✓	45
Wren		Green List		✓	6	✓	6

1.5 Bats

a) Methodology

- 1.5.1 During the extended Phase 1 habitat and protected species survey undertaken in 2014, an external inspection of all trees on site was carried out to assess their suitability for occupancy by roosting and/or hibernating bats. Potential roost features were observed from the ground with binoculars and scrutinised for their suitability to be used by bats, alongside searching for any evidence of use, such as staining, feeding remains or droppings. The likely value of the various habitat features for foraging and commuting bats was also critically assessed.
- 1.5.2 A further detailed inspection of trees present within the site boundary of the site was undertaken on 17 May 2016 to identify the presence of potential roost features. Inspections were undertaken from the ground using binoculars to identify the presence of potential roost features as well as identifying any evidence of use (where accessible).
- 1.5.3 Activity transect surveys were undertaken across two transect routes along the site alignment on a monthly basis between May and October 2014, with the exception of October during which each transect was undertaken twice due to adverse weather during the initial dusk survey. Each transect route was undertaken simultaneously by two surveyors using Pettersson D240x time-expansion bat detectors, one listening at 35kHz and one at 50kHz. Each transect was undertaken from dusk for one and a half to two hours after sunset with the exception of the second visit in October which was undertaken for two hours prior to dawn until sunrise due to adverse weather conditions during the initial dusk survey in October. The routes for Transects 1 and 2 are illustrated on **Figure 7.9 in Annex 7A.1**.
- 1.5.4 Data collected during activity transects were analysed in BatSound by experienced analysts and a measure of relative activity in the form of the number of bat passes per hour (B/h)² calculated.
- 1.5.5 Four static detectors (Wildlife Acoustic Song Meter SM2BAT+), making full-spectrum recordings, were deployed within areas of suitable habitat (hereafter referred to as monitoring stations (MSs)). The location of these

² A measure of relative bat activity has been calculated in the form of the number of bat passes per hour. This measure has been calculated to reflect both the total number of calls experienced over a complete transect for all bat species on each survey visit, and the total number of calls by a given species over a complete transect for all survey visits undertaken in 2014, combined. It is important to note that not all areas of the transect are recorded throughout; that calculations have been based on survey effort rounded to the nearest quarter of an hour and that the passes per hour value has been provided to the nearest tenth, As such this measure of relative bat activity is an approximation.

MSs are illustrated on **Figure 7.9** in **Annex 7A.1**. Static detectors were deployed on five occasions, monthly, between June and October 2014 (see **Table 1.16** for details of survey periods). On each occasion static detectors were deployed for a period of seven consecutive nights and were set to record between 20 minutes before sunset until 20 minutes after sunrise.

Table 1.16: Static detector survey periods in 2014

Survey visit	Survey Dates
1	16 June – 23 June
2	16 July – 24 July
3	5 August – 12 August
4	9 September – 17 September
5	7 October – 15 October
1	16 June – 23 June
2	16 July – 24 July

1.5.6 Data collected during static detector surveys was analysed using SonoChiro auto-identification software and the results grouped into six species groups (barbastelle, 'big bat'³ spp., *Plecotus* spp. (assumed to be brown long-eared bat⁴), *Pipistrellus* spp⁵., *Myotis* spp., and Nathusius' pipistrelle) and the mean number of passes per night calculated for further analysis.

1.5.7 Full details of the analysis process, as well as the trials undertaken to determine the suitability of SonoChiro as an analysis method, and the manual verifications undertaken, are provided in Arcadis (Ref 1.11).

b) Results

i. Extended Phase 1 habitat and protected species survey

1.5.8 During extended Phase 1 habitat and protected species survey, six mature Oak trees were identified within a hedgerow located within the site boundary, with the potential to support roosting bats (see Target Note 4).

1.5.9 Three areas of woodland (Target Note 1, Target Note 6 and Target Note 9) were identified in land adjacent to the site boundary. Woodland at Target

³ The 'big bat' species group includes calls identified specifically to noctule or serotine as well as those identified to the 'big bat' group (noctule, Leisler's bat, and serotine).

⁴ All long-eared bat recordings are considered to relate to brown long-eared bat echolocation calls due to the absence of grey long-eared bat from Suffolk based on their current known distribution (Ref 1.12).

⁵ The *Pipistrellus* spp. group includes calls identified specifically to common or soprano pipistrelle as well as those identified to the common/soprano pipistrelle group. This group excludes calls identified as Nathusius' pipistrelle.

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Note 1 and Target Note 9 was identified as containing trees with features suitable for roosting bats in the form of rot holes, splits and flaking bark. Woodland at TN 6 was considered to have only limited potential for roosting bats; however, habitat at this location was considered to provide good foraging opportunities for bats.

- 1.5.10 A single mature Oak tree at Target Note 7 was considered to have high potential to support roosting bats, while additional trees at Target Note 2, Target Note 8 and Target Note 10 were considered to have features of limited potential to support roosting bats.
- 1.5.11 Additionally, hedgerows located at Target Note 3, Target Note 5, and Target Note 8 were considered to provide good foraging and commuting opportunities for bats.
- 1.5.12 Full details of TNs are provided in **Table 1.5** in **Section 1.2b)i** and are illustrated on **Figure 7.3** in **Annex 7A.1**.

ii. [Activity transect surveys results](#)

- 1.5.13 Two activity transects were undertaken. Transect 1 was located within the northern half of the area enclosed by the site boundary, while Transect 2 was undertaken across the southern half. Both transects included areas of land adjacent to but not within the site boundary, where this habitat was considered to be suitable for bats. The location of the transect routes along the site alignment are illustrated on **Figure 7.9** in **Annex 7A.1**.
- 1.5.14 At least six species were recorded across both transects with overall activity levels largely comparable between the two transect routes. Activity levels on Transect 1 peaked in June (16B/h) while overall activity levels were highest in July (17B/h) on Transect 2. Activity levels were noticeably reduced on both transects during both the dawn and dusk surveys undertaken in October. The results of surveys across Transects 1 and 2 are detailed, by species/species group in **Table 1.17** and **Table 1.18** respectively below.

Table 1.17: Summary of all activity recorded during activity Transect 1 in 2014

Species	Number of passes recorded per species per survey visit and survey effort (hours)							Total	Bat passes per hour (B/h) **
	22.05.14 (2.25)	17.06.14 (2)	08.07.14 (1.75)	05.08.14 (2)	08.09.14 (2.25)	09.10.14 (dawn)	09.10.14 (dusk) (2.25)		
Common pipistrelle	18	21	11	16	13	2	4	85	6.1
Soprano pipistrelle	1	2	5	4	3	5	1	21	1.5
<i>Pipistrellus</i> spp.	8	6	0	1	1	0	0	16	1.1
Barbastelle	0	1	2	4	3	0	1	11	0.8
<i>Myotis</i> spp.	1	1	0	0	3	0	0	5	0.4
Serotine	0	0	0	2	0	0	0	2	0.1
Noctule	0	1	0	1	0	0	0	2	0.1
Brown long-eared bat*	0	0	1	0	0	0	0	1	<0.1
Big bat spp.	1	0	0	0	0	0	0	1	<0.1
Total	29	32	19	28	23	7	6		
Bat passes per hour (B/h)	12.9	16	10.9	14	10.2	4.7	2.7		

*All long-eared bat recordings are considered to relate to brown long-eared bat echolocation calls due to the absence of grey long-eared bat from Suffolk based on their current known distribution (Ref 1.12, Ref 1.13)

** This calculation of B/h has been calculated across survey visits which may have experienced differences in a range of factors including weather conditions. As such, this provides only a broad indication of the level of bat activity.

1.5.15 Common pipistrelle was found to be the most frequently encountered species, recorded during all survey visits. Although activity was reduced during both October 2014 surveys, there was no clear peak in activity levels. Activity was almost exclusively recorded across the northern section of Transect 1, with a cluster of activity recorded in the vicinity of the south-eastern corner of Buckle’s Wood CWS, as illustrated on **Figure 7.10** in **Annex 7A.1**. The earliest common pipistrelle pass recorded across Transect 1 was 31 minutes after sunset, recorded during the May 2014 survey.

1.5.16 Soprano pipistrelle was the second most frequently encountered species, although at a significantly lower levels than common pipistrelle. Soprano pipistrelle was recorded during all survey visits with no clear peak in activity levels. As noted with common pipistrelle, a cluster of activity was recorded at the south-eastern corner of Buckle’s Wood CWS, as illustrated on **Figure 7.11** in **Annex 7A.1**. Low numbers of passes were recorded in the hour after

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sunset with the earliest recorded 30 minutes after sunset during the September 2014 survey.

- 1.5.17 With the exception of calls identified to the *Pipistrellus* species group (1.1B/h), all other species / species groups were recorded at extremely low levels (<1B/h). All barbastelle passes were recorded along the Buckleswood Road and the south-eastern corner of Buckle’s Wood CWS. A single pass, in June 2014, was recorded in the hour following sunset (54 minutes after sunset). Barbastelle passes are illustrated on **Figure 7.12** in **Annex 7A.1**.
- 1.5.18 Serotine passes were recorded in August 2014 only, with one recorded in the hour after sunset (49 minutes). Noctule were recorded in June and August 2014 at the northern extent of Transect 1. A single pass was recorded in the hour following sunset (45 minutes after sunset). Bat passes belonging to the ‘big bat’ group (consisting of serotine, noctule and *Nyctalus* spp.) are illustrated on **Figure 7.13** in **Annex 7A.1**.
- 1.5.19 Only low levels of *Myotis* spp. activity was recorded. The location of *Myotis* spp. passes are illustrated on **Figure 7.14** in **Annex 7A.1**.
- 1.5.20 A single brown long-eared bat pass was recorded across all survey visits. This pass at the south-eastern corner of Buckle’s Wood CWS in July 2014 was recorded 37 minutes after sunset. It is considered likely that brown long-eared bats were under-represented, due to the quiet nature of their echolocation calls.

Table 1.18: Summary of all activity recorded during activity Transect 2 in 2014

Species	Number of passes recorded per species per survey visit and survey effort (hours)							Total	Bat passes per hour (B/h)**
	22.05.14 (2)	17.06.14 (2)	08.07.14 (2)	05.08.14 (2)	08.09.14 (2.25)	09.10.14 (dawn) (1.5)	09.10.14 (dusk) (2.5)		
Common pipistrelle	17	17	19	13	14	0	0	80	5.6
Soprano pipistrelle	3	10	12	5	7	7	5	49	3.4
Barbastelle	0	0	0	1	8	0	0	9	0.6
<i>Nyctalus</i> spp.	0	0	1	5	0	0	0	6	0.4
<i>Pipistrellus</i> spp.	5	0	0	0	0	0	0	5	0.4
Noctule	0	0	0	3	0	0	0	3	0.2
Nathusius’ pipistrelle	0	0	1	0	1	0	0	2	0.1

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Species	Number of passes recorded per species per survey visit and survey effort (hours)							Total	Bat passes per hour (B/h)**
	22.05.14 (2)	17.06.14 (2)	08.07.14 (2)	05.08.14 (2)	08.09.14 (2.25)	09.10.14 (dawn) (1.5)	09.10.14 (dusk) (2.5)		
Common/soprano pipistrelle	0	1	1	0	0	0	0	2	0.1
<i>Myotis</i> spp.	0	0	0	0	1	0	0	1	<0.1
Big bat spp.	0	0	0	0	1	0	0	1	<0.1
Total	25	28	34	27	32	7	5		
Bat passes per hour (B/h)	12.5	14	17	13.5	14.2	4.7	2		

** This calculation of B/h has been calculated across survey visits which may have experienced differences in a range of factors including weather conditions. As such this provides only a broad indication of the level of bat activity.

1.5.21 As noted on Transect 1, common pipistrelle were the most frequent species recorded, although no common pipistrelle were recorded during either of the Transect 2 surveys undertaken in October 2014. Activity levels during survey visits between May and September 2014 were largely consistent with no clear activity peaks. Common pipistrelle activity was recorded across Transect 2, with clusters of activity around the wooded copse at the southern extent of the transect and along field boundaries in the north-eastern corner, as illustrated on **Figure 7.10 in Annex 7A.1**. The earliest common pipistrelle pass recorded across Transect 2 was 30 minutes after sunset during the May 2014 survey.

1.5.22 Soprano pipistrelle were the second most frequently recorded species. Soprano pipistrelle were recorded during all survey visits (and the only species recorded during either of the October 2014 surveys), with no clear peaks in activity levels. As noted with common pipistrelle, activity was recorded across Transect 2 with a cluster of activity around the wooded copse at the southern extent of the transect, as illustrated on **Figure 7.11 in Annex 7A.1**. Low numbers of passes were recorded in the hour after sunset, with the earliest recorded 24 minutes after sunset in August 2014. A further pass was recorded 29 minutes prior to sunrise during the dawn survey in October 2014.

1.5.23 All other species/species groups were recorded at extremely low levels (<1B/h). Barbastelle passes were primarily recorded during the September 2014 survey, with passes recorded across the transect. All recorded barbastelle passes were recorded over an hour after sunset. Barbastelle passes are illustrated on **Figure 7.12 in Annex 7A.1**.

- 1.5.24 Noctule were recorded in August 2014 only, with all passes recorded over an hour after sunset. Bat passes belonging to the ‘big bat’ group (consisting of serotine, noctule and *Nyctalus* spp.) are illustrated on **Figure 7.13** in **Annex 7A.1**.
- 1.5.25 Only low levels of *Myotis* spp. activity was recorded. The location of *Myotis* spp. passes are illustrated on **Figure 7.14** in **Annex 7A.1**.
- 1.5.26 Nathusius’ pipistrelle, recorded only on Transect 2, were recorded in July and September 2014 only, with the earliest pass recorded 53 minutes after sunset.
- iii. [Static detector surveys](#)
- 1.5.27 Full details of the results of static detector surveys in the form of mean number of passes per night (mppn) across the site boundary are provided in **Table 1.19**. Recorded data has been grouped into six species groups (barbastelle, Nathusius’ pipistrelle, *Myotis* spp., ‘big bat’ spp., long-eared bat spp., and pipistrelle spp.).
- 1.5.28 Peak activity levels across all survey occasions for each species group are indicated in green.

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Table 1.19: Summary of static detector results on the site in 2014

Survey dates	Monitoring location	Mean passes per night					
		Barbastelle	<i>Myotis</i> spp. *	Big Bat spp. **	Nathusius' pipistrelle ***	Pipistrelle spp. ****	Long-eared bat spp. *****
16.06.14 – 23.06.14	1	0.29	0.14	1.00	0.14	613.57	0.14
	2	2.29	1.00	0.57	1.86	623.86	0.71
	3	0.00	8.43	0.00	1.57	45.86	0.00
	4	0.14	0.57	1.57	3.29	509.86	0.00
16.07.14 – 24.07.14	1	No Data					
	2	0.38	0.50	8.25	0.13	708.50	0.00
	3	0.00	10.88	1.88	0.00	29.00	0.50
	4	0.13	1.75	2.63	0.00	811.25	0.75
05.08.14 – 12.08.14	1	6.43	2.57	0.57	0.00	142.71	0.71
	2	8.71	2.14	0.14	0.00	675.86	0.29
	3	2.29	4.43	0.71	0.00	166.86	0.57
	4	0.43	1.86	0.14	0.00	396.71	0.29
09.09.14 – 17.09.14	1	0.00	0.75	4.50	0.13	19.50	0.13
	2	8.25	2.13	7.13	0.88	600.75	1.00
	3	0.00	0.25	0.38	0.38	6.00	0.50
	4	8.33	5.83	1.83	1.67	343.67	2.67
07.10.14 – 15.10.14	1	6.25	1.25	0.38	0.75	149.63	0.13
	2	6.71	0.57	0.14	3.57	314.86	0.14



SIZEWELL C PROJECT – ENVIRONMENTAL STATEMENT

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Survey dates	Monitoring location	Mean passes per night					
		Barbastelle	<i>Myotis</i> spp. *	Big Bat spp. **	Nathusius' pipistrelle ***	Pipistrelle spp. ****	Long-eared bat spp. *****
	3	2.88	1.63	0.00	0.25	12.38	0.38
	4	1.13	0.88	0.25	0.00	17.38	0.38

* *Myotis* spp. includes those calls identified by SonoChiro specifically as Natterer's and Bechstein's in addition to those identified to a group level as *Myotis* sp.

** Big Bat spp. includes those calls identified by SonoChiro specifically as Noctule, Serotine and Northern Bat in addition to those identified to a group level as Eptesicus/Nyctulus

*** Nathusius' Pipistrelle includes those calls identified by SonoChiro specifically as Nathusius' pipistrelle in addition to those identified as Nathusius'/Kuhl/Savi pipistrelle and those as Kuhl pipistrelle but which manual checks showed to be Nathusius' pipistrelle

**** Pipistrelle Sp. includes those calls identified by SonoChiro specifically as Common and Soprano pipistrelles in addition to those identified to a group level as common/soprano pipistrelle

***** Long-eared Bats include those calls identified by SonoChiro specifically as Brown or Grey Long-eared bats in addition to those identified to a group level as Long-eared bats.

iv. Tree assessment survey

- 1.5.29 Full details of the features identified during the tree assessment survey are provided in **Table 1.20** and are illustrated on **Figure 7.8** in **Annex 7A.1**.

Table 1.20: Results of tree assessment surveys in 2016

Tree Number	Grid Reference	Tree Species and general description	Description of Feature	Potential of Feature
1	TM 4417 6396	Mature Oak 900mm diameter stem	Branch stubs with loose bark at 4m on northern side.	High
			Loose bark on secondary limb at 6m on western side.	High
			Tear out wound with partially occluded bark at approx. 8m on northern side overhanging carriageway.	High
2	TM 4421 6395	Mature Oak 800mm diameter stem	Partially occluded tear out wound at 8m on northern side, potentially extending upwards and downwards into cavity.	High
			Large complex tear-out wound on upper side of limb in central crown at 10m.	High
			Extensive loose bark.	High
3	TM 4422 6395	Mature Oak 1000mm diameter stem Twin stem at 2.5m	Snapped off limb with deadwood (120mm diameter) at 7m on south-west side with few small fissures in deadwood.	Moderate
			Fissures in bark along top of limb to where it meets the second stem. Likely to be upwards facing, exposed to weather.	Moderate
4	TM 4425 6394	Mature Oak 700mm diameter stem	Several small limbs (150mm diameter) on southern side with deadwood, missing bark, shallow cracks and fissures.	Low
			200mm diameter limb at 700mm on southern side. Deadwood and loose bark between limbs and dead spur approx. 4m along stem.	Moderate
			Two small rot holes (10-20mm) with staining on underside of north-eastern limb (100-150mm diameter) at 6m overhanging road. Probably too small for roost.	Moderate
5	TM 4428 6394	Mature Oak 1100mm diameter stem	Small patch of split bark/canther probably from vehicle impact on northern side at 2.5m.	Moderate
			Loose bark with cavity behind (approx. 120 – 200mm) doesn't extend behind bark to any great extent.	Moderate

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Tree Number	Grid Reference	Tree Species and general description	Description of Feature	Potential of Feature
			Large tear-put wound on eastern side at 8m. Partially occluded. Extensive deadwood plates in wound with potential roost features. Cavity extends inwards and upwards with potential.	High
6	TM 4940 6392	Mature Oak 1100mm diameter stem	Snapped of primary limb/torn stub on southern side at 9m. Jagged torn wood and no apparent rot. Unlikely to go into useful feature.	Low
			Several sections of partially occluded wound further up from snapped off primary limb on southern side.	Moderate
			Dead snapped limb (180mm diameter) with deadwood and loose bark at 10m on eastern side.	Moderate
			Hazard beam split (250 – 300mm long) partially occluded in a limb (180mm diameter) with a 30mm diameter branch growing through the split at 10-12m above road on northern side.	High
7	TM 4449 6388	Mature Oak 1200mm diameter stem Extensive epicormic growth throughout	Fissure (15mm x 400mm) in bark on southern side at 1.5m extending 120mm back. Fairly obstructed by epicormic growth. No evidence of use.	Low
			Multiple deadwood and tear outs at very top of canopy (12-15m), including section of rams-horning (200mm diameter by 600mm long).	High
			Several partially occluded knots around deadwood stubs at 12m on eastern side.	Moderate
8	TM 4450 6383	Semi-mature Field Maple 300mm diameter stem mostly obscured by ivy	Thick mature ivy stems (30-50mm diameter) with potential roost features between ivy.	Low- Moderate
9a	Exemplar trees from a mixed broadleaf	Semi-mature Ash (on south-east corner)	Partially occluded tear-out wound below woodpecker hole.	High
9b		Semi-mature Oak	Deadwood and loose bark.	High

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Tree Number	Grid Reference	Tree Species and general description	Description of Feature	Potential of Feature
	copse at TM 440 635	(southern edge of pond)		
9c		Semi-mature Ash Triple stem at 4m (on northern edge of dry pond)	Large partially occluded wound from tear-out.	High
9d		Mature Oak (southern side of dry pond)	Many splits and fissures in raised bark with loose bark and rot cavities on main stem.	High
9e		Semi-mature Oak Partially obscured by ivy (north of dry pond)	Raised bark/canker.	High
9f		Semi-mature Ash (15m south of large pond)	Partially occluded tear out wound facing north at 8m. Cavity extending upwards.	High
10	TM 43340 63216	Mature Oak Multi-stem after 4m Mostly obscured by ivy 1100mm diameter stem	Large knot hole with rot cavity (150mm diameter) at branch scar at 3m on western side. Extends in 250mm plus and probably up into hollow cavity in stem. Partially obscured by ivy.	High
			Dead secondary limb (150mm diameter) at 7m on eastern side. No bark, with, mostly shallow, splits and fissures in deadwood.	Low
			Splits and fissures in loose bark on co-dominant stem on eastern side at 7-12m. Multiple potential access points (20mm diameter).	High

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Tree Number	Grid Reference	Tree Species and general description	Description of Feature	Potential of Feature
			Tear out wound on top of secondary limb on north side of tree at 7-8m, partially occluded with multiple splits and fissures.	High
11	TM 43337 63205	Mature Oak Multi-stem at 3m 1200mm diameter stem	Several co-dominant stems snapped off at crown leaving large wounds with large rot-hole cavities (200 – 300mm diameter) extending into stem on east and west side.	High
			Several dead smaller limbs (150mm diameter) with small splits, fissures and flaking bark.	Moderate
12	TM 43336 63191	Mature Oak 1200mm diameter stem Totally obscured by ivy Multi-stem at 5m Extensive epicormic growth	Main and co-dominant stem obscured by ivy. Association potential roost feature below two primary limbs on southern side of tree at 7m. Large cavity (100 x 400mm and 250mm deep. Open along bottom edge with small opening at top but mostly enclosed and sheltered.	High
			Several smaller dead limbs but narrow and shallow.	Low
13	TM 43330 63181	Mature Oak 1100mm diameter Multi-stem above 5m Mostly obscured by ivy	Tear out scar on secondary limb (250mm diameter) on eastern side at 8m. Potential cavity extending down into limb.	High
			Tear out scar and deadwood in crown centre at 10m. Potential cavity extends down.	High
			Early partial split hazard beam (split not opened up) on southern side of crown at 8m.	High
			Damage wound on outer end of above limb. Partially occluded (30x120mm), potentially extending into cavity.	High
			Small knot hole in end of 100mm diameter branch on south-western side at 4m. Hole (20x25mm) extends inwards along length of branch.	High
14	TM 43327 63159	Mature Oak Extensive crown dieback	Deadwood with loose plates of bark, shallow splits and fissures above crown.	Low

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Tree Number	Grid Reference	Tree Species and general description	Description of Feature	Potential of Feature
15	TM 43316 63149	Mature Field Maple Partially dead stem (600mm diameter) truncated at 4m	Truncated stem with multiple access points with cavity extending upwards into stem blocked by leaves.	High
16	TM 43285 63069	Semi-mature Ash Multi-stem at 0m Middle stem 400mm diameter Mostly obscured by ivy	Several partially occluded wounds on limb (150mm diameter) at 4m on southern side of southern stem.	Moderate
17	TM 43620 63201	Semi-mature Oak 900mm diameter Multi-stem from 4m	Loose bark/canker on western side at 5-6m.	High
			Several other sections of deadwood/loose bark at mid and upper crown.	Low- Moderate
18	TM 43630 63215	Semi-mature Ash Multi-stem at 0m Main stem 400mm diameter	Several small pruning wounds/knotholes. One larger pruning wound/knothole on western side at 2.5m (50x60mm) extending upwards into cavity approx. 50mm.	Moderate
			Dead branch stub on north 5m, partially occluded around deadwood. Potential roost feature cavity on upper side of deadwood extending upwards around occluded bark.	Moderate
19	TM 43709 63369	Semi-mature Ash Multi-stem at 4m Immature ivy throughout crown	Numerous areas of minor deadwood above crown and small splits	Low
			Torn limb, splits and fissures at end of limb on western side at 8m.	Moderate
			Small pruning wound/knothole on 150mm diameter limb on south-eastern side of tree. Knothole on underside (20x40mm) extending inwards and upwards. Inside smooth and polished.	High
20		Mature Oak	Deadwood with small splits in minor limbs.	Low- Moderate



SIZEWELL C PROJECT – ENVIRONMENTAL STATEMENT

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Tree Number	Grid Reference	Tree Species and general description	Description of Feature	Potential of Feature
	TM 43695 63419	Multi-stem at 6m	Partially occluded tear off wound with minor rams-horning and plate of deadwood.	Low- Moderate

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VOLUME 9: CHAPTER 7, APPENDIX 7A:

ANNEX 7A.5: DRAFT BAT METHOD STATEMENT TO

SUPPORT A LICENCE APPLICATION



Bats – Method Statement template to support a licence application

The Method Statement will be used to determine the impact of the proposal on the favourable conservation status (FCS) of the species concerned (Regulation 55(9)(b)).

You are strongly advised to refer to the Bat Mitigation Guidelines.

Please use recent photographs to support your application.

Wildlife Licensing
Natural England
Horizon House
Deanery Road
Bristol
BS1 5AH.
T. 020802 61089

Important advice:

The format below must be used. Please enter text below each heading keeping information as concise as possible.

All maps/figures that will become part of any annexed licence granted must be submitted as separate documents (with the site name and date included on the map/figure. See section I for list – all others may be included within the Method Statement document (e.g. survey maps/figures) if preferred).

A separate work schedule must also be submitted on form WML-A13a-E5a&b to accompany the Method Statement.

A Executive summary

Provide an overview (no more than 1 side of A4) of what works are proposed and how the impacts identified will be addressed in order to ensure no detriment to the maintenance of the population at a favourable conservation status.

This licence application only discusses licensable activities, there is additional information on bats within the ES **Volume 9 Chapter 7**.

The construction of the Sizewell C Project would require the delivery of substantial amounts of construction materials including (but not limited to) aggregates, cement and reinforced steel and containerised goods. SZC Co. has developed proposals for the use of rail in the delivery of freight during the construction of the Sizewell C Project, reducing Heavy Goods Vehicle (HGV) movements on local roads as part of the integrated transport strategy. The proposed development would be used by SZC Co during the construction phase of the Sizewell C power station to transport materials to the Sizewell C main development site.

The proposed green rail route in its entirety comprises a temporary rail extension of approximately 4.5km from the existing Saxmundham to Leiston branch line to a terminal within the main development site. The part of the green rail route between the proposed B1122 (Abbey Road) level crossing and the terminal within the main development site.

Survey work was undertaken in 2016 to identify roosts, main commuting routes and foraging habitat, to assess potential impacts and inform the mitigation design. Survey work comprised monthly activity transects, deployment of static detectors per month, roost assessments of 20 trees. **In 20XX, updated roost surveys were completed on all trees to be removed.**

Prior to the felling of **trees x, x and x**, two bat boxes per roosting feature lost will be installed on suitable retained trees within the red line boundary as mitigation for the loss of identified roosts and/or trees with high roost potential. This will be a total of **x bat boxes**, which will be installed at a variety of aspects to provide a range of roosting conditions.

An area of woodland and scrub planting will be included as part of the rail extension in order to mitigate for the loss of tree and hedgerow habitat.

To avoid indirect impacts on bats a Construction Environmental Management Plan (CEMP) and dedicated method statement will be in place detailing sensitive working methodologies to be implemented during construction. Landscape bunds will be created to reduce the noise and lighting impacts on the retained habitats, and an environmentally sensitive lighting scheme will be developed for use at the crossing points with the

particular aim of minimising light spill onto woodland and hedgerow habitats.

The proposed development is therefore considered unlikely to adversely affect the overall favourable conservation status of bats in the local area and there will be no residual adverse impacts.

B Introduction

B1 Background to activity/development:

Include a brief summary of:

- Why the activity and a licence are necessary (*e.g. bridge structure repairs are required and will affect a known maternity roost of Daubenton's bats, which will be temporarily lost whilst works are being undertaken; renovation works to an office building will result in the permanent loss of three day roosts of common pipistrelle bats; demolition of an existing hospital to be replaced with flats will result in the loss of a brown-long eared bat maternity roost*).

Development Proposals

The proposed green rail route in its entirety comprises of a temporary rail extension of approximately 4.5km from the existing Saxmundham to Leiston branch line to a terminal within the main development site. The part of the green rail route between the proposed B1122 (Abbey Road) level crossing and the terminal within the main Sizewell C power station development site.

The construction of the Sizewell C Project would necessitate the delivery of substantial amounts of construction materials including (but not limited to) aggregates, cement and reinforced steel and containerised goods. SZC Co. has developed proposals for the use of rail in the delivery of freight during the construction of the Sizewell C Project, reducing Heavy Goods Vehicle (HGV) movements on local roads as part of the integrated transport strategy. The proposed development would be used by SZC Co. during the construction phase of the Sizewell C power station to transport materials to the Sizewell C main development site.

The green rail route consists of two parts, a temporary rail extension and rail improvement works to an existing railway branch.

The temporary rail extension is of approximately 1.8 kilometres (km) in length from the junction with the existing Saxmundham to Leiston branch line to the proposed B1122 (Abbey Road) level crossing inclusive. It would run from west to east in two main parts with two level crossings (Buckleswood Road and Abbey Road):

- Saxmundham Road to Buckleswood Road.
- Buckleswood Road to B1122 (Abbey Road).

The proposed rail improvement works are required to the existing track and level crossings on the Saxmundham to Leiston branch in order to accommodate up to three freight trains (six movements) per day once the proposed rail extension route is operational. The proposed development makes up the rail proposals for the integrated freight management transport strategy.

Once the construction of Sizewell C is complete, the proposed rail extension route will be removed and the land reinstated, however the other rail improvement works to the Saxmundham to Leiston branch would be permanent.

Justification

For the UK to meet its energy and climate change objectives, the Government believes that there is an urgent need for new energy generation plant, including new nuclear power. Nuclear power generation is a low carbon, proven technology, which is anticipated to play an increasingly important role as we move to diversify and decarbonise our sources of energy.

The Government's policy on nationally significant energy infrastructure, in particular the NPS EN-6, considers the need for and siting of new nuclear power stations at a strategic level. The location of the Sizewell site is identified in the NPS EN-6. The boundary of the nominated site includes land in the Goose and Kenton Hills and a further area to the south of Sizewell A and B power stations, between Sizewell Wents and the hamlet of Sizewell.

- Include current status of planning permission (if applicable) *e.g. full planning permission with all relevant wildlife conditions discharged; permitted development; demolition with prior notification of demolition issues resolved*. If the proposal is for demolition only of a structure supporting a bat roost/s, please confirm whether there are plans to develop the site in the future and if so when.

The project is a Nationally Significant Infrastructure Project. An application has been submitted to the Planning Inspectorate and will be determined by the Secretary of State for Energy. This method statement is part of a draft licence application to assure Natural England that the proposed development's impact on bats has been considered in detail and that the mitigation proposed will be sufficient to ensure the favourable conservation status of bats.

B2 Relationship with other nearby development and cumulative impacts

B2.1 Is the current application part of a larger development project? For example, is it part of a phased or multi-plot housing development that will require more than one bat licence? Enter Yes, No or N/A in the text box below. If yes, note a separate **master plan** document will be required.

Yes

Important Advice: If yes to the above, please note that sections in [this](#) Method Statement on impact assessment and mitigation measures must explicitly relate *only* to impacts from the works currently proposed.

A project-wide master plan must detail the overall impact assessment and mitigation and explain where, and why, each of the bat licences will be required. The master plan must be included as a separate document to this application: see http://www.naturalengland.org.uk/Images/WML-G11_tcm6-9930.pdf for details that are to be included in this separate document. The separate master plan is expected to take due regard of the overall project to ensure that in-combination effects are considered, and mitigation and compensation measures are both sufficient and coherent.

If the current development is part of a larger development project, summarise very briefly here how the current application relates to the larger project and how the in-combination effects are considered and mitigation/compensation is sufficient.

The construction of the Sizewell C Project would require the delivery of substantial amounts of construction materials including (but not limited to) aggregates, cement and reinforced steel and containerised goods. SZC Co has developed proposals for the use of rail in the delivery of freight during the construction of the Sizewell C Project, reducing Heavy Goods Vehicle (HGV) movements on local roads as part of the integrated transport strategy. The proposed development would be used by SZC Co. during the construction phase of the Sizewell C power station to transport materials to the Sizewell C main development site. There are a suite of associated Environmental Impact Assessments associated with the overall scheme delivery, this includes:

- Sizewell B Relocated Facilities;
- Sizewell C Main Development Site;
- Northern Park and Ride;
- Southern Park and Ride;
- Two Village Bypass;
- Sizewell Link Road;
- Yoxford and other Highway Improvements;
- Freight Management Facility; and
- Green Rail Route and other Rail Improvements.

The project wide masterplan is presented in Figure B2.1 TBC 20XX

Important Advice: to accompany this Method Statement also include Figure. B2.1 for a Master plan overview - and see section I "Map checklist" at the end of this document.

B2.2 Apart from any mention in B2.1, please inform us of any past or future development or other projects (in the last 5 years or next 5 years) in the vicinity which may have significantly impacted or are likely to significantly impact on the same population/s of bats as this application (e.g. loss of maternity or hibernation roosts). You must make reasonable efforts to establish this, including discussions with your client and the Local Planning Authority – stating below what you undertook. A brief summary of the project/s should be provided including the site name and location, dates and if known the licence reference number(s).

Please note we are not expecting details of every licence/planning permission issued within the vicinity of the site – we are only concerned with projects that have the potential to significantly impact or have impacted on same population of bats (maternity and hibernation roosts). Note: Natural England is aiming to make available licensing records from the last 5 years publically available.

Data from MAGIC (Ref 1) shows eight bat disturbance licences that have been granted in relation to bat roosts

within 5km of the Scheme. Seven of these were non-maternity roosts. These are as follows:

- 2015-8754-EPS-MIT – brown long-eared (*Plecotus auritus*), Daubenton's (*Myotis daubentonii*) and Natterer's (*Myotis nattereri*) (approximately 1.1km North-east of the Scheme)
- EPSM2009-919 – brown long-eared (approximately 4.3km South of the Scheme)
- EPSM2009-724 – common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle (*Pipistrellus pygmaeus*), whiskered (*Myotis mystacinus*), Brandt's (*Myotis brandtii*), Daubenton's, brown long-eared and Natterer's (approximately 3.5km West of the Scheme)
- 2014-3688-EPS-MIT – common pipistrelle, Natterer's, noctule (*Nyctalus noctula*) and soprano pipistrelle (approximately 2.7km South-east of the Scheme)
- EPSM2013-6257 – brown long-eared, Daubenton's and Natterer's (approximately 1km North-east of the Scheme)
- EPSI2012-5178 – common pipistrelle, soprano pipistrelle, noctule and Natterer's (approximately 2.7km South-east of the Scheme)
- EPSM2012-3980 – barbastelle (*Barbastella barbastellus*) (approximately 4.7km North of the Scheme)
- 2017-30648-EPS-MIT – Daubenton's (approximately 3.6km South-west of the Scheme)

The remaining licence was for the destruction of a maternity roost:

- EPSM2011-2867 – brown long-eared (approximately 4.3km North of the Scheme)

None of these licences are related to the Sizewell site. All of these licence applications are of a sufficient distance from this scheme, the closest being 1km, that is it unlikely to have a detrimental effect on these roosts. The licences are shown on Figure B2.2.

Important Advice: locations of other bat mitigation sites that may have significantly impacted or are likely to significantly impact on the same population/s of bats as this application must be shown on Figure B2.2.

C Survey and site assessment (also see section 5 of the Bat Mitigation Guidelines)

C1 Pre-existing information on the bat species at the survey site:

Please undertake a historical data search within a 2km search radius and provide a summary of the results of this search. For example, records from local environmental records centres, local bat groups and previous survey work undertaken at the site is all relevant. Please briefly comment on the results in relation to your project/site

- Should no historical records be found from your search please state this – and specify what searches you undertook.
- Note that you must not include records from National Biodiversity Network (NBN) without first obtaining written permission from the relevant Data Provider.

Records were requested from Suffolk Biodiversity Information Service (SBIS) in December 2014 and those of protected or otherwise notable species of conservation interest within 2km of the site were obtained. A further desk-study data request was made to SBIS in March 2016 for bat records within 10km of the site to take into account the Core Sustainance Zones. **THE RECORD INFORMATION SHOULD BE UPDATED IN 20XX.**

The desk-study identified 93 records of bat species within the species-specific Zones of Influence's (ZoI). Species recorded comprised Daubenton's bat, Natterer's bat, noctule, common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, serotine, barbastelle and brown long-eared bat. Records were also identified for unspecified species within the *Myotis* spp. and *Pipistrellus* spp. groups.

Forty-five records, for eight species (Daubenton's bat, Natterer's bat, noctule, common pipistrelle, soprano pipistrelle, serotine, barbastelle and brown long-eared bat) as well as an unspecified *Pipistrellus* spp. were identified relating to bat roost locations, with further information identifying four of them as breeding roosts. None of the roost records were located within 500m of the site, with the closest roost records located approximately 520m to the south within Leiston (a common pipistrelle roost). Breeding roosts were identified within the relevant Zols for Natterer's bat, soprano pipistrelle, brown long-eared bat, and an unidentified *Pipistrellus* spp. with the

closest located 1.1km to the north-east within Upper Abbey Farm (Natterer's bat) though breeding has not been recorded in every year.

None of the remaining 47 activity records were identified within the site boundary, with the closest record, for a common pipistrelle, located approximately 600m to the south within Leiston.

It is likely that the multiple surveys undertaken as part of the EDF Sizewell applications are the most up to date information from the area.

C2 Status of the bat species: Detail conservation status at the local, county and regional levels. Please complete the following table, justifying your assessment, and add additional lines where necessary. If the status is unknown then please enter 'unknown'.

Species	Conservation status assessment		
	Local	County	Regional
Daubenton's	Rare NEED TO SEE 20XX RESULTS TO MAYBE UPDATE ALL SPECIES	Widespread and locally common in Suffolk (Ref 2)	Widespread in the UK Least Concern (Ref 3)
Natterer's	Rare	Widespread but uncommon in Suffolk	Nationally common, widespread in the UK Least Concern
Noctule	Rare	Widespread but uncommon in Suffolk	Common in England Least Concern
Leisler's	Rare	Rare and Uncommon in Suffolk	Nationally Rare Near Threatened
Common pipistrelle	Common	Common and widespread in Suffolk	Common and widespread in the UK Least Concern
Soprano pipistrelle	Common	Common and widespread in Suffolk	Common and widespread in the UK Least Concern
Nathusius' pipistrelle	Rare	Rare in Suffolk	Uncommon in the UK Near Threatened
Serotine	Rare	Uncommon but widespread in Suffolk	Uncommon but widespread in UK Vulnerable
Barbastelle	Frequent	Widespread but uncommon in Suffolk.	Nationally rare Vulnerable
Brown long-eared	Rare	Common and widespread in Suffolk	Common and widespread in UK Least Concern

* **Please note** that you can add more rows to the table: right click in any cell choose Insert > Insert rows below.

C3 Objectives of the survey to inform this proposal: Please complete the following table, entering 'Yes', 'No' or 'N/A' to indicate the objective of your survey and provide comments/explanation where necessary:

Survey objective	Yes / No / N-A	Comments
Determine presence / absence of bats	Yes	Ground Tree Assessments followed by Aerial Inspections
Determine bat usage of site (e.g. maternity, hibernation, night roosts in various structures (specify)).	Yes	Transect activity and static monitoring surveys across the active season
Identify foraging, commuting or swarming sites (explain)	Yes	Transect activity and static monitoring surveys to identify key commuting and foraging areas across the site
Other (explain)	N/A	

C4 Site/habitat description: Please provide:

- Brief descriptions of the site, including total size of the development site (ha) (most often within the red line planning boundary) and areas of the site with potential value to bats (ha).

The survey area consisted of the entire alignment of the proposed development, with a 100m buffer either side of the alignment where access was possible.

The part of the green rail route comprising a temporary rail extension of approximately 1.8 kilometres (km) in length from the junction with the existing Saxmundham to Leiston branch line to the proposed B1122 (Abbey Road) level crossing inclusive. This section of the development includes the section from Saxmundham Road to Buckleswood Road and the section from Buckleswood Road to B1122 (Abbey Road).

This area includes the hardstanding of the carriageways, arable fields, hedgerows and discrete woodlands. It is approximately 22.4 hectares in size.

The location of the site is shown on Figure C5a

- Brief descriptions of the structures on site, differentiating between **those surveyed** and **not surveyed**, with an explanation why. Ensure structures are referenced and consistently indicated on relevant figures and tables.

Within the site boundary, 16 trees were identified with bat roost potential (ten of high potential, three of moderate potential, two of low-moderate potential, and one of low potential). The trees are presented on Figure C4b.

- A description of adjacent areas/offsite habitats, specifying any relevance to bats, including descriptions of habitat/s relevant to bat commuting/foraging behaviour.

Three areas of woodland were identified in land adjacent to the red line boundary. Two of the woodlands were identified as containing trees with features potentially suitable for roosting bats in the form of rot holes, splits and flaking bark. The other woodland was considered to have only limited potential for roosting bats; however, habitat at this location was considered to provide good foraging opportunities for bats.

Additionally, hedgerows located in proximity to the development were considered to provide good foraging and commuting opportunities for bats.

The habitats are shown on Figure C5c.

- Please also include annotated (cross reference the structures) and dated photographs (showing both internal and external survey areas) as these are very useful as an assessment aid. These can be inserted below or submitted as a separate (referenced) document.

Additional survey results are presented in Annex C4. – **TBC 20XX SURVEYS**

C5 Field survey(s):

Surveys must be up to date and have been conducted within the current or most recent optimal season. Surveys must be undertaken in accordance with the most up to date edition of the Bat Conservation Trust (BCT) *Bat Surveys for Professional Ecologists – Good Practice Guidelines* and the *Bat Mitigation Guidelines*.

C5a Justification for surveys that deviate from the best practice guidelines: Please provide full justification below if your surveys deviate from the aforementioned best practice guidelines, confirming how you have obtained a full appreciation of the bat species roosting at the site, and of the type and status of roosts they use on site and in the context of the immediate surrounding area. **Please note that inadequate survey information is likely to cause delays to your licence application and may result in a Further Information Request.**

N/A

C5b Please complete the following tables and add additional lines where necessary (*right click in any cell outside the grey box area. Choose Insert > Insert rows below*). Please enter 'N/A' if the table is not applicable to your survey. Please ensure the information is consistent with Figure **C5b** (showing all buildings, structures and habitats that are within the survey area and distinguishing those that were surveyor and those that were not; indicate where surveyors were located):

Visual inspection

Date of each survey visit (e.g. format 01/06/13)	Structure reference / location	Equipment used (e.g. binoculars, endoscope)	Weather – (Include temps, precipitation, Beaufort wind scale etc)
17 May 2016	All Trees	binoculars	NEED TO UPDATE IN 20XX
Comments (to include # of surveyors used for each visit): 2 surveyors – Trees assessed from ground			
Comments:			
Comments:			
Comments:			

Please provide surveyors names (including Class Licence registration number if applicable) and ensure the above table states the number of surveyors used for each survey visit undertaken.

NEED TO UPDATE WITH 20XX

Dusk survey

Date of each survey visit (e.g. format 01/06/13)	Start and end times and time of sunset	Structure reference / location	Equipment used (include make of bat detectors and logging equipment)	Weather – (Include start and end temps, precipitation, Beaufort wind scale etc)
NEED TO ADD 20XX RESULTS				
Comments (to include # of surveyors used for each visit):				
Comments:				
Comments:				
Comments:				

Please provide surveyors names (including Class Licence registration number if applicable) and ensure the above table states the number of surveyors used for each survey visit undertaken.

Dawn survey

Date of each survey visit (e.g. format 01/06/13).	Start and end time and time of sunrise	Structure reference / location	Equipment used (include make of bat detectors and logging equipment)	Weather – (Include start and end temps, precipitation, Beaufort wind scale etc)
NEED TO ADD 20XX RESULTS				
Comments (to include # of surveyors used for each visit):				
Comments:				
Comments:				
Comments:				

Please provide surveyors names (including Class Licence registration number if applicable) and ensure the above table states the number of surveyors used for each survey visit undertaken.

'Other' survey (please specify e.g. trapping, remote, etc)

Date of each survey visit (e.g. format 01/06/13).	Start and end times	Structure reference / location	Equipment used (include make of bat detectors and logging equipment)	Weather – (Include start and end temps, precipitation, Beaufort wind scale etc)
22/05/2014 NEED TO UPDATE TO 20XX RESULTS		Transect 1	Pettersson detectors and Roland audio recorders	
Comments (to include # of surveyors used for each visit):				
17/06/2014		Transect 1	Pettersson detectors and Roland audio recorders	
Comments:				
08/07/2014		Transect 1	Pettersson detectors and Roland audio recorders	
Comments:				
05/08/2014		Transect 1	Pettersson detectors and Roland audio recorders	
Comments:				
08/09/2014		Transect 1	Pettersson detectors and Roland audio recorders	
Comments:				
09/10/2014 (dawn)		Transect 1	Pettersson detectors and Roland audio recorders	
Comments:				
09/10/2014 (dusk)		Transect 1	Pettersson detectors and Roland audio recorders	
Comments:				
22/05/2014		Transect 2	Pettersson detectors and Roland audio recorders	
Comments:				
17/06/2014		Transect 2	Pettersson detectors and Roland audio recorders	
Comments:				
08/07/2014		Transect 2	Pettersson detectors and Roland audio recorders	
Comments:				
05/08/2014		Transect 2	Pettersson detectors and Roland audio recorders	
Comments:				
08/09/2014		Transect 2	Pettersson detectors and Roland audio recorders	
Comments:				
09/10/2014 (dawn)		Transect 2	Pettersson detectors and Roland audio recorders	
Comments:				
09/10/2014 (dusk)		Transect 2	Pettersson detectors and Roland audio recorders	
Comments:				

Please provide surveyors names (*including Class Licence registration number if applicable*) and ensure the above table states the number of surveyors used for each survey visit undertaken.

NEED TO UPDATE FOR 20XX

Please explain any constraints on the survey/s undertaken (time of year, cold weather, refused access, safety issues preventing access etc – justify as necessary and include evidence where required). If access was refused please provide evidence (letter/email) to demonstrate this.

NEED TO UPDATE FOR 20XX

Also complete the following:

- If DNA analysis of droppings has been undertaken, please indicate below (Yes, No, N/A) and ensure that **Figure C5b** (if applicable – see below) details the locations where the samples were taken. Where long-eared bats are detected but cannot be identified to species level visually, DNA analysis of any droppings will be needed where grey long-eared bats may be present.

N/A

- Please confirm that a walk over survey/check has been carried out within 3 months *prior* to application submission by a suitably experienced ecologist to ensure that conditions have not changed since the most recent survey was undertaken. Provide details of any changes to conditions and habitats and/or structures on site since the surveys were undertaken.

Date of walkover survey/check	
Details of any changes to conditions and habitats and/or structures, if there are no changes please insert 'None'	

C6 Survey results: Summarise your findings in the tables below and cross reference to **Figure C6** (which must also include flight lines, access points, dimensions of existing roosts etc). If you did not undertake a specific survey type please add N/A to the relevant table/s. Raw data is to be appended to the Method Statement (including sonograms, DNA analysis results etc).

Roost types to be referenced as: *Day, Night, Feeding Perch, Transitional, Satellite, Maternity, Hibernation confirmed, Foraging Area, Commuting Route, Swarming Site, Other.* See end of document for “Definitions” of these roosts.

When completing “**Notes/observations**” include reference to *direct observations, extent and age of droppings, presence of field signs, emergence or re-entry, echolocation analysis.* Also include DNA results if applicable and include nil results)

Visual inspection results

Date (e.g. format 01/06/13)	Species and numbers	Roost type (to be consistent with the above listed types)	Structure reference (consistent with relevant figures and other text)	Roost location	Access points (include # of them)	Dimensions of existing roosts or explanation of where the roost is (as appropriate)
17/05/2016	n/a	n/a	1	TM 4417 6396	3 potential features identified	n/a
Notes/observations:						
17/05/2016	n/a	n/a	2	TM 4421 6395	3 potential features identified	n/a
Notes/observations:						
17/05/2016	n/a	n/a	3	TM 4422 6395	2 potential features identified	n/a

Notes/observations:						
17/05/2016	n/a	n/a	4	TM 4425 6394	3 potential features identified	n/a
Notes/observations:						
17/05/2016	n/a	n/a	5	TM 4428 6394	3 potential features identified	n/a
Notes/observations:						
17/05/2016	n/a	n/a	6	TM 4940 6392	4 potential features identified	n/a
Notes/observations:						
17/05/2016	n/a	n/a	7	TM 4449 6388	3 potential features identified	n/a
Notes/observations:						
17/05/2016	n/a	n/a	8	TM 4450 6383	1 potential feature identified	n/a
Notes/observations:						
17/05/2016	n/a	n/a	9	Exemplar trees from a mixed broadleaf copse at TM 440 635		n/a
Notes/observations:						
17/05/2016	n/a	n/a	10	TM 43340 63216	4 potential features identified	n/a
Notes/observations:						
17/05/2016	n/a	n/a	11	TM 43337 63205	2 potential features identified	n/a
Notes/observations:						
17/05/2016	n/a	n/a	12	TM 43336 63191	2 potential features identified	n/a
Notes/observations:						
17/05/2016	n/a	n/a	13	TM 43330 63181	5 potential features identified	n/a
Notes/observations:						
17/05/2016	n/a	n/a	14	TM 43327 63159	1 potential feature identified	n/a
Notes/observations:						
17/05/2016	n/a	n/a	15	TM 43316 63149	1 potential feature identified	n/a
Notes/observations:						
17/05/2016	n/a	n/a	16	TM 43285 63069	1 potential feature identified	n/a
Notes/observations:						
17/05/2016	n/a	n/a	17	TM 43620 63201	2 potential features identified	n/a
Notes/observations:						
17/05/2016	n/a	n/a	18	TM 43630 63215	2 potential features identified	n/a
Notes/observations:						

17/05/2016	n/a	n/a	19	TM 43709 63369	3 potential features identified	n/a
Notes/observations:						
17/05/2016	n/a	n/a	20	TM 43695 63419	2 potential features identified	n/a
Notes/observations: 9 and x outside work footprint so no further survey required X, x and x – Assessed overall as offering Low potential for roosting bats X, x, and x – Assessed overall as offering Moderate potential for roosting bats. CLIMBING SURVEYS UNDERTAKEN IN 20XX X, x and x – Assessed overall as offering High potential for roosting bats. CLIMBING SURVEYS UNDERTAKEN IN 20XX NEED TO UPDATE WITH 20XX RESULTS						

Provide further (brief) comments/explanation if required:

Survey results are shown on Figure C6a

Dusk survey results

Date (e.g. format 01/06/13)	Start and end times	Species and numbers	Roost type (to be consistent with the above listed types)	Structure reference (consistent with relevant figures and other text)	Roost location	Access points (include # of them)	Dimensions of existing roosts or explanation of where the roost is (as appropriate)
N/A							
Notes/observations:							
Notes/observations:							
Notes/observations:							
Notes/observations:							

Provide further (brief) comments/explanation if required:

Dawn Survey results

Date (e.g. format 01/06/13)	Start and end times	Species and numbers	Roost type (to be consistent with the above listed types)	Structure reference (consistent with relevant figures and other text)	Roost location	Access points (include # of them)	Dimensions of existing roosts or explanation of where the roost is (as appropriate)
N/A							
Notes/observations:							
Notes/observations:							
Notes/observations:							
Notes/observations:							

Provide further (brief) comments/explanation if required:

'Other' results – please specify.

Date (e.g. format 01/06/13)	Species and numbers	Roost type (to be consistent with the above listed types)	Structure reference (consistent with relevant figures and other text)	Roost location	Access points (include # of them)	Dimensions of existing roosts or explanation of where the roost is (as appropriate)
n/a						
Notes/observations:						
Notes/observations:						
Notes/observations:						
Notes/observations:						

Provide further (brief) comments/explanation if required:

No roosts were identified from transect or static surveys, though survey work did indicate the likely presence of a soprano pipistrelle roost in close proximity to the site.

NEED TO UPDATE WITH 20XX RESULTS

C7 Interpretation/evaluation of survey results (also see the Bat Mitigation Guidelines section 5.8 and Figure 4 for conservation significance of roost type): Please complete the following table:

Structure reference (ensure consistency with other text and Figures)	Species	Count / estimate of number of individuals	Roost location	Site status assessment (e.g. maternity, feeding roost, swarming site, hibernation confirmed etc)	Conservation significance of roost
NEED TO UPDATE WITH 20XX RESULTS					

Provide further (brief) comments / explanation if required:

Important Advice:

Survey maps that must be included in this section of the Method Statement, or as separate documents if preferred, are listed in *section I "Map checklist" at the end of this document.*

Insert survey figures, photographs etc below here if not submitting them as separate documents

D Impact assessment in absence of mitigation or compensation for each species / roost type

(also see section 6 of the Bat Mitigation Guidelines). Where appropriate you must take into consideration cumulative impacts of your proposals on the bat species and populations identified in your survey in each section.

Guidance on quantifying roosts for the purpose of licensing: To be considered the same roost, the locations need to have the same **functional** and **qualitative** (e.g. physical) characteristics, be used by the **same species** for the **same purpose** (e.g. day roosting) and be within the **same building / structure**. If the physical characteristics are different (e.g. one roost is in external crevices in the wall and the other is in the roof void against internal timbers) then they should be considered different roosts - because they offer bats different roosting opportunities. If the physical characteristics are similar and provide the same functional characteristics, used by the same species for the same purpose (e.g. transitional roost) but with different individual roosting locations within the overall building /

structure, that could be considered one transitional roost. If two species are using an area which provides the same characteristics, for the same function, it is still two roosts - as there are two species.

D1 Initial impacts: The impact/s of activities undertaken on site pre-development and during works must be considered and explained. **Consider disturbance** (such as human presence, noise, vibration, dust, lighting, access obstruction due to scaffolding and plastic sheeting etc), **temporary damage and temporary loss of roosts and injuring/killing.**

E.g. Unsupervised contractor removing roof tiles has the potential to crush 3 common pipistrelle bats using the roof tiles as day roosts. Major negative impact at a site level; Demolition of an extension to a building will take place adjacent to a maternity roost of common pipistrelle bats situated under the soffit board of the retained building. Potential for significant disturbance if demolition works are undertaken during the maternity period through vibration, noise and dust. Medium negative impact on a local level.

Unsupervised, non-sensitive felling of the trees has the potential to kill any bats roosting in the trees at the time of felling. Major negative impact at a site level.

Loss of immediate habitat surrounding trees. Minor negative impact at a site level.

The transect and static surveys identified low levels of bat activity for most species. The activity was mainly associated with the hedgerows and woodland habitat. The narrow footprint of the works in these habitats means that these existing flight lines will not be affected by the works and the proposed railway extension will not sever any existing important flight lines.

It would be good practice to keep additional lighting in this area task-focused to avoid light spill, particularly avoiding lighting the woodland and hedgerow habitats.

Confirm number of roosts to be damaged: **SURVEYS TO BE COMPLETED 20XX**

D2 Long-term impacts: Consider and explain the impacts of the proposed works on the different species populations at a site, local, regional, and national level.

D2.1. Roost modification: e.g. changes to roosts/access points, new entrances (including human access e.g. for servicing/maintenance etc), change in size of roost space, changes in air flow, temperature and humidity, light etc. Please detail the access points into each roost and the type/s of roosts which will be modified.

E.g. Non-mitigated changes to the roof structure, which requires replacing, will lead to the modification of 3 access points into a common pipistrelle maternity roost which will result in bats being unable to enter or exit the roost. Moderate negative impact on a local level.

N/A

Confirm number of roosts to be modified: **n/a**

D2.2. Roost loss: Loss or deterioration of roosting sites, access points, habitat, etc must be considered. Please detail the access points into each roost and types of roost/s which will be lost.

E.g. Demolition of building reference X in June will lead to the loss of a night roost in the porch used by 1 lesser horseshoe bat and the loss of a maternity brown-long eared bat roost in the loft space. This will lead to the death and/or injury of bats including dependent young and permanent destruction (loss) of both roosts. Moderate negative impact at a site level for lesser horseshoe bats and moderate negative impact at a local level for brown-long eared bats.

Felling of **x, x, x and x** will lead to the permanent loss of **x day roosts** and could result in the death and/or injury of bats. Based on the Bat Mitigation Guidelines, the permanent loss of day roosts used by low numbers of non-breeding bats at times of year excluding hibernation is of low negative impact. In the absence of mitigation, the loss of these roost sites will be significant at local level only.

TO BE UPDATED WITH 20XX RESULTS

Confirm number of roosts to be destroyed: **x**

D2.3. Fragmentation and isolation: Will the proposed works results in these impacts? E.g. loss of linear features such as hedges, tree lines, increased lighting, severance of flight lines by roads/rail lines, separation of breeding/hibernation sites from feeding grounds, etc.

E.g. In addition to the removal of common pipistrelle day roosts in trees along the proposed road, removal of hedgerows, shown on Figure D, and the construction of the new road will fragment a significant commuting and foraging route for a lesser horseshoe maternity roost. This may cause a reduction in the

long term success of the breeding colony of lesser horseshoes by restricting existing foraging range or killing bats on the road. Potentially major negative impact at a site and local level.

There is no predicted fragmentation or isolation issue relating to development as existing habitat links outside of the order limits will be retained.

The initial loss of habitat will have a minor negative impact at a site level; however, as the habitat being lost is primarily arable fields which offer little value to bats, fragmentation and isolation will be minimal.

D3 Post-development interference impacts: e.g. extra street lighting or other external lighting, use of loft space as storage, increased noise. Please also consider other direct or indirect post development impacts which may include disturbance/ injuring/killing.

E.g. Security lighting being installed will shine on the brown-long eared bat maternity roost access points which may affect emergence patterns and lead to a reduction in foraging times. This may cause a reduction in the long term success of the breeding colony or cause the roost to be abandoned. Moderate to high negative impact at a site and local level.

The proposed development will involve an increase in noise levels in the area for the duration of the Sizewell C construction. The area is currently unlit, as such there will be a decrease in dark areas in the vicinity to the roost locations. Operational lighting would be limited to the B1122 (Abbey Road) level crossing and the level crossing at Buckleswood Road. The remaining rail route extension would be unlit. The lighting design would use light fittings chosen to limit stray light.

Once the Sizewell C construction works are completed the area will be reinstated. Overall the post-development interference will have a minor negative impact at a site level.

D4 Predicted scale of impact of this development/activity on species status (also see section 6.5 of the Bat Mitigation Guidelines and the BCT's Bat Survey Good Practice Guidelines): Please complete the following table to explain what this is likely to be at the site, local/county and regional levels for each roost type and species. Add additional lines when necessary

Roost types to be referenced as: Day, Night, Feeding Perch, Transitional, Satellite, Maternity, Hibernation confirmed, Foraging Area, Commuting Route, Swarming Site, Other.

Species and Numbers (which will be affected at the time works will be undertaken)	Roost type	Predicted scale of impact (<i>place X in relevant column</i>)			Notes (include impact on roost – damage / destruction /modification etc)
		Site	County	Regional	
					Needs to be completed once we have confirmed if any roosts are present on site

****Please note** that you can add more rows to the table: right click in any cell outside the grey box area. Choose Insert > Insert rows below.

Provide further comments/explanation as required (this helps understand how the impacts will be mitigated or compensated for when assessing section E):

No additional pressures on roosting bats are anticipated during the operation of the proposed development.

Mitigation provided during the operation of the proposed development for potential roosting features lost during construction will result in a net increase of roosting availability in the area. Potential roosting features exist in the wider landscape, such as in the nearby buildings and trees. The increase in roost availability will therefore be slight at the local scale.

In addition to the loss of roosts, the proposed development will lead to the removal of limited hedgerow habitats which may cause the displacement of a small number of foraging or commuting bats from the immediate area.

The habitats to be lost during construction are typical of the wider area and therefore represent only a small

reduction in the available habitats during construction. The habitats are connected to the wider landscape via a network of hedgerows and watercourses so fragmentation during construction would be limited in extent. All the hedgerow habitat removed during construction would be replaced during the removal and reinstatement phase.

Important Advice:

Please ensure that a separate 'Impact map' is provided ([Figure D](#)) which must show all structures or habitats (clearly referenced) that will be disturbed, damaged or destroyed, detailing where the roosts and access points are etc. Also see *section 1 "Map checklist" at the end of this document.*

E Mitigation and Compensation (please also see section 7 and 8 of the Bat Mitigation Guidelines)

E1 Please explain why this design was chosen over other potential solutions - set out what other designs were considered and why they were not feasible (e.g. if the proposal is to construct a new stand-alone roost, explain why it is not possible to retain the roost in the existing structure etc). The mitigation solution being proposed in the method statement should be the one that delivers the 'need' with the least impact on the bat population.

The design of the rail extension has been through a number of iterations to ensure that the selected route option meets the objectives of the development which include reducing / minimising the impact on the wider environment. It has been positioned to avoid impacting any of the woodlands and to limit the impact on the hedgerows.

The proposed development uses environmental barriers (earth bunds) to reduce noise levels and has integrated landscaping to soften the visual impact. The design includes SuDs which will form part of the drainage strategy of the development.

The final design required the felling of xx trees which are unavoidable, but the design will retain the majority of the suitable roosting habitat in the vicinity. In addition, there will be some woodland and scrub planting to the north-east of the site see [Figure E1](#).

E2.2 Capture and release (if applicable):

Please confirm that you agree to undertake the following procedures for the capture and exclusion of bats, where these are applicable:

- a. The use of endoscopes, artificial light from torches, destructive search by soft demolition (see Definitions), temporary obstruction of roost access, temporary or permanent exclusion methods (including installation) and use of static hand held nets must only be undertaken or directly supervised by the Named Ecologist, or an Accredited Agent.
- b. Where capture and/or handling of bats are necessary, only the Named Ecologist, Accredited Agent, or an Assistant directly supervised by the Named Ecologist may do so. Capture/handling/exclusion of bats must only be undertaken in conditions suitable for bats to be active.
- c. Where bats are discovered and taken (excluding unexpected discoveries during adverse weather conditions) they must either be relocated to an alternative roost (see Definitions) suitable for the species, or where bats are held this must be done safely and bats released on site at dusk in, or adjacent to, suitable foraging/ commuting habitat in safe areas within or directly adjacent to the pre-works habitat.
- d. Endoscopes and hand held nets are only to be used to assist with the locating and capture of bats.
- e. Temporary and permanent exclusion must be carried out using techniques specified in the most up to date edition of the '*Bat Workers Manual*'. If one-way exclusion devices are to be used, each device must remain in position for a period of at least 5 consecutive days/ nights throughout a spell of suitable weather conditions, or remain longer until these conditions prevail.
- f. Prior to destructive works, an inspection using torches and/or an endoscope must be performed internally to search for the presence of bats. If any licensed vesper bat species is found and is accessible, each will be captured by gloved hand or hand-held net, given a health check and then each placed carefully inside a draw-string, calico cloth holding bag or similar for transport. If any licensed horseshoe bat species is found, the capture methods outlined in (h) will only be used after it has been shown that overnight dispersal or exclusion are no longer practicable methods.
- g. Following inspection and exclusion operations, the removal of any feature with bat roost potential, will be only performed by hand in suitable weather conditions and under direct ecological supervision. Where

applicable, materials will be removed carefully away and not rolled or sprung to avoid potential harm to bats. The undersides of materials will be checked by the Named Ecologist or Accredited Agent for bats that may be clung to them before removal.

- h. For sites where the presence of horseshoe species has been confirmed, the following exclusion method will be used: prior to work commencing, the Named Ecologist or Accredited Agent will conduct a thorough internal inspection for the presence of horseshoe bats. Only after the void is shown to be unoccupied will the destructive search commence, or all apertures into that void be closed and sealed (windows, doors, etc) by use of boarding, sealed tarpaulin or similar.

If a horseshoe bat is encountered, it will be left undisturbed during daylight. After all bats have dispersed overnight, the void will be sealed as described above. If all bats have not emerged, the Named Ecologist will either use torchlight and non-tactile human presence to disturb the bat to encourage it to emerge and disperse, during night only, or through use of a hand held net. Only after all bats have emerged from the building or void will it be sealed.

Yes, I agree / No, I don't agree
Yes

If NO, please provide justification below. Please use this text box to describe any additional information on protocols to be employed if bats are found during works. Non-standard capture and exclusion apparatus must be shown on **Figure E2**.

--

Should your proposals include capture (taking) please specify numbers of each species that will be affected at the time the works are to be undertaken:

Species	Expected number of bats to be captured at the time works will be undertaken. <i>Note: this may be different to the number of bats using the roost at its optimum time as timings for works will be at a time when bats are least likely to be present.</i>

*** Please note that you can add more rows to the table: right click in any cell outside the grey box area. Choose Insert > Insert rows below.*

E3 Bat roost and access point retention, modification and creation: Please detail how all impacts to each species (as identified in sections C and D) will be mitigated. If not applicable to your proposals please state 'N/A' in the relevant text boxes.

Please note that breathable roofing membranes must not be installed into a roof used by bats. If the use of roof membranes is necessary, only Bitumen type 1F felt with a hessian matrix will be permitted under licence:

N/A

E3.1 Retention of existing roost(s) – Works may include, for example, maintenance works that result in no material changes to the roost but may cause disturbance or temporary damage e.g. temporary exclusion of a roost to allow investigative and repair works to a bridge. Provide details of all works including:

- Number and description of roosts to be retained, with an explanation of how they will be retained. Confirm dimensions to be retained.

TBC

- Number of access/entrance points to be retained and how this will be achieved. If enhancements to the roosts will be provided, such as through crevice provision, please detail.

TBC

- Mitigation for any other impacts e.g. new lighting at the site.

New lighting is proposed at the crossing points. The lighting will be on 12m columns and provided with directionally controlled LED lamps to limit light spill.

E3.2 Modification of existing roost(s) - Works may include, for example, reduction in roof void height, change of tiles and roof lining (stating the type of membrane that will be used), alteration of access point through replacement of soffits etc. Please provide the following:

- Dimension details of modified roosts: clearly state what the original roost dimensions were and what the dimensions of the modified roost will be.

n/a

- Dimension details of modified access points: clearly state how the access points are being modified.

n/a

- Details of any other modifications to be made to roosts.

n/a

- Mitigation for any impacts of lighting on the modified roost/s if appropriate.

n/a

E3.3 New roost creation (including bat houses, cotes and bat boxes etc).

Note – creation of compensation for high impact cases (e.g. loss of a maternity roost) must be protected in the long term. Any bat boxes or roost structures that are part of a licence proposal which do not show signs of bats must be retained for a minimum of 5 years from date of completion of the development/works. Typically this will be around 5 years for low conservation status roost compensation (e.g. bat boxes) and longer for other significant roosts (e.g. bat houses, lofts etc). The exact time period will be specified in any licence issued. For high conservation status roost loss, the compensation roost/s must still be protected in the long term by another means (such as a s106 agreement), which is particularly important if the structure is likely to change ownership.

E3.3a Please complete the table below for the species and roost types listed. For all other species and roost types please provide information under **E3.3b**.

Species & Roost type for which new roost creation will be provided Select 'yes' for those species impacted or 'N/A' if not applicable to this application	New roost creation		
	Compensation should be in line with the <i>Bat Mitigation Guidelines</i> . Where compensation is being provided, there should be at least one compensation feature, suitable for the species concerned, per roost and per species to be impacted, OR If a proposal impacts more than one bat species and / or roost type then cumulative impacts must be considered when designing the compensation; this should always be in line with the species and / or roost type which will be subject to the greatest impact and ensure that the requirements of all species impacted are met.		
	Compensation Feature	Quantity	Location of Compensation Feature (as shown on Figure E3)
Common pipistrelle <input checked="" type="checkbox"/> Yes <input type="checkbox"/> N/A <i>Day roost</i> <i>Night roost</i> <i>Feeding</i> <i>Transitional/Occasional</i>	<input checked="" type="checkbox"/> Bat box <input type="checkbox"/> Integrated bat box/ bat brick/ bat tube <input type="checkbox"/> Bat tile (including ridge tile) <input type="checkbox"/> Other (specify): <input type="checkbox"/> None	2 boxes for every roost feature lost	<input type="checkbox"/> In same building <input type="checkbox"/> In other existing building on site <input type="checkbox"/> In new building <input checked="" type="checkbox"/> Other (specify): On suitable retained trees within the red-line boundary at varying aspects to provide a variety of roosting habitats.

<p>Soprano pipistrelle <input checked="" type="checkbox"/> Yes <input type="checkbox"/> N/A</p> <p>Day roost Night roost Feeding Transitional/Occasional</p>	<input checked="" type="checkbox"/> Bat box <input type="checkbox"/> Integrated bat box/ bat brick/ bat tube <input type="checkbox"/> Bat tile (including ridge tile) <input type="checkbox"/> Other (specify): <input type="checkbox"/> None	<p>2 boxes for every roost feature lost</p>	<input type="checkbox"/> In same building <input type="checkbox"/> In other existing building on site <input type="checkbox"/> In new building <input checked="" type="checkbox"/> Other (specify): On suitable retained trees within the red-line boundary at varying aspects to provide a variety of roostings habitats.
<p>Whiskered <input type="checkbox"/> Yes <input checked="" type="checkbox"/> N/A</p> <p>Day roost Night roost Feeding Transitional/Occasional</p>	<input type="checkbox"/> Bat box <input type="checkbox"/> Integrated bat box/ bat brick/ bat tube <input type="checkbox"/> Bat tile (including ridge tile) <input type="checkbox"/> Other (specify): <input type="checkbox"/> None		<input type="checkbox"/> In same building <input type="checkbox"/> In other existing building on site <input type="checkbox"/> In new building <input type="checkbox"/> Other (specify):
<p>Brandt's <input type="checkbox"/> Yes <input checked="" type="checkbox"/> N/A</p> <p>Day roost Night roost Feeding Transitional/Occasional</p>	<input type="checkbox"/> Bat box <input type="checkbox"/> Integrated bat box/ bat brick/ bat tube <input type="checkbox"/> Bat tile (including ridge tile) <input type="checkbox"/> Other (specify): <input type="checkbox"/> None		<input type="checkbox"/> In same building <input type="checkbox"/> In other existing building on site <input type="checkbox"/> In new building <input type="checkbox"/> Other (specify):
<p>Daubenton's <input type="checkbox"/> Yes <input type="checkbox"/> N/A</p> <p>Day roost Night roost Feeding Transitional/Occasional</p>	<input type="checkbox"/> Bat box <input type="checkbox"/> Integrated bat box/ bat brick/ bat tube <input type="checkbox"/> Bat tile (including ridge tile) <input type="checkbox"/> Other (specify): <input type="checkbox"/> None		<input type="checkbox"/> In same building <input type="checkbox"/> In other existing building on site <input type="checkbox"/> In new building <input type="checkbox"/> Other (specify):
<p>Natterer's <input checked="" type="checkbox"/> Yes <input type="checkbox"/> N/A</p> <p>Day roost Night roost Feeding Transitional/Occasional</p>	<input checked="" type="checkbox"/> Bat box <input type="checkbox"/> Integrated bat box/ bat brick/ bat tube <input type="checkbox"/> Bat tile (including ridge tile) <input type="checkbox"/> Other (specify): <input type="checkbox"/> None	<p>2 boxes for every roost feature lost</p>	<input type="checkbox"/> In same building <input type="checkbox"/> In other existing building on site <input type="checkbox"/> In new building <input checked="" type="checkbox"/> Other (specify): On suitable retained trees within the red-line boundary at varying aspects to provide a variety of roostings habitats.
<p>Brown long-eared <input checked="" type="checkbox"/> Yes <input type="checkbox"/> N/A</p> <p>Day roost Night roost Feeding Transitional/Occasional</p>	<p>Note: boxes for this species will only be acceptable in certain circumstances, where this is justified on an ecological basis</p> <input checked="" type="checkbox"/> Bat box, justification To match the roosting feature being lost <input type="checkbox"/> Other (specify): <input type="checkbox"/> None	<p>2 maternity boxes for every roost feature lost</p>	<input type="checkbox"/> In same building <input type="checkbox"/> In other existing building on site <input type="checkbox"/> In new building <input checked="" type="checkbox"/> Other (specify): On suitable retained trees within the red-line boundary at varying aspects to provide a variety of roostings habitats.
<p>Serotine <input type="checkbox"/> Yes <input checked="" type="checkbox"/> N/A</p> <p>Day roost Night roost Feeding Transitional/Occasional</p>	<p>Note: bat boxes are not suitable for this species. Compensation should replicate, as closely as possible, the existing roost:</p> <input type="checkbox"/> Bat tile <input type="checkbox"/> Bat brick <input type="checkbox"/> Other (specify):		<input type="checkbox"/> In same building <input type="checkbox"/> In other existing building on site <input type="checkbox"/> In new building <input type="checkbox"/> Other (specify):
<p>Lesser Horseshoe <input type="checkbox"/> Yes <input checked="" type="checkbox"/> N/A</p> <p>Day roost Transitional/Occasional</p>	<p>A proportionate number of bat features suitable for the species. The provision of one feature, suitable for the species concerned (eg void) per roost to be impacted will be considered</p>		<input type="checkbox"/> In same building <input type="checkbox"/> In other existing building on site <input type="checkbox"/> In new building <input type="checkbox"/> Other (specify):

	appropriate:		
	Specify:		

E3.3b For all species and roost types not covered in the above table please provide the following:

- New roost dimension details or features (to include bat tiles/boxes as applicable).

The table above has been completed for all of the species are likely to be found roosting within the trees on site, on the assumption that they will be low numbers non-breeding roosts. TBC UPON THE RESULTS OF THE 20XX SURVEYS.

In order to mitigate for the loss of the roost sites, prior to works commencing, a total of 2 bat boxes for every roosting feature lost, will be positioned on suitable retained trees within the red line boundary at varying aspects to provide a range of roosting conditions. The locations of these will be determined by an ecologist on site. Two landscape bunds 2m in height would be provided within the site. These would help screen the adjacent landscape and ecological receptors.

Any hedgerows removed to facilitate the development will be replanted once the construction of Sizewell C is complete and the rail extension is removed and reinstated.

- Access points and size of access points.

n/a

- Location details (including an 8-figure grid reference for bat houses or bat lofts relating to the structure. 8-figure grid references are not required for positions of individual boxes, tiles etc).

n/a

- Aspect. Explain how the internal conditions of the roost will be created.

n/a

- Details of the materials to be used e.g. timber, sarking, felt etc.

n/a

- Justification for any variation from the original roost and/or deviations from recommendations in the Bat Mitigation Guidelines. (*Diagrams of widely available standard bat box designs are not required; just refer to bat box name and reference number, e.g. Schwegler 1FF*).

n/a

- Mitigation for any impacts of lighting if appropriate.

New lighting is proposed at the crossing points. The lighting will be on 12m columns and provided with directionally controlled LED lamps to limit light spill. This lighting will be removed when the rail extension is decommissioned and the habitat is reinstated.

- Structures for access for monitoring / maintenance purposes (if applicable)

n/a

E3.4 Other habitat re-instatement or creation (e.g. retention of existing flight lines, retention or creation of appropriate vegetation around roost entrances where applicable) – please include details of:

- Habitat replacement (following works resulting in temporary impacts) or creation not covered by sections E2 to E3 such as hedgerow/woodland planting or enhancement. State the length of hedgerow planting and areas (ha) of other planting to be provided such as woodland and anticipated establishment period etc.

Two landscape bunds 2m in height would be provided within the site. These would help screen the adjacent landscape and ecological receptors.
Any hedgerows removed to facilitate the development will be replanted once the construction of Sizewell C is complete and the rail extension is removed and reinstated.

- Creation of flight lines/routes of connectivity.

n/a

- Foraging area enhancements, etc

n/a

- Mitigation for any impacts of lighting if appropriate.

New lighting is proposed at the crossing points. The lighting will be on 12m columns and provided with directionally controlled LED lamps to limit light spill.

E3.5 Wider biodiversity gains:

Please indicate if enhancements, over and above what is necessary to mitigate the impact of the activity of the licence proposal, are being provided. Please indicate if enhancements are included to satisfy the requirement of a planning permission, and if so state the relevant planning condition, or other consents in your response below. Please also state if an applicant wishes to provide more than is typically required to mitigate for the impacts. Enter N/A if this is not applicable to your application.

Note: Any licence granted will only cover mitigation and compensation required to fulfill licensing requirements, but will acknowledge additional biodiversity enhancements.

The landscape bunds will reduce noise and light spill resulting from the lighting at each crossing point which will serve to reduce the potential effects due to disturbance and displacement of foraging bats. It should be noted that during the activity transect and static surveys, only low levels of bats were recorded within the area. Regardless of the presence of roosts, one bat box for every moderate and high roosting potential tree to be lost will be installed on suitable retained trees within the red-line boundary. Biodiversity net gain has been considered and calculated for the site in a separate Biodiversity Net Gain Report and the scheme will deliver XX% in Biodiversity Units and XX in Hedgerow Units.

Important Advice:

Scaled maps/plans of mitigation/compensation must be provided as separate maps/figures (also **see section I "Map checklist" at the end of this document**):

- **Figure E2** if non-standard capture and exclusion apparatus is proposed please include diagrams/photographs.
- **Figure E3** to show specifications for mitigation / compensation to be provided and annotate where it will be provided. Should the scheme be large or complicated it may be necessary to submit more than one figure.

NOTE: It must be possible to compare these with the survey results plan (**Figure C6**) and 'Impacts' Figure (**D**).

E4 Post-development site safeguard: Further guidance and explanation on post-development monitoring requirements are included within our 'How to get a licence' document http://www.naturalengland.org.uk/Images/wml-g12_tcm6-4116.pdf. Also see Section 8.7 of the Bat Mitigation Guidelines.

E4.1 Habitat/site management and maintenance: Is any specific post-development habitat management and site maintenance planned? If 'No'; state 'N/A'. If 'Yes' include the following:

- The period (years and months) for which habitat management and maintenance will take place. Ensure that this is consistent with the post development works detailed in section **E5b** of the **Work Schedule document, WML-A13-a-E5a&b**.

Throughout construction a suitably qualified ecologist will be available to resolve uncertainties regarding ecological issues and to monitor compliance with good practice mitigation measures as defined in the CEMP and the dedicated method statement.

An area of woodland and scrub will be created in the north-east section of the site to mitigate for the loss of tree and hedgerow habitat. On the decommissioning of the rail extension all remaining habitats within the site will be reinstated.

Initial monitoring will be undertaken to ensure measures have been installed to the correct specification and to inform any remedial measures.

All habitats will be reinstated once the rail extension is decommissioned

- Details of what will be undertaken in terms of site maintenance required to ensure long-term security of the affected population (e.g. maintain, repair or reinstate access points; maintain and repair heaters and /or data loggers; maintain, repair or restore bat feature / bat loft in good condition; repair or replace inspection hatches; management and maintenance of lighting regime, or bat boxes etc).

The bat boxes will be checked for usage by the named ecologist / accredited agent in September for the first three years post construction / after installation (**YEARS**). Any boxes that require maintenance / repair/ replacement will only be moved once they have been inspected by the named ecologist/ accredited agent to ensure no bats are disturbed.

The conditions of the habitats in the vicinity of the bat boxes will also be checked by the named ecologist / accredited agent and any necessary management requirements reported back to EDF.

- Details of what will be undertaken in terms of habitat management (e.g. planting cover around roost structure, hedgerow management regime, checking establishment of habitat creation; reduction of shade around roosts, woodland management to maintain species and structural diversity etc). Ensure this relates to the relevant map.

n/a

Note – for phased or multi-plot developments a separate habitat management and maintenance plan is required, which must be submitted with the master plan: see guidance on phased developments.

Important Advice:

Please include **Figure E4** as a separate figure to show which structures and habitats will be managed, maintained and monitored post development as part of your proposal – also see *section 1 "Map checklist" at the end of this document*).

E4.2 Population monitoring, roost usage etc: This should be in line with the monitoring requirements detailed in the Bat Mitigation Guidelines section 8.7 and Figure 4.

E4.2a Please complete the table below for the species and roost types listed. For all other species and roost types please provide information under E4.2b.

Species	Roost type	Post-development monitoring requirement
Common pipistrelle Soprano pipistrelle Whiskered Brandts Daubenton's Natterer's Brown long-eared	<i>Day roost</i> <i>Night roost</i> <i>Feeding</i> <i>Transitional/Occasional</i>	<input checked="" type="checkbox"/> None. There is no post-development requirement for proposals affecting bat roosts supporting up to any 3 species indicated, of the roost types listed, where they are used by low numbers of each species. <input checked="" type="checkbox"/> A single presence / absence survey at an appropriate time of year is to be undertaken. This should not take place in the first year following completion of development. Timing (year): years one, two and three post tree felling <input type="checkbox"/> Other (specify):
Serotine	<i>Day roost</i> <i>Night roost</i> <i>Feeding</i> <i>Transitional/Occasional</i>	<input type="checkbox"/> A single presence / absence survey at an appropriate time of year is to be undertaken. This should not take place in the first year following completion of development. Timing (year): <input type="checkbox"/> Other (specify):
Lesser Horseshoe	<i>Day roost</i> <i>Transitional/Occasional</i>	<input type="checkbox"/> A single presence or absence survey at an appropriate time of year to be undertaken in year 2 post development plus a check of the condition and suitability of the roost. <input type="checkbox"/> Other (specify):

E4.2b For all species and roost types not covered in the above table please include details of:

- Timing – state the years and months post development monitoring or other will be undertaken. Ensure that is consistent with the post development works detailed in section **E5b** of the **Work Schedule document WML-A13-a-E5a&b**.

E4.2a TO BE UPDATED FOR 20XX SURVEYS – If small roosts for pipistrelles or brown long-eared are found then no monitoring will be required. If other species are found then monitoring will be required.

- The type of monitoring which will be undertaken – include survey methods and equipment to be used. If it is expected any bats are to be taken or disturbed during this period please state anticipated numbers per species against each licensable activity.

Monitoring will be in the form of an external and internal inspection of the bat boxes to look for evidence of use (presence of bats, urine stained, droppings, scratch marks etc.) As the monitoring will involve a daytime inspection, the surveys will be carried out in September when signs of bats using the roost throughout the active season would have accumulated.

- Specify which compensation/mitigation measures will be subject to monitoring (as referenced on Figure E4).

The bat boxes installed on the suitable retained trees as shown on Figure E4 will be subject to inspection in September **YEAR, YEAR and YEAR**. If the bat boxes are damaged or missing, they will be replaced. In the unlikely event that the mitigation is shown to be ineffective (i.e. no evidence of bats using the bat boxes), then the bat box location may be amended.

Please note that it will be a requirement of the licence to undertake remedial action should monitoring identify that further management/maintenance is required of any compensation/mitigation provided, to ensure that mitigation/compensation measures are working effectively and are fit for purpose.

Important advice: Please always consider whether any *post development* monitoring effort should be staggered over alternate years in cases where use of the compensation measures may not occur in the same year of provision.

E4.3 Mechanism for ensuring safeguard of mitigation/compensation and post-development management, maintenance and monitoring works:

Please explain what mechanism is in place to ensure safeguard of mitigation/compensation provisions (e.g. Restrictive Covenant, clause to relinquish future development rights in S106 agreement, NERC Act agreement, explicit recognition of site in local planning documents, designation as County Wildlife Site or similar.) The need for this, and the type of mechanism, will vary with the scheme and impact. For substantial impact schemes (e.g. destruction of a significant maternity roost, or important hibernation site), some mechanism is always required. If you offer no specific mechanism, explain how you believe the population will be free of threats as far as can be reasonably determined (**the expectation of the granting of a licence should not be used for this purpose**).

The mitigation measures are within the red line boundary and will be owned and managed by EDF.

Explain how all post-development works (management, maintenance (including remedial action) and monitoring, as appropriate) will be ensured? Include a commitment that the monitoring, habitat management and maintenance work will be undertaken. Mechanism/s for ensuring delivery must be in place before applying for a licence (also see Section F).

All habitats within the red line boundary will be monitored, managed and maintained by EDF (or their sub-contractors) for the duration of the operation of the rail extension. Once the railway is decommissioned and the area reinstated, the ownership will revert back to the landowners **HAS THIS BEEN CONFIRMED? COULD THE MITIGATION MEASURES BE ADDED TO EDFS ASSET REGISTER TO ENSURE COMPLIANCE?**

SECTION F TBC BY EDF

E5 Timetable of works: Please complete the **work schedule document WML-A13-a-E5a&b found on the 'bat' application form web page and append to your application pack.**

Important Advice: Please note that from end of March 2014 a separate work schedule is a mandatory requirement to support a new bat licence application when using this template.

F Declarations

If the mitigation/compensation area/s is/are not owned by the applicant, you must have consent from the relevant land owner(s). You must have also secured details of how any measures to maintain the population in the long term will be achieved (e.g. a legal agreement).

F1 Declaration Statement(s) – You must include the following declarations within your Method Statement and include the appropriate answer (Yes/No/Not applicable):

F1.1 Re: section E1 - I confirm that relevant landowner consent/s has/have been granted to accept bats into roosts or access into roosts on land outside the applicant's ownership:

F2.2 Re: section E2 - I confirm that landownership consent/s has/have been granted to allow the creation of the proposed compensation on land outside the applicant's ownership

F2.3 Re: section E3 - I confirm that consent/s has/have been granted by the relevant landowner/s for monitoring, management and maintenance purposes on land outside the applicant's ownership

Comments if applicable:

Important Advice:

Unsecured consents statement:

If you have been unable to secure consents for any of the three declarations please explain why and detail any plans you have in place to obtain the consent(s) or provide details of any right(s) or agreement(s) that will enable the lawful implementation of the proposed mitigation, compensation and monitoring. Failure to provide the appropriate landowner consents means that the Method Statement is unlikely to meet the requirements for the FCS test to be met. It is therefore in your interest to ensure that the appropriate consents have been secured *before* applying for a licence.

G References: List any references cited, and include credits for source information.

H Annexes (supporting documents please append to your application pack)

H1 Pre-existing survey reports;

H2 Raw survey data.

I Check list of figures to be submitted with each Bat Method Statement

With your Method Statement and supporting documents please submit the following maps/figures – see table below. Note that some can be included within the Method Statement itself (if preferred) and others must be submitted individually (i.e. separate documents). Maps/Figures must include the title, site name as referenced on your application form, date and figure reference. If a grid reference is more applicable (e.g. a bat house is being provided please included this). Include a scale bar (appropriate to the situation e.g. 100m on site maps, 1km on location maps) and direction of North etc.

Additional maps, photographs or diagrams should be included where necessary to adequately explain the scheme.

Figure reference	Mandatory as will be included	Mandatory for assessment	What it must show (also see details above on site reference, dating and naming).
------------------	-------------------------------	--------------------------	--

	in the annexed licence, if applicable	purpose only, but will not be included in the annexed licence	
Figure B2.1	-	Yes, if the application is part of a phased or multi-plot development	Master plan overview- note – this is not the same as a master plan document, for which you should follow the guidance as stated in section B2.1.
Figure B2.2	-	Yes, if applicable	Locations of other nearby bat licensed sites, or sites which will be impacted on by future development.
Figure C5a	-	Yes	Location map at an appropriate scale for the application (often 1:50,000 or 1:25,000)
Figure C5b	-	Yes	Survey area showing all buildings, structures and habitats that are within the survey area and distinguishing those that were surveyed and those that were not. Indicate where surveyors were located. Aerial photographs should be provided where possible (ensure you have permission to use copy righted maps). If automated detectors were used or transect routes, ensure that these are indicated as appropriate.
Figure C6	-	Yes	Survey results - provide clear, annotated and cross-referenced maps/plans/photographs to show the survey results (access points, location of roosts, flight lines, results of activity surveys where DNA samples were taken etc). Ensure Figure is at a suitable scale to show the results.
Figure D	Yes	-	Impacts plan – map/figure which must show all structures or habitats (clearly referenced) that will be disturbed, damaged or destroyed, detailing where the roosts and access points are.
Figure E2	Yes – but only if applicable to the application	-	Non-standard capture and exclusion apparatus. If these are proposed please include diagrams/photographs.
Figure E3	Yes	-	Specifications for mitigation / compensation (including all dimensions for bat lofts/houses/stand-alone structures and materials to be used etc and 8-figure grid reference). Mitigation / compensation (must show all habitat creation, restoration, boxes). It may be necessary to submit more than 1 figure if the proposal is large or complicated.
Figure E4	Yes – when monitoring and maintenance will be included in the licence	-	Monitoring, management and maintenance map. Please indicate the specific structures and habitat that are to be managed, maintained and monitored as part of this licence proposal. Ensure that they are correctly referenced and are consistent with other parts of the Method Statement and figures.

Definitions of roost types to be included in the application (further detail can also be found in the Bat Mitigation Guidelines and the BCT’s “Bat Surveys Good Practice Guidelines”):

- a. **Day roost:** a place where individual bats, or small groups of males, rest or shelter in the day but are rarely found by night in the summer.
- b. **Night roost:** a place where bats rest or shelter in the night but are rarely found in the day. May be used by a single individual on occasion or it could be used regularly by the whole colony.
- c. **Feeding roost:** a place where individual bats or a few individuals rest or feed during the night but are rarely present by day.
- d. **Transitional / occasional roost:** used by a few individuals or occasionally small groups for

generally short periods of time on waking from hibernation or in the period prior to hibernation.

- e. **Swarming site:** where large numbers of males and females gather during late summer to autumn. Appear to be important mating sites
- f. **Mating sites:** sites where mating takes place from later summer and can continue through winter.
- g. **Maternity roost:** where female bats give birth and raise their young to independence.
- h. **Hibernation roost:** where bats may be found individually or together during winter. They have a constant cool temperature and high humidity. Sites where hibernating bats have been confirmed by appropriate survey effort should be classed as '**hibernation confirmed**'.
- i. **Satellite roost:** an alternative roost found in close proximity to the main nursery colony used by a few individual breeding females to small groups of breeding females throughout the breeding season.
- j. **Other** – please explain what the roost type is if not one of the above (we recognise that roost types are interchangeable and not always easy to classify according to the nuances of certain species).
- k. An '**alternative roost**' shall include: a purposely installed bat box; an existing roost which will not be impacted by the works; or other new/enhanced roosting opportunities. Any alternative roost must be suitable for the species, within or close to the existing roost and free from additional disturbance or development pressure.

Section G – References

Ref 1: Ref 1: MAGIC, 2014: Magic Interactive Mapping Application. Available from <http://www.magic.gov.uk/MagicMap.aspx> [Accessed: March 2019].

Ref 2: Suffolk Biodiversity Partnership. (2012) Suffolk Local Biodiversity Action Plan: Grouped Plan for Bats. Suffolk Biodiversity Partnership, Suffolk

Ref 3: Mathews F, Kubasiewicz LM, Gurnell J, Harrower CA, McDonald RA, Shore RF. (2018) A Review of the Population and Conservation Status of British Mammals: Technical Summary. A report by the Mammal Society under contract to Natural England, Natural Resources Wales and Scottish Natural Heritage. Natural England, Peterborough.

VOLUME 9: CHAPTER 7, APPENDIX 7A:

ANNEX 7A.5: DRAFT BAT METHOD STATEMENT TO

SUPPORT A LICENCE APPLICATION

FIGURES



NOTES

KEY

- GREEN RAIL ROUTE DEVELOPMENT
- SITE BOUNDARY
- VOLUME 9 ASSESSMENT AREA
- BAT LICENSED SITE

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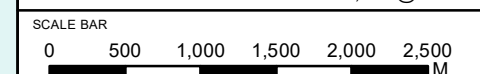


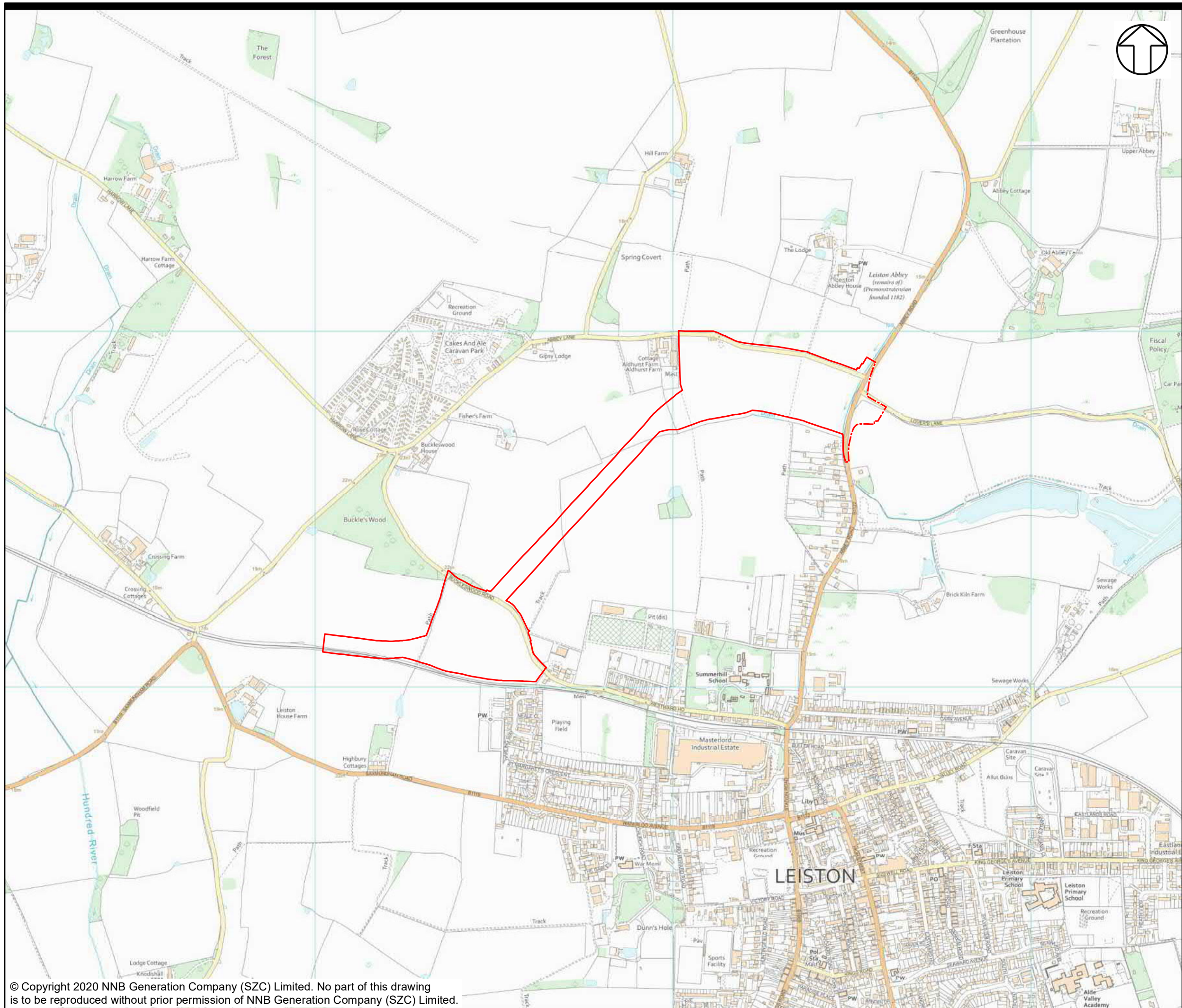
DOCUMENT:
 SIZEWELL C
 GREEN RAIL ROUTE
 BAT METHOD STATEMENT

DRAWING TITLE:
 FIGURE B2.2: LOCATIONS OF NEARBY BAT LICENSED SITES

DRAWING NO:
 FIGURE 7A-5.1

DATE: JAN 2020 DRAWN: R.M. SCALE: 1:50,000 @A3





NOTES

KEY

- GREEN RAIL ROUTE DEVELOPMENT SITE BOUNDARY
- - - VOLUME 9 ASSESSMENT AREA

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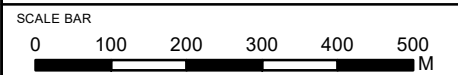


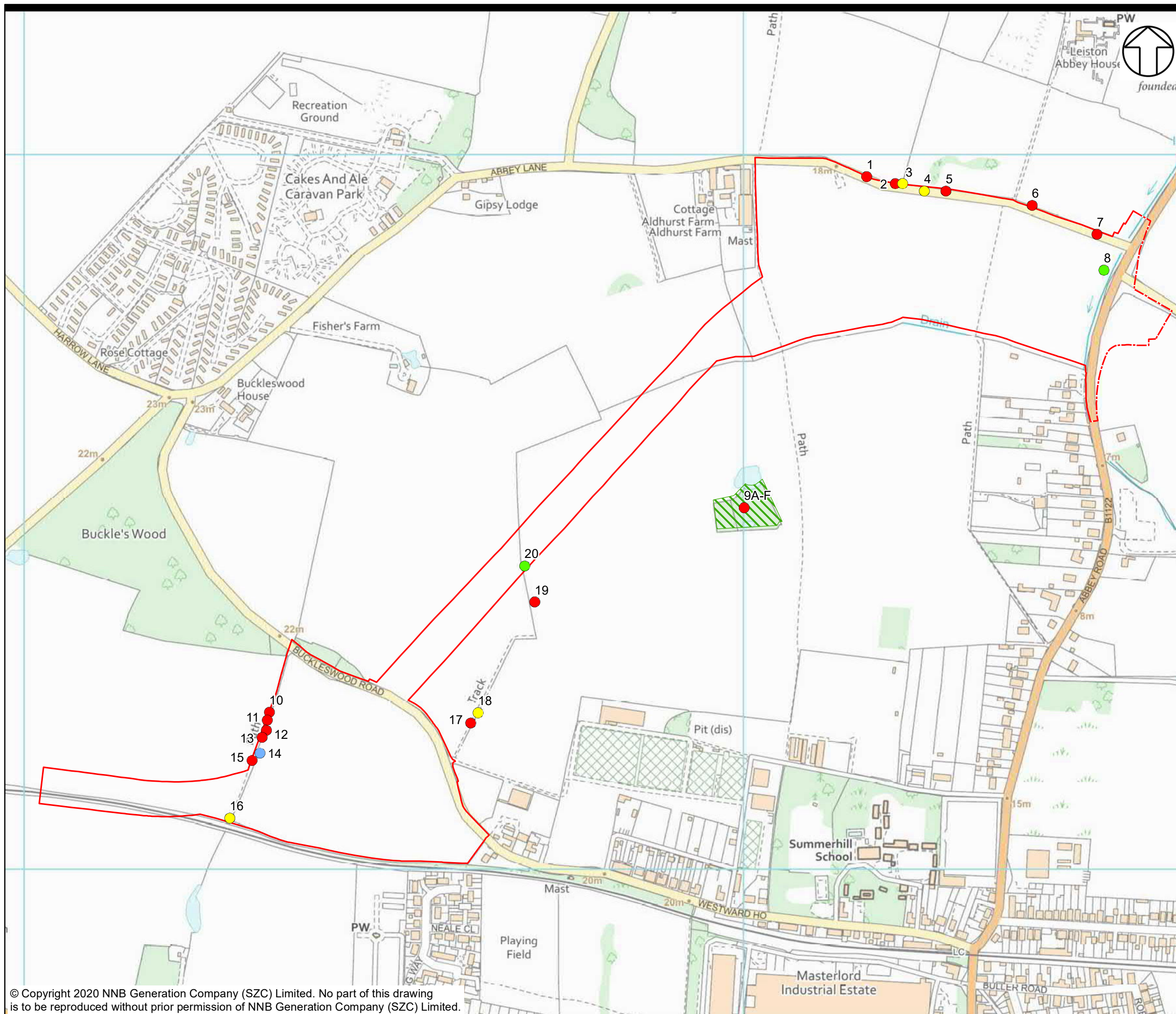
DOCUMENT:
 SIZEWELL C
 GREEN RAIL ROUTE
 BAT METHOD STATEMENT

DRAWING TITLE:
 FIGURE C5a: LOCATION PLAN

DRAWING NO:
 FIGURE 7A-5.2

DATE: JAN 2020 **DRAWN:** R.M. **SCALE:** 1:10,000 @A3





NOTES

KEY

- GREEN RAIL ROUTE DEVELOPMENT
- SITE BOUNDARY
- VOLUME 9 ASSESSMENT AREA
- ROOST POTENTIAL CLASSIFICATION**
- HIGH POTENTIAL
- MODERATE POTENTIAL
- LOW-MODERATE POTENTIAL
- LOW POTENTIAL
- BAT ROOST POTENTIAL AREA

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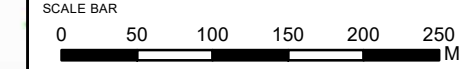


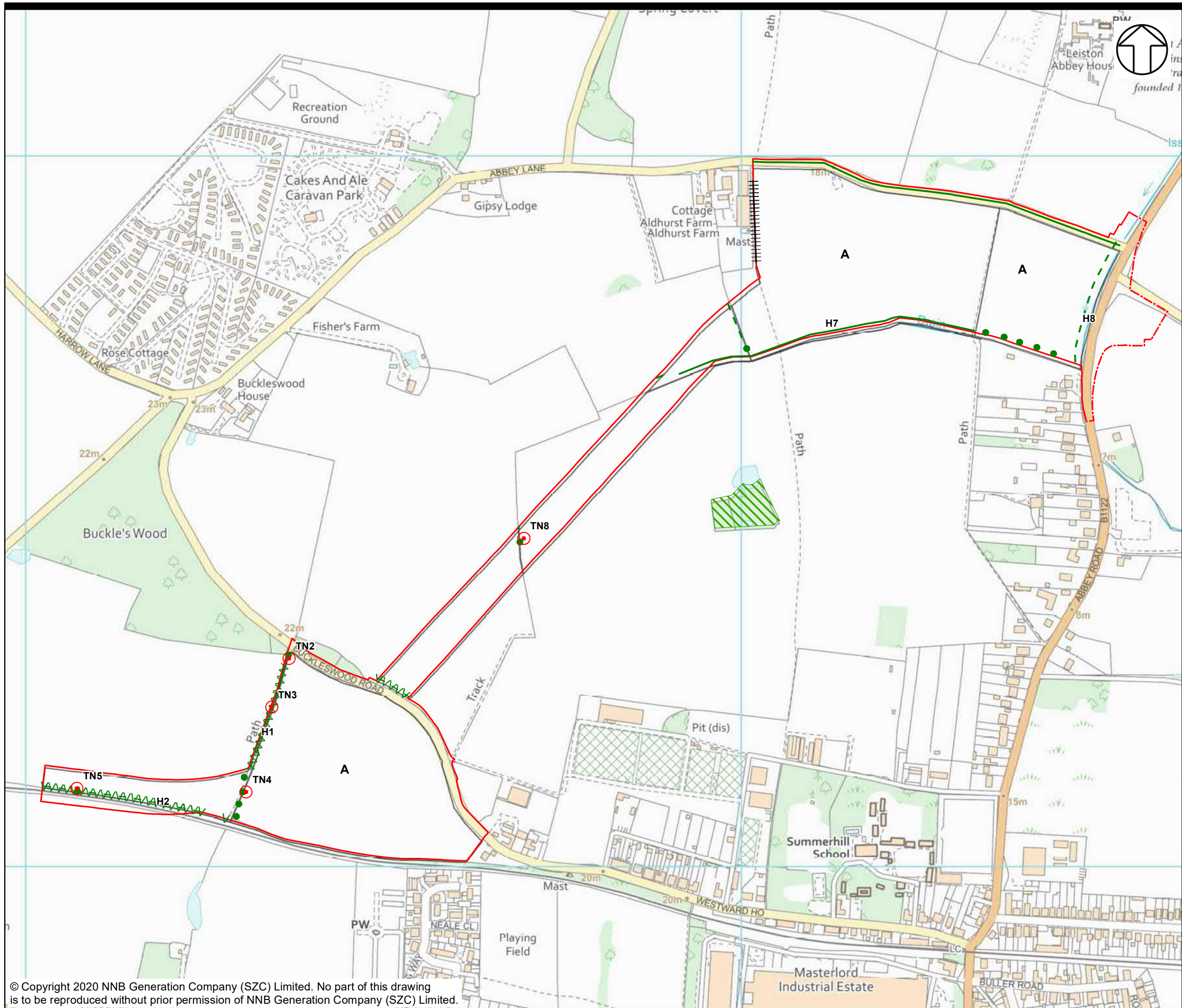
DOCUMENT:
 SIZEWELL C
 GREEN RAIL ROUTE
 BAT METHOD STATEMENT

DRAWING TITLE:
 FIGURE C5b: GREEN RAIL ROUTE BAT TREE
 ASSESSMENT RESULTS 2015

DRAWING NO:
 FIGURE 7A-5.3

DATE: JAN 2020 **DRAWN:** R.M. **SCALE:** 1:5,000 @A3





NOTES

KEY

- GREEN RAIL ROUTE DEVELOPMENT
- - - VOLUME 9 ASSESSMENT AREA
- BAT ROOST POTENTIAL AREA
- TARGET NOTE (TN)
- BROADLEAVED SCATTERED TREES
- INTACT HEDGE - SPECIES POOR
- ~ DEFUNCT HEDGE - NATIVE SPECIES-RICH
- - - DEFUNCT HEDGE - SPECIES-POOR
- FENCE
- IMPROVED GRASSLAND
- CULTIVATED/DISTURBED LAND - ARABLE

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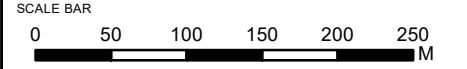


DOCUMENT:
 SIZEWELL C
 GREEN RAIL ROUTE
 BAT METHOD STATEMENT

DRAWING TITLE:
 FIGURE D: GREEN RAIL ROUTE IMPACTS PLAN

DRAWING NO:
 FIGURE 7A-5.4

DATE: JAN 2020 **DRAWN:** R.M. **SCALE:** 1:5,000 @A3



VOLUME 9: CHAPTER 7, APPENDIX 7A:

ANNEX 7A.6 - NON-LICENSABLE METHOD STATEMENTS:

- ANNEX 7A.6A - GREAT CRESTED NEWTS
- ANNEX 7A.6B - REPTILES



VOLUME 9, CHAPTER 7, APPENDIX 7A.6A:
GREAT CRESTED NEWT METHOD STATEMENT

Contents

1	Great Crested Newt Non-licensable Method Statement.....	1
1.1	Introduction	1
1.2	Site Reasonable Avoidance Measures Method Statements for Great Crested Newt..	4
1.3	Great Crested Newt	5
1.4	Approach to vegetation clearance.....	8
	References	10

Tables

None provided.

Plates

Plate 1.1: Site location	3
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Figures

None provided.

Appendices

Appendix 7A6A.1: Toolbox Talk	12
Appendix 7A6A.2: Declaration.....	13

1 Great Crested Newt Non-licensable Method Statement

1.1 Introduction

a) Background and scheme overview

1.1.1 SZC Co. is proposing to build and operate a new nuclear power station on the Suffolk coast, known as Sizewell C Power Station (hereafter referred to as 'Sizewell C') located to the north of the existing Sizewell B Power Station.

1.1.2 It is located to the north of the existing Sizewell B power station, the Sizewell C site is located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston. The project is being submitted as a component Nationally Significant Infrastructure Project (NSIP) and will be approved through the Development Control Order Process (DCO).

1.1.3 This great crested newt Method Statement outlines the key approaches to mitigating potential impacts to the great crested newt (*Triturus cristatus*) populations at the site and will be used by SZC Co and any relevant subcontractors, in relation to the proposal to build the Sizewell C.

1.1.4 This document is presented as a first draft. SZC Co and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to protected species before the document is finalised. Further surveys will be undertaken as relevant and these will also inform the final draft of this and related documents, sufficient to inform any relevant licence.

1.1.5 The proposed Sizewell C nuclear power station would comprise two UK EPR™ units with an expected net electrical output of approximately 1,670 megawatts (MW) per unit, giving a total site capacity of approximately 3,340MW. The design of the UK EPR™ units is based on technology used successfully and safely around the world for many years, which has been enhanced by innovations to improve performance and safety. The UK EPR™ design has passed the Generic Design Assessment process undertaken by UK regulators (Office for Nuclear Regulation and Environment Agency), and has been licenced and permitted at Hinkley Point C. Once operational, Sizewell C would be able to generate enough electricity to supply approximately six million homes in the UK.

1.1.6 In addition to the key operational elements of the UK EPR™ units, the Sizewell C Project comprises other permanent and temporary development to support the construction and operation of the Sizewell C nuclear power

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station. The key elements are the main development site, comprising the Sizewell C nuclear power station itself, offshore works, land used temporarily to support construction including an accommodation campus, and a series of off-site associated development sites in the local area including:

- two temporary park and ride sites; one to the north-west of Sizewell C at Darsham (the ‘northern park and ride’), and one to the south-west at Wickham Market (the ‘southern park and ride’) to reduce the amount of traffic generated by the construction workforce on local roads and through local villages;
- a permanent road to bypass Stratford St Andrew and Farnham (referred to as the ‘two village bypass’) to alleviate traffic on the A12 through the villages;
- a permanent road linking the A12 to the Sizewell C main development site (referred to as ‘Sizewell link road’) to alleviate traffic from the B1122 through Theberton and Middleton Moor;
- permanent highway improvements at the junction of the A12 and B1122 east of Yoxford (referred to as the ‘Yoxford roundabout’) and other road junctions to accommodate Sizewell C construction traffic;
- a temporary freight management facility at Seven Hills on land to the south-east of the A12/A14 junction to manage the flow of freight to the main development site; and
- a temporary extension of the existing Saxmundham to Leiston branch line into the main development site (‘the green rail route’) and other permanent rail improvements on the Saxmundham to Leiston branch line, to transport freight by rail in order to remove large numbers of HGVs from the regional and local road network.

1.1.7 The components listed above are referred to collectively as the ‘Sizewell C Project’.

b) [Site location and setting](#)

1.1.8 The proposed rail extension route site comprises part of the green rail route. The proposed rail extension route comprises the approximately 1.8km from the existing Saxmundham to Leiston branch line to the proposed B1122 (Abbey Road) level crossing. In addition, works (including track replacement and level crossing upgrades) are also required along the existing to the Saxmundham to Leiston branch.

1.1.9 Once operational, the proposed development would be used during the construction phase of the Sizewell C Project to transport construction

materials to the main development site. It would support up to three freight trains per day (six movements) at the peak of construction.

1.1.10 The proposed rail extension route site is dominated by intensively managed arable fields bounded by hedgerows, the majority of which have been recorded as species-poor with large gaps. Whilst no woodland habitat is present within the site, several blocks of woodland are present in close proximity to the site, particularly within the south of the site. Although the site is dominated by arable land, some limited areas of improved grassland habitat are present immediately adjacent to the north-western boundary of the site.

1.1.11 The area covered by this method statement is presented in **Plate 1.1** below.

Plate 1.1: Site location



1.1.12 The purpose of the works is to enable the transport of building materials for the construction of the various developments associated with the Sizewell C project, which would minimise additional HGC traffic on the road network surrounding the site. However, as a component of this, vegetation clearance and ground-breaking works (collectively referred to as “facilitating works” within this report) will be required in order to facilitate the proposed development. Accordingly, a number of potential ecological constraints are associated with the proposed facilitating works, as are set out below.

c) **Key ecological constraints**

1.1.13 The key potential legislative constraints associated with the facilitation works within the site include:

- great crested newt;
- reptiles; and
- bats.

1.1.14 In order to enable the proposed development of the proposed development as detailed above, a number of facilitating works (including vegetation clearance works and ground-breaking works) are required. Given the great crested newt presence of great crested newts within the site, the proposed facilitating works have the potential to cause injury/ mortality to this species should it be present within the site at the time of the works. Accordingly, the purpose of this document is to provide a reasonable avoidance measures method statement that can be used by SZC Co. and any relevant subcontractors, to ensure the safeguarding of great crested newt during the facilitation works to be undertaken within the site.

1.2 **Site Reasonable Avoidance Measures Method Statements for Great Crested Newt**

a) **Introduction**

1.2.1 This section provides a suite of dedicated reasonable avoidance measures method statements for the ecological constraints that may be encountered for great crested newt during the facilitation works.

1.2.2 In all cases the aim of the Method Statement is to reduce the risk of causing injury / mortality of the protected species and avoid contravention of the relevant legislation. The Ecological Clerk of Works (ECoW) will determine exactly when and where it is appropriate to apply the measures described in the reasonable avoidance measures method statements. The ECoW will oversee and quality-control the implementation of the tasks undertaken.

1.2.3 It is the responsibility of the site contractors to carry out the works in a manner which will not contravene the legislation with regards to protected species in the areas identified as having potential to support protected species. Any variations from the individual Method Statements may contravene legislation and therefore risk prosecution. Thus, it is their joint responsibility that no changes to the timings or methods outlined below are made without prior agreement from the ECoW.

b) Toolbox talk

- 1.2.4 Prior to commencement of the facilitation works, all site contractors will be briefed by the ECoW as part of the site induction. The toolbox talk (**Appendix 7A.6B.1**) will provide a basic overview of the life history, habitat requirements, identification and legal protection granted to the legally protected species / other species of conservation concern present on within the site that may be encountered during the works.
- 1.2.5 Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present on site that have the potential to be used by these species and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on protected species that could occur within or in the vicinity of the working area.
- 1.2.6 There is a declaration (**Appendix 7A.6B.2**) for those present to sign to confirm they have understood the constraints and actions presented.

1.3 Great Crested Newt

a) Site status

- 1.3.1 Great crested newts are found throughout the Zone of Influence (Zol) in the ponds located: to the north in the land around Leiston Abbey; in the middle of the Zol; to the west within adjacent woodland and gardens; and adjacent to Crossings Farm and Crossing Cottages. The animals found within these ponds are considered to be part of a single, wider meta-population.
- 1.3.2 Although the majority of the proposed development consists of arable fields of limited suitability for foraging great crested newts, the field margins, hedgerows and blocks of woodland are suitable foraging habitat, with the woodland providing suitable hibernation sites, and hedgerows and associated margins providing connectivity between ponds.
- 1.3.3 Evidence suggests that great crested newt using the site are not dependent on the habitats present and will also be using a range of additional habitats in the wider area. No significant effects on the great crested newt population are expected as a result of the proposed works.

b) Legislation

- 1.3.4 Great crested newt is listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) (Ref 1.1) in respect of Section 9, which makes it an offence, inter alia, to:
- intentionally or recklessly kill, injure or take (handle) a great crested newt;

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- intentionally or recklessly damage, destroy or obstruct access to any structure or place that a great crested newt uses for shelter or protection; or
 - intentionally or recklessly disturb a great crested newt while it is occupying a structure or place that it uses for shelter or protection.
- 1.3.5 The offence “recklessly” was added by the Countryside and Rights of Way Act 2000 (CRoW) (Ref 1.2).
- 1.3.6 great crested newt receives further protection under Regulation 41 of The Conservation of Habitats and Species Regulations 2017. They are listed on Schedule 2 of the Regulations, which makes it an offence, inter alia, to:
- deliberately capture, injure or kill a great crested newt;
 - deliberately disturb a great crested newt, in particular any disturbance which is likely:
 - impair their ability to:
 - survive, to breed or reproduce, or to rear or nurture their young, or
 - hibernate or migrate
 - affect significantly the local distribution or abundance of great crested newt; or
 - damage or destroy a breeding site or resting place of a great crested newt.
- 1.3.7 great crested newt are also included on Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 (Ref 1.3). This Act places a duty upon public bodies to have regard to the purpose of conserving biodiversity within all of their actions. The species listed under Section 41 are ‘Species of Principal Importance for the conservation of biodiversity in England’ for which conservation steps should be taken or promoted.
- 1.3.8 When the reasonable avoidance measures methods described in this Method Statement are taken into account, the cumulative risks and effects on the local great crested newt population(s) will be not significant. It is therefore considered that a great crested newt licence is not required for the facilitation works outlined in this Method Statement.
- 1.3.9 The Ecological Clerk of Works (ECoW), will oversee and quality-control the implementation of the ecological tasks undertaken.

NOT PROTECTIVELY MARKEDc) **Toolbox talk for great crested newts**

1.3.10 Prior to commencement of the works, all site contractors will be briefed by the ECoW as part of the site induction to provide them with a basic overview of the life history, habitat requirements, identification and legal protection granted to great crested newt.

1.3.11 Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present within the site that have the potential to be used by great crested newt and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on great crested newt that could occur within or in the vicinity of the working area. The toolbox talk will stress that: potential great crested newt refugia / hibernation features should be left undisturbed; and great crested newt should not be handled by contractors.

d) **Precautionary working methods**

1.3.12 A different precautionary working method will be utilised dependent upon whether the works are being undertaken in the great crested newt active or hibernation period. These periods are dependent upon weather conditions (temperature and rainfall) but are likely to be in the region of November to February inclusive (hibernation season) and March to October (active season). The ECoW will be responsible for determining the appropriate working methodology.

1.3.13 The prescriptions of this method statement should be followed during works in any areas with potential to support great crested newts. These areas include but are not limited to: tree roots, hedgerow bases, rough grassland areas, arable field margins, earth banks, log piles, rock piles and woodlands.

1.3.14 If possible, all impacts to terrestrial areas which may offer hibernation potential (i.e. log piles, embankments etc.) will be removed outside of the hibernation period, as great crested newt are more likely to be active and associated with ponds during this period. However, there are restrictions on certain works due to the potential to impact upon nesting birds (during the bird nesting season, generally March to August inclusive), and all works timings will need to consider this.

1.3.15 No ponds supporting great crested newt are to be directly impacted by the works therefore an approach to pond removal is not required. For clarity, the precautionary working methodologies have been split down into three scenarios:

- Vegetation clearance in the active season.
- Vegetation clearance in the hibernation season.

- Ground-breaking works in the active and hibernation season.

1.4 Approach to vegetation clearance

a) Vegetation clearance in the active season

1.4.1 Any clearance within the active season must also consider the potential to impact upon nesting birds. Suitable measures to prevent impacts to nesting birds should be employed, which are likely to include pre-works checks for nests. These measures in relation to birds are not outlined in full within this document.

1.4.2 Prior to commencement of the vegetation clearance works, the ECoW will liaise with the contractor to clearly demarcate the required working area.

1.4.3 The precautionary working methods to safeguard great crested newt during vegetation clearance in the active season are set out below.

- The ECoW will work with the contractor to determine a cutting regime whereby any animals present are able to move away from the cutting into retained habitats and not isolated in an unsuitable area. This area will be walked by the ECoW to identify any areas offering great crested newt sheltering opportunities prior to works commencing.
- Any suitable great crested newt sheltering features (e.g. log piles, compost heaps or debris) will be identified by the on-site ecologist. These will be avoided if possible, if not they will be checked by the ECoW before their removal (should this be required). Any removal of sheltering habitats will be supervised by the ECoW. These will be dismantled by hand; this should be overseen by the ecologist.
- Shelter features that require removal should be reinstated near the clearance area in a quiet, sheltered location. This will ensure that no net loss of potential great crested newt shelter features takes place. If possible, shelter features should be dismantled by hand and moved out of the working area, supervised by the ECoW where appropriate. Such materials will be lifted (not dragged) out of the working area.
- Vegetation is to be cleared at a minimum 150mm from the ground in the first pass.
- Subsequent to this, a suitable period of time as decided by the ECoW will be given to allow for any great crested newt present at the time of works to move away from the cut areas, this will also allow the ECoW to check the area for great crested newt, along with other species.
- The vegetation will then be cut to as close to ground level as possible.

NOT PROTECTIVELY MARKED

- Vegetation cuttings are to be piled within the site so as to create additional sheltering opportunities to great crested newt within the site.
- b) [Vegetation clearance in the hibernation season](#)
- 1.4.4 Prior to commencement of the vegetation clearance works, the ECoW will liaise with the contractor to clearly demarcate the required working area.
- 1.4.5 The precautionary working methods to safeguard great crested newt during vegetation clearance in the hibernation season are set out below.
- Any suitable great crested newt sheltering features (e.g. log piles, compost heaps or debris) will be identified by the on-site ecologist. These will be avoided if possible, if not they will be checked by the ECoW before their removal (should this be required). If possible, this removal should be undertaken by hand or slowly under close supervision by the ECoW.
 - Shelter features that require removal should be reinstated near the clearance area in a quiet, sheltered location. This will ensure that no net loss of potential great crested newt shelter features takes place. If possible, shelter features should be dismantled by hand and moved out of the working area, supervised by the ECoW where appropriate. Such materials will be lifted (not dragged) out of the working area.
 - The vegetation will then be cut to as close to ground level as possible.
 - Vegetation cuttings are to be piled within the site so as to create additional sheltering opportunities to great crested newt within the site.
- c) [Approach to ground-breaking works including top-soil stripping \(active season and hibernation period\)](#)
- 1.4.6 If possible, all impacts to terrestrial areas which may offer hibernation potential (i.e. log piles, embankments etc) will be removed outside of the hibernation period, as great crested newt are more likely to be active and associated with ponds during this period. However, there are restrictions on certain works due to the potential to impact upon nesting birds (during the bird nesting season, generally March to August inclusive), and all works timings will need to consider this.
- 1.4.7 Given that vegetation clearance works are to take place within the site prior to the commencement of any ground-breaking works, it is likely that the risk of encountering great crested newt will be reduced, due to the removal of suitable terrestrial habitat within the areas proposed for ground-breaking works. Ground-breaking works include any ground investigations, archaeology trenching, topsoil stripping etc.

NOT PROTECTIVELY MARKED

1.4.8 Prior to commencement of the ground-breaking works, the ECoW will liaise with the contractor to clearly demarcate the required working area. The methodology outlined below assumes that all vegetation has previously been removed.

1.4.9 The precautionary working methods to safeguard great crested newt during ground-breaking works in the active season are set out below.

- Any suitable great crested newt sheltering features (e.g. log piles, compost heaps or debris) will be identified by the on-site ecologist. These will be avoided if possible, if not they will be checked by the ECoW before their removal (should this be required). If possible, this removal should be undertaken by hand or slowly under close supervision by the ECoW.
- Shelter features that require removal should be reinstated near the clearance area in a quiet, sheltered location. This will ensure that no net loss of potential great crested newt shelter features takes place. If possible, shelter features should be dismantled by hand and moved out of the working area, supervised by the ECoW where appropriate. Such materials will be lifted (not dragged) out of the working area.
- The topsoil will then be carefully removed using a toothed bucket (if permitted under the contractors reasonable avoidance measures method statement) under close ecological supervision by the ECoW.

d) **Action to take if great crested newt are found**

1.4.10 Should any great crested newt be found during the facilitation works the following must be observed due to the strict level of protection afforded to this species:

- the works will stop;
- the great crested newt will not be handled or moved from its resting place; and
- the ECoW will assess the situation to determine whether a European Protected Species mitigation licence will be required before the works can continue; and if Natural England need to be informed.

References

- 1.1 Her Majesties Stationary Office (HMSO) (1981). The Wildlife and Countryside Act (as amended). HMSO, London.
- 1.2 HMSO (2000) The Countryside Rights of Way (CRoW) Act. HMSO, London.

- 1.3 HMSO (2006). The Natural Environment and Rural Communities Act. HMSO, London.

Appendix 7A6A.1: Toolbox Talk

Ecology Toolbox Talk - Great Crested Newt



GCN identification:



Great Crested Newts are typically dormant between November and February. Sheltering/hibernation sites include log/brush piles, mammal burrows and tree/hedgerow roots.



GCNs, their habitats, and their eggs are legally protected from harm.



If a amphibian is found, stop work and report to the ECoW - do not handle.

Moving amphibians can be relocated by the ECoW away from works. Sheltering/dormant amphibians & their sheltering/hibernation site must be left in-situ, undisturbed.

Where amphibians are found:





Appendix 7A6A.2: Declaration

Toolbox talk title:	Ecology
Given by:	
Site:	
Date:	

Name	Company	Signature

Name	Company	Signature



VOLUME 9, CHAPTER 7, APPENDIX 7A.6B: REPTILE METHOD STATEMENT

Contents

1.	Reptile Non-licensable Method Statement.....	3
1.1	Introduction.....	3
1.2	Site Reasonable Avoidance Measures Method Statements for reptiles	6
1.3	Reptiles.....	7
1.4	Facilitating work requirements	10
	References	13

Plates

Plate 1.1:	Site location	5
Plate 1.2:	Vegetation clearance equipment	11
Plate 1.3:	Ground-breaking works equipment.....	12

Figures

None provided.

Appendices

Appendix 7A6B.1:	Toolbox Talk	14
Appendix 7A6B.2:	Declaration of Understanding.....	15

1. Reptile Non-licensable Method Statement

1.1 Introduction

a) Background and Scheme Overview

1.1.1 SZC Co is proposing to build and operate a new nuclear power station on the Suffolk coast, known as Sizewell C Power Station (hereafter referred to as ‘Sizewell C’) located to the north of the existing Sizewell B Power Station.

1.1.2 It is located to the north of the existing Sizewell B power station, the Sizewell C site is located on the Suffolk coast, approximately halfway between Felixstowe and Lowestoft; to the north-east of the town of Leiston.

1.1.3 This Reptile Method Statement will be used by the ecological consultant, SZC Co and any relevant subcontractors, in relation to the proposal to build the Sizewell C.

1.1.4 This document is presented as a first draft. SZC Co and its consultant ecologists are committed to working with Natural England and other stakeholders to develop the approaches outlined within this document to ensure a legally robust approach to protected species before the document is finalised. Further surveys will be undertaken as relevant and these will also inform the final draft of this and related documents.

1.1.5 The proposed Sizewell C nuclear power station would comprise two UK EPR™ units with an expected net electrical output of approximately 1,670 megawatts (MW) per unit, giving a total site capacity of approximately 3,340MW. The design of the UK EPR™ units is based on technology used successfully and safely around the world for many years, which has been enhanced by innovations to improve performance and safety. The UK EPR™ design has passed the Generic Design Assessment process undertaken by UK regulators (Office for Nuclear Regulation and Environment Agency), and has been licenced and permitted at Hinkley Point C. Once operational, Sizewell C would be able to generate enough electricity to supply approximately six million homes in the UK.

1.1.6 In addition to the key operational elements of the UK EPR™ units, the Sizewell C Project comprises other permanent and temporary development to support the construction and operation of the Sizewell C nuclear power station. The key elements are the main development site, comprising the Sizewell C nuclear power station itself, offshore works, land used temporarily to support construction including an accommodation campus and a series of off-site associated development sites in the local area including:

- two temporary park and ride sites; one to the north-west of Sizewell C at Darsham (the ‘northern park and ride’), and one to the south-west at

Wickham Market (the ‘southern park and ride’) to reduce the amount of traffic generated by the construction workforce on local roads and through local villages;

- a permanent road to bypass Stratford St Andrew and Farnham (referred to as the ‘two village bypass’) to alleviate traffic on the A12 through the villages;
- a permanent road linking the A12 to the Sizewell C main development site (referred to as ‘Sizewell link road’) to alleviate traffic from the B1122 through Theberton and Middleton Moor;
- permanent highway improvements at the junction of the A12 and B1122 east of Yoxford (referred to as the ‘Yoxford roundabout’) and other road junctions to accommodate Sizewell C construction traffic;
- a temporary freight management facility at Seven Hills on land to the south-east of the A12/A14 junction to manage the flow of freight to the main development site; and
- a temporary extension of the existing Saxmundham to Leiston branch line into the main development site (‘the green rail route’) and other permanent rail improvements on the Saxmundham to Leiston branch line, to transport freight by rail in order to remove large numbers of HGVs from the regional and local road network.

1.1.7 The components listed above are referred to collectively as the ‘Sizewell C Project’.

b) Site location and setting

1.1.8 The proposed rail extension route site comprises part of the green rail route. The proposed rail extension route comprises the approximately 1.8km from the existing Saxmundham to Leiston branch line to the proposed B1122 (Abbey Road) level crossing. In addition, works (including track replacement and level crossing upgrades) are also required along the existing to the Saxmundham to Leiston branch.

1.1.9 Once operational, the proposed development would be used during the construction phase of the Sizewell C Project to transport construction materials to the main development site. It would support up to three freight trains per day (six movements) at the peak of construction.

1.1.10 The proposed rail extension route site is dominated by intensively managed arable fields bounded by hedgerows, the majority of which have been recorded as species-poor with large gaps. Whilst no woodland habitat is present within the site, several blocks of woodland are present in close proximity to the site, particularly within the south of the site. Although the site

is dominated by arable land, some limited areas of improved grassland habitat are present immediately adjacent to the north-western boundary of the site.

1.1.11 The area covered by this method statement is presented in **Plate 1.1** below.

Plate 1.1: Site location



1.1.12 The purpose of the works is to transport construction materials to the main development site during the proposed construction works, and it would support up to regular transport of materials during the peak construction period (2028). However, as a component of this, vegetation clearance and ground-breaking works (collectively referred to as “facilitating works” within this report) will be required in order to facilitate the proposed development. Accordingly, a number of potential ecological constraints are associated with the proposed facilitating works, as are set out below.

c) **Key ecological constraints**

1.1.13 The key potential legislative constraints associated with the facilitation works within the site include:

- great Crested Newts;
- bats; and

- reptiles.

This method statement only covers guidance relating to reptiles, however a second method statement has been prepared for bats and a draft protected species licence for the great crested newts has also been prepared.

- 1.1.14 In order to enable the proposed development of the proposed rail extension route site, as detailed above, a number of facilitating works (including vegetation clearance works and ground-breaking works) are required. Given the opportunities afforded to reptiles by the habitats present within the site, the proposed facilitating works have the potential to cause injury/ mortality to this species group should it be present within the site at the time of the works. Accordingly, the purpose of this document is to provide a reasonable avoidance measures method statement that can be used by the ecological consultant, SZC Co and any relevant subcontractors, to ensure the safeguarding of reptiles during the facilitation works to be undertaken within the site.

1.2 Site Reasonable Avoidance Measures Method Statements for reptiles

a) Introduction

- 1.2.1 This section provides a suite of dedicated reasonable avoidance measures method statements for the ecological constraints that may be encountered for reptiles during the facilitation works.

- 1.2.2 In all cases the aim of the Method Statement is to reduce the risk of causing injury / mortality of the protected species and avoid contravention of the relevant legislation. The Ecological Clerk of Works (ECoW) will determine exactly when and where it is appropriate to apply the measures described in the reasonable avoidance measures method statement. The ECoW will oversee and quality-control the implementation of the tasks undertaken.

- 1.2.3 It is the responsibility of the site contractors to carry out the works in a manner which will not contravene the legislation with regards to protected species in the areas identified as having potential to support protected species. Any variations from the individual Method Statements may contravene legislation and therefore risk prosecution. Thus, it is their joint responsibility that no changes to the timings or methods outlined below are made without prior agreement from the ECoW.

b) Toolbox talk

- 1.2.4 Prior to commencement of the facilitation works, all site contractors will be briefed by the ECoW as part of the site induction. The toolbox talk (**Appendix**

7A.6B.1) will provide a basic overview of the life history, habitat requirements, identification and legal protection granted to the legally protected species / other species of conservation concern present on within the site that may be encountered during the works.

1.2.5 Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present on site that have the potential to be used by these species and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on protected species that could occur within or in the vicinity of the working area.

1.2.6 There is a declaration (**Appendix 7A.6B.2**) for those present to sign to confirm they have understood the constraints and actions presented.

1.3 Reptiles

a) Site status

1.3.1 Given that the site supports a number of hedgerows and is located in close proximity areas of woodland and improved grassland habitats, it is considered that the site may be used opportunistically by foraging and commuting reptiles. Nevertheless, the desk-study data received from the Suffolk Biodiversity Information Service returned a number of records of reptiles within 200m of the site, including those of reptiles recorded within the nearby Wood Farm present to the southeast of the site. Whilst records of this species group were returned from the area surrounding the site, given the dominance of sub-optimal reptile habitat within the site, it is unlikely that the site is of elevated potential to this species group.

1.3.2 Whilst no targeted reptile surveys were undertaken an incidental sighting of a single grass snake (*Natrix natrix*) was observed, outside the site boundary, to the west of a pond in the woodland block south of Aldhurst Farm during survey work carried out within the site, such that there is potential for reptiles to make at least occasional use of the site.

b) Legislation

1.3.3 There are four common and widespread species of reptile that are native to Britain, i.e. common or viviparous lizard (*Zootoca vivipara*), slow worm (*Anguis fragilis*), adder (*Vipera berus*) and grass snake. Grass snake is also listed on Schedule 5 of the Wildlife and Countryside Act (as amended) (Ref 1.1) in respect of Section 9, which makes it an offence, inter alia, to intentionally (or recklessly) kill or injure this species (recklessly as added by the Countryside and Rights of Way Act (CroW) Act (Ref 1.2))

1.3.4 Common lizard, slow worm, adder and grass snake are also included on Section 41 of the Natural Environment and Rural Communities (NERC) Act

2006 (Ref 1.3). This Act places a duty upon public bodies to have regard to the purpose of conserving biodiversity within all of their actions. The species listed under Section 41 are 'Species of Principal Importance for the conservation of biodiversity in England' for which conservation steps should be taken or promoted.

c) **Toolbox talk**

1.3.5 Prior to commencement of the vegetation clearance works, all site contractors will be briefed by the ECoW as part of the site induction to provide them with a basic overview of the life history, habitat requirements, identification and legal protection granted to reptiles.

1.3.6 Site-specific toolbox talks will also be undertaken as necessary to identify the habitats present within the site that have the potential to be used by reptiles and outline the environmental measures to be followed in order to avoid breaches of legislation and / or adverse effects on reptiles that could occur within or in the vicinity of the working area. The toolbox talk will stress that potential reptile refugia / hibernation features should be left undisturbed; and reptiles should not be handled by contractors.

d) **Precautionary working methods**

1.3.7 The exact timings of the vegetation clearance works are currently unknown. However, these works will need to consider potential impacts to other receptors in addition to reptiles, particularly nesting birds, dependent upon the timings of the works.

1.3.8 Vegetation clearance which does not disturb the ground or vegetation below 150mm can be conducted year-round with a low risk of impacting upon reptiles, however there are seasonal constraints in relation to birds. Potential impacts to nesting birds will need to be considered of vegetation removal is required between March and August inclusive (generally considered to be the bird nesting season).

1.3.9 Any vegetation clearance likely to impact vegetation below 150mm or which is likely to impact the ground layer or features which offer reptiles shelter or protection should take place during the active reptile period (March to October (inclusive), although the exact timings are weather dependant). In order to avoid disturbing reptiles during hibernation (the period where reptiles are most vulnerable). Accordingly, with respect to the proposed clearance of suitable reptile habitat, it is proposed that a staged vegetation clearance exercise is undertaken under the direct supervision of the ECoW, in order to reduce the suitability of the habitats within the site.

1.3.10 Where it is necessary to undertake vegetation clearance in and around suitable reptile habitat the following precautionary measures will be put in place to avoid encountering and accidentally injuring reptiles:

- vegetation clearance (below 150mm) and ground-breaking works will only be conducted in the active season (March to October inclusive seasonally dependant) and when the weather is suitable i.e. it is warm, approximately 8°C should be the minimum temperature. The works should not be conducted early in the morning before reptiles have had a chance to ‘warm up’;
- the ECoW will work with the contractor to determine a cutting regime whereby any animals present are encouraged away from the cutting into retained habitats and not isolated in an unsuitable area. This area will be walked by the ECoW to disturb reptiles prior to works commencing;
- the ECoW will also consider any impacts to ground nesting birds, if appropriate and assess any risk;
- initially, vegetation is to be cleared to reduce cover for reptiles (at a minimum 150mm from the ground in the first pass);
- subsequent to this, a suitable period of time as decided by the ECoW will be given to allow for any reptiles present at the time of works to move away from the cut areas;
- the grassland / remaining vegetation will then be cut to as close to ground level as possible;
- vegetation cuttings are to be piled within the site so as to create additional sheltering opportunities to reptiles within the site;
- any suitable reptile sheltering features (e.g. log piles, compost heaps or debris) will be identified by the on-site ecologist. These will be avoided if possible, if not they will be checked by the ECoW before their removal (should this be required). Any removal of sheltering habitats will be supervised by the ECoW. These will be dismantled by hand; this should be overseen by the ecologist. If a reptile is found the ecologist will decide whether or not it is appropriate to relocate the animal;
- shelter features that require removal should be reinstated near the clearance area in a quiet, sheltered location. This will ensure that no net loss of potential reptile shelter features takes place. If possible, shelter features should be dismantled by hand and moved out of the working area, supervised by the ECoW where appropriate. Such materials will be lifted (not dragged) out of the working area; and

- if reptiles are found, the ECoW will move the animals out of the way to a place of safety. This location would be decided on a case-by-case basis, but it would be within the one designated reptile receptor areas (Kenton Hills, St. James Covert and Broom Covert) near to a suitable refuge or hibernation feature, surrounded by suitable foraging and basking habitat and judged to be a safe distance from the ongoing vegetation clearance works. Reptiles will not be handled by contractors, as common lizards and slow worms may shed their tails if handled inappropriately.

1.3.11 Should any reptiles be found on site during the works when the ECoW isn't present, the ECoW should be contacted immediately for advice.

1.4 Facilitating work requirements

a) Vegetation clearance methods

1.4.1 As set out above, vegetation clearance works are required in order to facilitate the development of the site. A staged vegetation clearance exercise at a suitable time of year will be undertaken in order to safeguard any reptiles present at the time of works. Such works will take place under the supervision of the ECoW. Such an approach will minimise the potential harm caused to reptiles within the site as it will avoid disturbing this species group during the hibernation period.

1.4.2 Prior to commencement of the vegetation clearance works, the ECoW will liaise with the contractor to clearly demarcate the required working areas.

1.4.3 If shelter features are present (i.e. log and vegetation piles), those will be checked by the ECoW before their removal (should this be required).

1.4.4 If shelter features are present that require removal, those should be reinstated near the clearance area in a quiet, sheltered location. This will ensure that no net loss of potential reptile shelter features takes place. If possible, shelter features should be dismantled by hand and moved out of the working area, supervised by the ECoW where appropriate. Such materials will be lifted (not dragged) out of the working area.

1.4.5 Should works be required in winter (November to February inclusive) or in cold weather (below 8°C overnight temperature) the ECoW will advise upon bespoke working methods. Likely to require a hand search and a staged vegetation clearance approach under direct supervision.




1.4.6 The vegetation arisings will be collected and used to create habitat piles in areas adjacent to the site (which are to be retained during the development works).

b) **Vegetation clearance equipment**

1.4.7 The vegetation clearance contractors on site will utilise equipment specific to their clearance methods as per their reasonable avoidance measures. For example:

- John Deere 3 series compact with cut and collector flail;
- John Deere 4 series compact tractor with side arm flail; and
- brushcutter, rakes, pitchforks and other hand tools.

Plate 1.2: Vegetation clearance equipment

<i>John Deere 3 series compact tractor</i>	<i>John Deere 4 series tractor</i>
	
<i>Brushcutter</i>	
	

c) **Ground-breaking Works Methods**

1.4.8 Given that vegetation clearance works are to take place within the site prior to the commencement of any ground-breaking works, it is likely that the risk of encountering reptiles will be reduced, due to the absence of suitable habitat within the areas proposed for ground-breaking works.

1.4.9 Reptiles are known to enter hibernation by burrowing underground, by settling into tree root systems or by entering voids and crevices in the ground or surrounding material. Accordingly, should the works take place during the

reptile hibernation period (the dormancy period runs from November to February (inclusive) and ideally should be avoided where possible), it is considered necessary for the ground-breaking works to be undertaken under direct supervision of the ECoW. Small sections of the topsoil removed and inspected by the ECoW. Hand-digging under ECoW supervision may also be required.

d) Ground-breaking Works Equipment

1.4.10 Contractors will utilise the equipment as per their reasonable avoidance measures. For example:

- JCB 16C-I new generation 1 tonne mini digger;
- spade;
- spill kits; and
- Chapter 8 barrier/ Heras fencing.

Plate 1.3: Ground-breaking works equipment

<p><i>JCB 16C-I New Generation 1 Tonne Mini Digger</i></p>	<p><i>Chapter 8 barrier/ Heras fencing</i></p>
	

References

- 1.1 Her Majesties Stationary Office (HMSO) (1981). The Wildlife and Countryside Act (as amended). HMSO, London.
- 1.2 HMSO (2000) The Countryside Rights of Way (CRoW) Act. HMSO, London
- 1.3 HMSO (2006). The Natural Environment and Rural Communities Act. HMSO, London

Appendix 7A6B.1: Toolbox Talk

Reptiles

Reptiles in the UK



IF BITTEN SEEK MEDICAL HELP IMMEDIATELY.

Legal Protection
All reptile species are protected.

Likely to be found in:



Reptiles typically dormant between November and February. Sheltering/hibernation sites include log / brush piles, mammal burrows and tree / hedgerow roots.

