

## 7.0A ECOLOGY

### Chapter Alterations

#### A1.1 This chapter of the ES addendum updates the ES in respect of the following:

- Update to bat survey methods and results to include surveys in August and September;
- Update to badger survey methods and results to include surveys in November;
- Update of references with new citation and other minor typographical errors;
- Update of development description to include details of lighting parameters and restrictions on heavy goods vehicles;
- Update of operational impacts on Special Areas for Conservation (SAC) and bats to reflect updated lighting mitigation proposals;
- Additional information on badgers and bats included in and mitigation measures and summary of effects;
- Update of effects of new lighting parameters on receptors;
- Update of layout change on effects on badgers; and
- Addition of references to Planning Practice Guidance (PPG).

### Introduction

7.1 This chapter of the Environmental Statement (ES) assesses the likely significant effects of the Proposed Development on ecology and nature conservation through the construction, operational and decommissioning stages of the project. This chapter is supported by six appendices;

- Appendix 7.1: Ecology Assessment - West Sussex Sites – Wisborough Green – 1;
- Appendix 7.2A: Wisborough Green-1 Protected Species Report;
- Appendix 7.3: Consultation Log;
- Appendix 7.4A: Habitat Regulations Assessment;
- Appendix 7.5: Tree Survey Report; and
- Appendix 7.6A: Confidential Appendix.

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7.2 This chapter includes the following information;

- the legal and policy basis for the topic;
- the identification of key ecological features (receptors) and their value;
- the sources of impact and the sensitivity of receptors to impacts;
- the nature, scale and duration of any effects (both direct and indirect) of the proposal on sensitive receptors;
- potential mitigation measures to reduce negative effects; and
- an assessment of the significance of residual effects.

7.3 This chapter has been prepared by URS Infrastructure and Environment UK Ltd.

### **Planning Policy Context**

#### ***National Planning Policy***

##### *National Planning Policy Framework*

7.4 The National Planning Policy Framework (NPPF) (Ref. 7.1) states that the planning system should contribute to and enhance the natural and local environment by minimising impacts on biodiversity and providing net gains in biodiversity where possible, including by establishing coherent ecological networks that are more resilient to current and future pressures. The NPPF should be read in conjunction with the Government Circular: Biodiversity and Geological Conservation, ODPM Circular 06/2005 (Ref. 7.2).

7.5 Local planning authorities should set criteria based policies against which proposals for any development on or affecting protected wildlife will be judged. Distinctions should be made between the hierarchy of international, national and locally designated sites, so that protection is commensurate with their status.

7.6 To minimise impacts on biodiversity, planning policies should plan for biodiversity at a landscape-scale; identify and map components of the local ecological networks; and

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promote the preservation, restoration and re-creation of priority habitats and ecological networks and the protection and recovery of priority species populations and identify suitable indicators for monitoring biodiversity.

- 7.7 A number of principles should be applied by local planning authorities when determining planning applications. Notably, the primary aim should be to avoid significant harm to protected species and habitats and, if not possible, mitigate impacts, or, as a last resort, provide adequate compensation. Furthermore, opportunities to incorporate biodiversity should be sought.

### **Planning Practice Guidance (2014)**

#### **Biodiversity, ecosystems and green infrastructure**

- 7.7a **The Planning Practice Guidance (PPG) was published by DCLG in 2014 and makes clear that “information on biodiversity impacts and opportunities should inform all stages of development (including, for instance, site selection and design including an pre-application consultation) as well as the application itself.” Pre-application discussions to agree the scope of works for the ecological surveys is necessary before the planning application is made.**
- 7.7b **Local understanding of ecological networks is required to lead biodiversity enhancements and should seek to include habitat restoration re-creation and expansion, improved links, buffering of sites, new biodiversity features and securing management for long term enhancement. The mitigation hierarchy at paragraph 118 of the NPPF recommends three steps - avoidance, mitigation and compensation, and the PPG makes clear that only when an application cannot satisfy the hierarchy should it be refused.**

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**Local Planning Policy***Chichester District Local Plan (1999) (Ref. 7.3)*

- 7.8 The Chichester District Local Plan was adopted in April 1999. The Local Plan will eventually be replaced by the new Local Plan Core Strategy. Until the Local Plan Core Strategy is adopted the saved strategies of the Chichester District Local Plan forms the development plan.
- 7.9 Protection of ecology is addressed primarily by the nature conservation policies RE7 (Nature Conservation – Designated Sites) and RE8 Nature Conservation (Non-Designated Areas) and BE14 (Wildlife Habitat, Trees, Hedges and Other Landscape Features). These policies recognise nature conservation interest within and outside of designated sites, which may include ancient woodland, Local Nature Reserves and wildlife corridors.

*West Sussex Minerals Local Plan (adopted July 2003) (Ref. 7.4)*

- 7.10 The plan sets out its policies for the protection of the environment. Those relevant to the Application Site are;
- Policy 10: Proposals for mineral working which may irreversibly damage statutorily designated sites of historic, architectural, natural or scientific interest will only be granted if the damage can be prevented or the need for the minerals outweighs the environmental objections relating to those designations;
  - Policy 13: Proposals for mineral extraction in areas which do not have statutory protection but which are of local environmental significance will be given careful consideration and will not be permitted unless the benefits of the development would outweigh the detrimental effects of the proposal on the value of these areas having taken into account measures to mitigate any adverse impacts; and
  - Policy 16: Appropriate measures will be required for safeguarding the water environment during working and the prudent use and recycling of water within mineral workings will be encouraged.

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*UK Post-2010 Biodiversity Framework (Ref. 7.5)*

- 7.11 This document sets a broad enabling structure for action across the UK between now and 2020, including a shared vision and priorities for UK-scale activities to help deliver the 'Aichi targets' and the EU Biodiversity Strategy. A major commitment by Parties to the Convention of Biological Diversity is to produce a National Biodiversity Strategy and/or Action Plan.
- 7.12 The UK Post-Development Framework is relevant in the context of Section 40 of the NERC Act 2006 (Ref. 7.6), meaning that Priority Species and Habitats are capable of being material considerations in planning. These species are identified as species of conservation concern often due to their rarity and/or a declining population trend.

*Chichester Local Biodiversity Action Plan (Ref.7.7)*

- 7.13 The Local Biodiversity Action Plan (LBAP) for Chichester District is a strategic document bringing together the Council's planned activities to protect our local biodiversity, as well as proposing new areas of activity such as habitat improvements to some of the Biodiversity Opportunity Areas identified by the Sussex Biodiversity Action Plan.

**Other Relevant Guidance***Birds of Conservation Concern (Ref. 7.8)*

- 7.14 Leading governmental and non-governmental conservation organisations in the UK reviewed the population status of 247 bird species regularly found in Britain, and placed them onto one of three lists - red, amber or green. Although these listings offer no legal protection, they are meant to help guide conservation action for individual species.
- 7.15 Red List Species are species of high conservation concern. They are Globally Threatened according to International Union for the Conservation of Nature (IUCN) criteria, and include:

- those whose population or range has declined rapidly in recent years; and those that have declined historically and not shown a substantial recent recovery.

7.16 Amber List Species are species of medium conservation concern. They have an unfavourable conservation status in Europe, and include:

- those whose population or range has declined moderately in recent years;
- those whose population has declined historically but made a substantial recent recovery;
- rare breeders; and
- those with internationally important or localised populations.

7.17 Green List Species are the remaining species with stable or increasing populations and that are presently not of conservation concern.

## **Legislation**

### ***The Wildlife and Countryside Act 1981 (Ref. 7.9)***

7.18 The Wildlife and Countryside Act 1981 (as amended) (WCA) is the means by which the Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention) and the European Union Directive on the Conservation of Wild Birds (79/409/EEC) (EU Birds Directive) are implemented in Great Britain.

7.19 Wild animals listed on Schedule 5 of the WCA are subject to specific protection under Section 9, which make the following an offence:

- Intentional killing, injuring and taking;
- Possession or control;
- Intentional or reckless damage to, destruction of, obstruction of access to any structure or place used by a scheduled animal for shelter or protection;
- Intentional or reckless disturbance of an animal occupying such a structure or place;

- Selling, offering for sale, possessing or transporting for the purposes of sale; and
- Advertising for buying or selling.

7.20 The WCA prohibits the intentional killing, injuring or taking of any wild bird (with certain exceptions) and the taking, damaging or destroying of a wild birds' nest or eggs. Special penalties are given for offences related to birds listed on Schedule 1.

7.21 A number of plant species, including Japanese knotweed *Fallopia japonica* and giant hogweed *Heracleum mantegazzianum* are listed on Schedule 9 of the WCA. This makes it an offence to plant them in the wild or otherwise cause them to grow.

### ***The Countryside and Rights of Way Act 2000 (Ref. 7.10)***

7.22 Part III of the Countryside and Rights of Way Act, 2000 (CRoW) requires that Government Departments have regard for the conservation of biodiversity, in accordance with the Convention on Biological Diversity in 1992. In addition, it demands that the Secretary of State publishes a list of living organisms and habitat types that are considered to be of principal importance in conserving biodiversity. These species and habitats are listed under Section 74 of the CRoW Act, as amended by Section 41 of the Natural Environment and Rural Communities Act 2006 (NERC) (Ref. 7.11).

7.23 The CRoW Act amends the WCA, by also making it an offence to “recklessly destroy, damage or obstruct” access to a sheltering place used by an animal listed in Schedule 5 of the Act or “recklessly disturb” an animal occupying such a structure or place.

### ***Natural Environment and Rural Communities Act 2006***

7.24 The NERC Act further extends the requirement to have regard for biodiversity to all public authorities, which includes local authorities and local planning authorities, and requires that the Secretary of State consults Natural England in the publication of the list of living organisms and habitat types deemed to be of principal importance in conserving biodiversity.

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***The Conservation of Habitats and Species Regulations 2010 (Ref. 7.12)***

- 7.25 The Conservation of Habitats and Species Regulations 2010 (as amended), hereafter referred to as the 'Habitats Regulations' are the principal means by which the European Union Directive on the Natural Habitats and Wild Fauna and Flora (92/43/EEC) (EC Habitats Directive) is transposed in England and Wales. These 2010 Regulations update the legislation and consolidate the many amendments which have been made to the Habitats Regulations since they were first approved in 1994.
- 7.26 The Habitats Regulations place a duty on the Secretary of State to compile a list of sites considered to be important for habitats or species listed in Annexes I and II of the EC Habitats Directive. There are 39 plant species on Schedule 9 of the Act for which it is illegal to let escape or cause to grown in the wild.
- 7.27 The Habitats Regulations also assign a European level of protection to a variety of native species of plants and animals listed in Annex IV(a) of the EC Habitats Directive, which are known as European Protected Species (EPS). It is an offence to deliberately pick, collect, cut, uproot or destroy a wild plant of an EPS. In addition, wild animals, which are listed on Schedule 2 of the Regulations, are subject to the provisions in Regulation 39, which make it an offence to:
- Deliberately capture, injure or kill a wild animal of a EPS;
  - Deliberately disturb any such animal which is likely to:
    - To impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or, in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
    - To affect significantly the local distribution or abundance of the species to which they belong;
  - Deliberately take or destroy the eggs of such an animal; or
  - Damage or destroy a breeding site or resting place of such an animal.



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***The Protection of Badgers Act 1992 (Ref 7.13)***

- 7.28 The Protection of Badgers Act 1992 protects badgers against killing, injury or taking. Badger setts are also protected against damage, destruction or obstruction and it is illegal to disturb a badger whilst it is in its sett.

***The Wild Mammals (Protection) Act 1996 (Ref. 7.14)***

- 7.29 It is an offence to intentionally cause all wild mammals unnecessary suffering by certain methods, including crushing and asphyxiation.

**Assessment Methodology*****Scoping and Consultation***

- 7.30 A consultation exercise was undertaken to establish the scope of protected species surveys to be conducted (see Appendix 7.3 for consultation log). On 14th March 2013, URS met with the County Ecologist from West Sussex County Council (WSSCC) to discuss the scope of works required to support the planning application for the Proposed Development. The following principles were agreed.

- Detailed information on bat activity should be collated to inform a Habitat Regulation Assessment screening (see Appendix 7.4A for information to inform the Habitats Regulation Assessment). This would include;
  - Desk study information on the activity of bats from the Mens Special Areas of Conservation (SAC) and Ebernoe SAC.
  - Bat activity survey data for the Application Site, gathered in accordance with Bat Conservation Trust (BCT) (2012) guidelines (Ref. 7.15).
- An assessment of the structure of woodland edge and a hazelnut search would provide sufficient data to assess the potential effects on hazel dormouse in areas where there will be no loss of suitable hazel dormouse habitat resulting from the development proposals.

- Breeding bird survey data is not required to assess the potential effects of small scale, temporary projects of this type; however, a search for the nests of Schedule 1 birds should be undertaken prior works beginning, if works are started within the bird breeding season.
- Enhancements to the Application Site should be targeted at species known to be present and should be carefully located so as not to be impacted by any future works at the Application Site.

7.31 A Scoping Report for the Proposed Development was issued to WSCC and stakeholders in April 2013 (refer to Chapter 2 for further information). Requirements set out in the Scoping Opinion relating to ecology are presented below:

- Screening the scheme for a Habitat Regulation Assessment to assess any potential effects on The Mens and Ebernoe SACs.
- Considering impacts upon statutory and non-statutory designated wildlife sites and other sensitive habitats, such as ancient woodland;
- Conducting relevant protected species surveys for the project and where those species are found providing the following information within the ES:
  - An assessment of how the species uses the Application Site;
  - The direct and indirect effects of the development upon that species;
  - Full details of mitigation or compensation that might be required;
  - Whether the impact is acceptable and/or licensable.
- Conducting relevant surveys for protected species at the optimum time of year by suitably qualified and, where appropriate, licensed ecologists;
- The development design should aim to reduce adverse impacts on sensitive areas or species, and should if possible provide opportunities for overall wildlife gain;
- Consideration of cumulative and or in-combination impacts.

7.32 On 12th June 2013, URS undertook a telephone consultation with the Protected Species and Environmental Planning Adviser at Natural England to discuss the extent of bat survey data required to inform a screening for a Habitat Regulations

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Assessment. Natural England advised that the Application Site should be considered a medium-sized site of medium quality, and that BCT (2012) guidelines (Ref. 7.15) should largely be followed in terms of survey effort. It was agreed that monthly bat activity surveys between April and August, with one dusk and pre-dawn survey within a 24 hour period would be appropriate.

7.33 The survey area considered during the ecological investigations included the Application Site which is approximately 1.63ha and is depicted in Figure 7.1. The adjacent habitats were also included in order to evaluate potential nearby sensitive receptors which could be impacted by the Proposed Development.

7.34 The scope of ecological investigations undertaken for the assessment is as follows:

- Desk-based study to search the online websites and collate records from local record centres and recorders;
- Extended Phase 1 habitat survey to record the nature and extent of vegetation and habitats within and near to the Application Site;
- Specific surveys for the following receptors:
  - otters *Lutra lutra*;
  - water voles *Arvicola terrestris*;
  - badger *Meles meles*;
  - bats; and
  - hazel dormouse *Muscardinus avellanarius*.

7.35 The Extended Phase 1 habitat survey noted the potential of the Application Site to support very low numbers of common reptile species; however, it is unlikely that surveys would record any individuals under these conditions. Furthermore, it is unlikely that significant effects on the conservation status of reptiles or legal offences would occur if suitable avoidance and measures are adopted. For this reason reptiles were scoped out of the protected species surveys, but will be considered in the ES to ensure that they are protected in accordance with current legislation.

7.36 On 13th February 2013, The Environmental Dimensions Partnership (EDP) undertook an arboriculture survey of trees on the Application Site in accordance with BS5837:2012 guidelines (Ref. 7.16) (see Appendix 7.5 for full detailed of the tree survey). The trees along the woodland edge to the north and west of the Application Site were assessed to record details of species, size, age and condition. Based on these characteristics, the trees were then categorised in terms of their arboricultural and landscape value. The survey also allowed protection measures to be developed to prevent damage to the trees during construction works.

### ***Desk-Based-Study***

7.37 A desk-based study was undertaken between January and May 2013 to collate existing records of rare, notable, protected and invasive species up to 5km from the Application Site (see Appendix 7.1 for details). Rare, notable, protected and invasive species includes species included under Schedules 1, 5 and 8 of the Wildlife and Countryside Act 1981 (as amended); Schedules 2 and 4 of The Conservation of Habitats and Species Regulations 2010 (the Regulations); and Species and Habitats of Principal Importance in England, listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

7.38 The following sources were contacted for information:

- The Mens and Ebernoe Management Team at Sussex Wildlife Trust;
- Sussex Biodiversity Record Centre;
- South Downs National Park Authority;
- Sussex Bat Group;
- Sussex Ornithological Society; and
- Multi-Agency Geographical Information for the Countryside.

7.39 For full survey details see Appendices 7.1 & 7.2.

### ***Field Surveys***

7.40 For full survey details see Appendices 7.1 & 7.2.

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*Vegetation and Habitats*

- 7.41 An Extended Phase 1 habitat survey was undertaken in January 2013 and updated in August 2013, to record vegetation and habitats within and adjacent to the Application Site (see Appendix 7.1 for full survey details). Habitats were recorded according to published JNCC guidelines for Phase 1 habitat survey (Ref. 7.17). Habitats were mapped and target notes made for features of particular interest.
- 7.42 The habitats were then appraised for their suitability to support rare, notable or protected species.

*Badger*

- 7.43 The Application Site and a buffer was surveyed for badgers using the methodologies of Harris, Cresswell & Jefferies (Ref. 7.18). The Application Site was systematically searched for signs of badgers, including setts, latrines, signs of foraging, tracks, paths and hair on fencing in January, April, June **and November** 2013 to monitor levels of badger activity in the area. The status of the entrances of any setts was assessed according to criteria set out in Neal and Cheeseman (Ref. 7.19).

*Water Vole and Otter*

- 7.44 In January and August of 2013, Boxal Brook was survey for evidence of water voles and otters according to current survey guidelines (Ref. 7.20 & 7.21). The banks of all waterbodies were walked to search for signs of these animals. Any signs of water voles such as burrows, latrines, feeding remains, paths or the animals themselves were recorded on a scale map of the site. Furthermore, signs of otters such as holts, spraints, footprints or the animals themselves were also mapped.

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## *Bats*

### *Bat Roost Assessment*

7.45 An assessment of trees on and adjacent to the Application Site was undertaken in January 2013, to determine their potential to support roosting bats (see Appendix 7.2A for full details of surveys). Each tree was assigned to one of the following categories based on its potential to support roosting bats using the following criteria as defined by the BCT guidelines (Ref. 7.15):

- Category 1\*: Trees with multiple, highly suitable features capable of supporting larger roosts.
- Category 1: Trees with definite potential, supporting fewer suitable features than category 1\* trees or with the potential for use by single bats.
- Category 2: Trees with no obvious potential, although the tree is of a size and age that elevated surveys may result in cracks or crevices being found; or the tree supports some features which may have limited potential to support bats.
- Category 3: Trees with no potential to support bats.

### *Bat Activity Surveys*

7.46 Transect surveys were conducted around the Application Site during the months of May, June, July, **August and September**, 2013. This level of survey effort ~~will~~ provides ~~sufficient data to assess~~ bat activity data throughout the bat active season. Surveyors walked the transect route recording all bats seen or heard together with their species, numbers and activity (see Appendix 7.2A Protected Species Report for full details of surveys). Identification was aided by the use of Batbox Duet frequency division/heterodyne bat detectors to ensure full coverage of all bat calls. All transect survey bat call data was also recorded on to Edirols, so that calls could be reanalysed at a later date to confirm identification, as necessary.

7.47 Following BCT guidance, dusk activity surveys at dusk started a quarter of an hour before sunset and lasted for up to three hours. A pre-dawn transect survey was also

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conducted in June. This was undertaken within 24 hours of a dusk activity survey. This survey was undertaken for two hours prior to sunrise.

- 7.48 In addition to the walked transect surveys, automated surveys (using SM2 bat detectors) were undertaken around the Application Site **each month between April and September, inclusive** ~~during April, May and July and will continue each month until September, 2013.~~ During each month **up to four** ~~five~~ detectors were placed in strategic locations along the woodland edge, near to the Application Site. The detectors were left in place for at least five nights on each occasion to record all bat activity between half an hour before dusk and half an hour after dawn. All data was analysed **manually by identifying bat species from the visual representation of bat calls generated** by using the computer software, Analook. **i.e. sounds are converted into images.** ~~which assists species identification.~~

#### *Hazel Dormouse*

- 7.49 Searches for hazelnuts that have been gnawed by dormouse is the most efficient method of surveying for dormouse (Ref. 7.22). In April 2013, in line with current guidelines (Ref. 7.22) over 100 hazelnuts were collected from the floor of woodland near to the Application Site. Each nut was examined for the tooth marks indicative of hazel dormouse predation.
- 7.50 Furthermore, an assessment of the woodland edge was made for its suitability to support hazel dormouse. The assessment was based on the structure of the vegetation, the lateral connectivity of the vegetation (in terms of allowing arboreal species to move freely through the canopy), and plant species composition.
- 7.51 No evidence of dormouse was found during the hazelnut survey and therefore further surveys were not conducted.

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*Limitations*

- 7.52 No bat transect survey was undertaken in April 2013. This was due to the unusually cold and wet weather conditions in 2013 which, according to BCT Guidelines, were suboptimal for bat surveying (Ref. 7.15).
- 7.53 The assessment evaluates sites, habitats, species and other ecological features using an approach based on the 'Guidelines for Ecological Impact Assessment in the United Kingdom' (Ref. 7.23), classifying potential ecological receptors into a hierarchy of ecological value based on geographical scale of importance. Key areas and/or species of ecological value within the site are identified and the main factors contributing to their current ecological value are described. The assessment also takes account of relevant wildlife legislation and national and local planning policies.
- 7.54 In order to determine the significance of any effects of the Proposed Development a robust assessment methodology is required. The assessment method used is based upon various different protocols for the assessment of significance. The criteria draw on the IEEM guidelines for ecological impact assessment.
- 7.55 The value of receptors are identified and placed in a geographic context from "international" to "site" levels in accordance with the following scale:
- International (Very High);
  - UK and National (High);
  - Regional/County (Medium);
  - Local or Parish (Low);
  - Site (Very Low); and
  - Negligible.
- 7.56 Processes or factors within the proposed development that could potentially affect habitats and species or the wider environment are identified within the assessment.



- 7.57 Habitats and species within the survey area that might be affected by potential effects either directly or indirectly are considered and existing conditions are defined.
- 7.58 Likely significant effects arising from the development and the effects (beneficial or adverse) of these on species and their habitats are predicted, and where possible quantified. The geographic level at which these effects are considered to be significant is determined. IEEM guidelines suggest ecological experience and professional judgement should be integral part of this assessment process and impacts are described simply as “significant” or “not significant” at certain geographical levels.
- 7.59 In order to produce a summary of the ecological impacts within this chapter the IEEM impact descriptions are translated to the terms for effect significance throughout the rest of the ES. The approach to this translation is shown in Table 7.1.

**Table 7.1 Translation between IEEM assessment and ES Significance Terminology**

EIA Effect Significance		Equivalent IEEM Assessment
Significant	Major Beneficial	Positive Impact on ecological integrity or conservation status at Regional, National or International level.
	Moderate Beneficial	Positive Impact on ecological integrity or conservation status at Borough - County level.
Non-significant	Minor Beneficial	Positive Impact on ecological integrity or conservation status at Site - Local level.
Neutral	Negligible	No Significant Impact on ecological integrity or conservation status.
Non-significant	Minor Adverse	Adverse Impact on ecological integrity or conservation status at Site - Local level
Significant	Moderate Adverse	Adverse Impact on ecological integrity or conservation status at Borough - County level.
	Major Adverse	Adverse Impact on ecological integrity or conservation status at Regional, National or International level

- 7.60 Measures to avoid or reduce significant effects, if possible, have been developed in conjunction with other elements of the design and mitigation for other environmental disciplines. Where necessary, measures to compensate for impacts to features of nature

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conservation importance are also included. Remaining (residual) impacts of the Proposed Development after the implementation of mitigation are then reported.

- 7.61 Scope and opportunity for enhancement within the Proposed Development is considered, even if there are no significant negative impacts.

## **Baseline Conditions**

### ***Desk-Based Study Results***

#### *Statutory Designated Sites*

- 7.62 The Mens Special Area of Conservation (SAC) lies c.0.7km to the south of the Application Site (Figure 7.2). The Annex I habitats that are a primary reason for selection of the SAC site include Atlantic acidophilous beech *Fagus sylvatica* forests which is a beech forest with holly, growing on acid soils, in a humid Atlantic climate.
- 7.63 The Mens is an extensive area of mature beech woodland rich in lichens, bryophytes, fungi and saproxylic invertebrates. It is one of the largest tracts of Atlantic acidophilous beech forests in the south-eastern part of the habitat's UK range.
- 7.64 Annex II species that are qualifying feature, but not a primary reason for site designation includes a colony of barbastelle *Barbastella barbastellus* bats. Surveys, undertaken in 2008 for the Sussex Wildlife Trust, revealed that a breeding population of between 80-120 breeding females are present at The Mens (Ref. 7.24). Radio-tracking studies were been undertaken to identify core foraging areas for these bats and identified that the barbastelles of The Mens SAC forage to the east of the SAC, principally on the floodplain of the river Arun from close to Horsham in the north, to Parham in the south. They also cross to the Adur floodplain. In some cases the bats travelled up to 7km to visit foraging areas (Ref. 7.24).

- 7.65 The Mens is also designated as a Site of Special Scientific Interest (SSSI) due to being one of the most extensive examples of wealden woodland in West Sussex. It is important for its size, structural diversity and the extremely rich fungal and lichen flora. The wood also supports a diverse community of breeding birds and a nationally endangered species of fly.
- 7.66 Ebernoe Common SAC is located approximately 5km west of the Application Site (Figure 7.2). The Annex I habitats that are a primary reason for selection of this site are Atlantic *acidophilous* beech forests. Ebernoe Common has an extensive block of beech high forest and former wood-pasture. The woods are important for a number of bat species, in particular Bechstein's *Myotis bechsteinii* bat and barbastelle bats; both bat species are primary reasons for the selection of this site as an SAC.
- 7.67 Studies, undertaken in 2008 for the Sussex Wildlife Trust, have shown that the barbastelle from Ebernoe Common SAC follow the River Kird and woodland edges to the north and south of the SAC for commuting and foraging (Ref. 7.254). There has been less study of the bechstein bat populations. However, those radio-tracking projects which have been implemented for the species have established that the tracked individuals generally remained within approximately 1.5km of their roosts (Ref. 7.25).
- 7.68 Ebernoe Common is also an SSSI and is of national importance as an example of a large ancient woodland. It contains a wide range of structural and vegetation community types which have been influenced in their development by differences in the underlying soils and past management. The native trees, particularly those with old growth characteristics, support rich lichen and fungal communities, and a diverse woodland breeding bird assemblage. Nationally important maternity roosts for barbastelle bat and Bechstein's bat occur within the woodland.

#### *Non-Statutory Designated Sites*

- 7.69 Dunhurst & Northup Copses Site of Nature Conservation Importance (SNCI) lies approximately 15m north of the Application Site boundary and is an area of ancient

woodland (Figure 7.2). The majority of the woodland is dominated by oak *Quercus robur*, growing over dense hazel *Corylus avellana* and hawthorn *Crataegus monogyna*. The ground flora includes ivy *Hedera helix*, bluebell *Hyacinthoides non-scripta* and Goldenrod *Solidago virgaurea*.

#### *Flora and Fauna*

##### Vegetation

- 7.70 Blocks of ancient woodland were recorded within 1km of the site. The invasive plants Japanese knotweed *Fallopia japonica* and variegated yellow archangel *Lamium galeobdolon* subsp. *Argentatum* have been recorded within 1km of the Application Site. The rare species true fox-sedge *Carex vulpina*, rye brome *Bromus secalinus* and chamomile *Chamaemelum nobile* have also been recorded within 1km.

##### Bats

- 7.71 Six species of bats were recorded within 5km of the site: brown long-eared bat *Plecotus auritus*, common pipistrelle *Pipistrellus pipistrellus*, Daubenton's bat *Myotis daubentonii* and noctule *Nyctalus noctula*, serotine *Eptesicus serotinus* and barbastelle bats. The closest bat record was for a Daubenton's bat recorded approximately 210m to the north of the Application Site.

##### Other Mammals

- 7.72 Badger, weasel *Mustela nivalis*, roe deer *Capreolus capreolus*, grey squirrel *Sciurus carolinensis*, wood mouse *Apodemus sylvaticus* and rabbit *Oryctolagus cuniculus* have all been recorded within 1km and could occur on the site or within nearby woodland. There are no records of hazel dormouse within 1km.

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### Birds

- 7.73 Three Schedule 1 bird species were identified during the search these were kingfisher *Alcedo atthis*, barn owl *Tyto alba* and hobby *Falco subbuteo*.
- 7.74 Furthermore, a number of Species of Principal Importance for Nature Conservation under section 41 of the NERC Act 2006 and/or Red or Amber List Birds of Conservation Concern have been recorded within 2km of the Application Site (wood warbler *Phylloscopus sibilatrix*, snipe *Gallinago gallinago*, barn swallow *Hirundo rustica*, turtle dove *Streptopelia turtur*, tawny owl *Strix aluco*, skylark *Alauda arvensis*, nightingale *Luscinia megarhynchos*, fieldfare *Turdus pilaris*, song thrush *Turdus philomelos*, redwing *Turdus iliacus*, spotted flycatcher *Muscicapa striata*, marsh tit *Parus palustris*, starling *Sturnus vulgaris*, house sparrow *passer domesticus*, linnet *Carduelis cannabina* and yellowhammer *Emberiza citrinella*), however, none of these species were recorded on the Application Site or the field in which it is located.
- 7.75 Of the above species, skylark is the only species likely to use the arable land within the Application Site for nesting. The adjacent woodland is likely to support a range of other bird species.

### Reptiles

- 7.76 The relatively more widespread reptile species, grass snake *Natrix natrix*, slow worm *Anguis fragilis* and common lizard *Lacerta vivipara*, have been recorded within 1,060m, 892m and 1,060m of the Application Site, respectively. Whilst grass snakes are often associated with aquatic habitats, slow worm and common lizards may be found in areas of scrub and grassland. None of these species are likely to occur on arable land as these areas contain few food sources for these animals and are regularly disturbed by farm operations.

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### Invertebrates

- 7.77 The rare and/or notable invertebrates, stag beetle *Lucanus cervus*, brown hairstreak moth *Thecla betulae*, white admiral butterfly *Limenitis camilla* and purple emperor butterfly *Apatura iris*, have been identified within 1,130m, 272m, 362m and 814m, of the Application Site, ~~respectively~~ **respectively**. These species are all associated with woodland and/or hedgerow habitats and are unlikely to occur on the arable land of the Application Site.

### **Site Survey Results**

#### *Phase 1 Habitat Survey*

- 7.78 The Application Site is approximately 1.63ha in size. It largely comprises a small area of an intensively managed arable field which supported cereal stubble at the time of survey. Part of the proposed access track is coincident with an existing farm track which comprises hard standing. A small area of improved grassland falls within the Application Site boundary. This habitat was dominated by perennial rye-grass *Lolium perenne* and white clover *Trifolium repens*. Furthermore, two mature trees overlap the access track where it meets the Kirdford Road.
- 7.79 Adjacent habitats include a narrow strip of semi-improved grassland which forms the field boundary. This habitat was dominated by false oat-grass *Arrhenatherum elatius*, cock's foot *Dactylis glomerata*.
- 7.80 A block of broadleaved semi-natural and ancient woodland (Dunhurst & Northup Copses SNCI) lies to the north and west of the Application Site. This woodland comprised stands of oak, alder *Alnus glutinosa*, hazel, blackthorn *Prunus spinosa*, hawthorn, crab apple *Malus sylvestris*, ash *Fraxinus excelsior*, crack willow *Salix fragilis*, holly *Ilex aquifolium* and field maple *Acer campestre*. The ground flora comprised bluebell *Hyacinthoides non-scripta* and ivy *Hedera helix*.

- 7.81 Boxal Brook runs through the woodland approximately 40m to the north of the Application Site. The brooks did not contain any aquatic or marginal vegetation, but small areas of stinging nettles *Urtica dioica* were recorded on the banks.
- 7.82 Hedgerows to the north and south of Kirdford Road were classified as species-poor intact hedgerows. These comprised hawthorn *Crataegus monogyna*, hazel *Corylus avellana*, field maple *Acer campestre* and dog rose *Rosa canina*.
- 7.83 A dry ditch runs parallel with Kirdford Road. It is connected underneath the field entrance by a ceramic pipe. Species present adjacent and within the ditch included bramble and bracken *Pteridium aquilinum*. Other species present included false brome *Brachypodium sylvaticum*, black knapweed *Centaurea nigra* and rosebay willowherb *Chamerion angustifolium*.
- 7.84 There is one building near to the field entrance. The building is a single-storey metal construction which has no potential to support roosting bats.

#### *Water Vole and Otter*

No evidence of water voles or otters was recorded during the surveys and it is concluded that these species do not use the stretch of Boxal Brook within the survey area.

#### *Badger*

For badger survey results see Appendix 7.6A.

#### *Bat Roost Assessment*

- 7.85 Twenty-four trees on the edge of the woodland were assessed as having potential to support roosting bats (15 Category 1 trees and 9 Category 2 trees). The woodland may also provide foraging habitat for bats. No other trees on the edge of the woodland or in proximity to the access road were considered to have the potential to support roosting bats. For full survey results refer to Appendix 7.1 and 7.2A.

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*Bat Activity Survey*

- 7.86 The April static bat detector survey recorded 308 bat passes over five nights. 52% of the passes were recorded by the static detector at Location 2, on the edge of the woodland, approximately 15m north of the Application Site (Figure 7.3). A further 38% of the passes were recorded at Location 4, which was along the eastern field boundary, approximately 200m southeast of the Application Site. The majority of registrations were of common pipistrelle bat. Twenty-two passes by barbastelle bats were recorded. All of the barbastelle registrations were made at Location 4.
- 7.87 The May static bat detector survey recorded 1,061 bat passes over eight nights. 51% of the registrations were for common pipistrelle and a further 24% were for soprano pipistrelle. 185 barbastelle passes were recorded over eight nights, with all but one registration being made at Location 3, which was approximately 140m east of the Application Site, along the eastern field boundary. *Myotis* species were identified at locations 1, 2 and 3. Some of the registrations at Location 1 were identified as Daubenton's bat, a common *Myotis* species associated with aquatic habitats.
- 7.88 During the May transect survey, two barbastelle bats were recorded flying along the edge of the woodland opposite the northeast corner of the Application Site. Furthermore, six common pipistrelle and 20 soprano pipistrelle passes were recorded along the northern and eastern field boundaries. The first bat recorded during this survey occurred at 21:14, approximately 33 minutes after sunset, and was identified as a soprano pipistrelle commuting northwards towards Northup Copse. No bats were recorded over the arable habitat.
- 7.89 The June static bat detector survey recorded 1,315 bat passes over five nights. 82% of the registrations were made at Location 2, with pipistrelle species making up 95% of the records. Four registrations of barbastelle were recorded over the five nights. These passes were recorded at Locations 1 and 2.
- 7.90 During the June transect survey 87 bat passes were recorded (includes passes recorded during the dusk and dawn survey). No barbastelles were recorded; however, two *Myotis*



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species were recorded at 22:43 and at 03:42, respectively. The first bat recorded was identified as a soprano pipistrelle at 21:45, approximately 40 minutes after sunset. The last calls were recorded at 03:59, consisting of two soprano pipistrelle bats, at approximately 47 minutes before sunrise. This suggests that the bats roost at some distance from the survey area.

- 7.91 Bat activity was recorded predominately along the eastern field boundary. No bats were recorded over the arable habitat.
- 7.92 The July static bat detector survey recorded 3,339 bat passes over seven nights. 49% of the bat registrations were recorded at Location 4. The majority of the registrations were for pipistrelle species and no barbastelle bats were recorded. Six registrations of *Nyctalus* species (Noctule and Leislars) were recorded for the first time. Registrations were made at Locations 2 and 4.
- 7.93 During the July transect survey, a total of 30 bat passes were recorded comprising common pipistrelle and an unknown pipistrelle species. The majority of activity was located to the south of the Application Site, near to the eastern field boundary. The first bat recorded was approximately 42 minutes after sunset suggesting that the roost site was some distance from the survey area. No bats were recorded within the arable area of the field. No barbastelle bats were recorded during the July transect surveys.
- 7.94 No barbastelle bat passes were recorded in August by static detectors. The earliest bats recorded at location 1 were all between 21:20 and 21:38 and were common and soprano pipistrelles. At location 4 first bats were recorded between 21:07 and 21:24 and again were common and soprano pipistrelles. Five different species were recorded at location 4 including Leisler's and noctule. *Myotis* sp. were only recorded at location 3. **During the transect survey a single barbastelle bat was recorded flying to the east of the site approximately 55 minutes after sunset.**
- 7.95 In September, the earliest bats were recorded from 19:36 to 20:15 and included common and soprano pipistrelles, *Myotis* sp and one possible barbastelle. The barbastelle was recorded at 19:57 on 16th September, on this date the sunset time was

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19:17. **The September transect survey recorded a total of 86 bat passes, most of which were from species of pipistrelle bats within the woodland. Two barbastelle bats were recorded on the edge of and inside the woodland.**

### **Summary**

- 7.96 Barbastelle activity was recorded in ~~April, May and June~~ **every month apart from July.** Barbastelle activity peaked in May. Barbastelle activity was predominantly recorded along the eastern site boundary.
- 7.97 Bats foraged and commuted along the woodland edge and were not recorded over the Application Site, which is characterised by arable habitat.
- 7.98 For full survey results refer to Appendix 7.2A.

### *Hazel Dormouse*

- 7.99 Over 100 hazelnuts were collected within the woodland surrounding the Application Site. An examination of each nut revealed no evidence of hazel dormouse. An assessment of the woodland edge habitat revealed that the woodland edge closest to the Application Site was gappy, with a poor structure and sparse understory vegetation. Furthermore, there are no records of dormouse within 1km of the Application Site.

### ***Future Baseline***

- 7.100 The habitats within the Application Site are managed as arable farmland. Assuming this continues, this area is unlikely to support different species in the future because the habitats are not natural, species-poor and regularly disturbed. The grassland is cut and also disturbed by farming operations and therefore is unlikely to change in future years.
- 7.101 The hedgerows, trees and woodland are established habitats and in the absence of a change of management are unlikely to change in future years.

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7.102 In the absence of development, substantive changes to these habitats in not expected.

### **Evaluation**

7.103 This section evaluates the nature conservation interest of the study area in terms of the habitats and the species it supports. This value is placed in a geographical context through the framework described in the Assessment Methodology section.

### *Designated Sites*

7.104 The Mens SAC is of International (Very High) Value to ecology due to its international statutory designation and the habitats and species that it supports.

7.105 The Mens SSSI is of National (High) Value to ecology due to its national statutory designation.

7.106 Ebernoe Common SAC is of International (Very High) Value to ecology due to its international statutory designation and the habitats and species that it supports.

7.107 Ebernoe Common SSSI is of National (High) Value to ecology due to its national statutory designation.

7.108 Dunhurst & Northup Copses SNCI, which incorporates the woodland and trees to the north of the Application Site, is an area of ancient woodland which contains numerous mature trees and a varied ground flora characteristic of ancient woodland. The woodland is likely to support a range of animals including foraging and roosting bats, birds, badgers and small mammals. Ancient woodland is a rare habitat and the SNCI is assessed to be is of County (Medium) value.

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*On Site Habitats*

- 7.109 On site habitats include small areas of arable land, improved grassland and hard standing. The arable land is intensively managed and offers few opportunities for wildlife. Birds may forage in the stubble during the winter and skylark may use the field for nesting; however, the Application Site is only 1.63ha of land which is a small proportion of the total arable habitat available within the wider landscape. Furthermore, arable land provides few of the invertebrates required by foraging bats (Ref. 7.24). improved grassland is a common and widespread habitat in the UK and is of negligible value due to the small area on the site. The hard standing has negligible value to wildlife. Together, the habitats on the Application Site are considered to be of Site (Very Low) value.
- 7.110 Two mature trees overlap the field entrance where the new access track adjoins Kirdford Road. One of these trees has been assessed as having moderate potential to support roosting bats. Taking into account the number of similar mature trees in the area, the trees are assessed as being of Local (Low) value.

*Adjacent Habitats*

- 7.111 Woodland habitats are assessed as part of the SNCI above.
- 7.112 A narrow semi-improved grass margin abuts the woodland edge. This habitat may provide a corridor for low numbers of common reptiles and invertebrates. This habitat is of Negligible value.

*Badger*

- 7.113 One **active** badger sett **was recorded within 20m of the Application Site, but activity levels were low, with only three entrances showing any signs of activity.** Two disused badger setts **were also** as recorded ~~approximately 20m from the Application Site~~ **within the survey area.** Mammal paths were noted in the woodland that were probably created

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by badgers. The habitats within the site boundary provide few opportunities for badgers due to the small area involved and because arable land does not provide optimal foraging habitat for badgers compared to the woodland and grassland in the wider landscape. Badger is a widespread and common species in West Sussex and is considered to be of Site (Very Low) value.

#### *Bats*

7.114 At least six species of bats were recorded using the habitats adjacent to the Application Site (common pipistrelle, soprano pipistrelle, Leisler's bat, noctule, barbastelle and *Myotis* sp.). Good numbers of passes of more common/widespread bat species were recorded (common pipistrelle, soprano pipistrelle and Leisler's bat). Fewer passes by rarer bats were also recorded (barbastelle and *Myotis* species) along the woodland edge to the east of the site. It is probable that a proportion of barbastelle bats from The Mens SAC use the woodland edge for commuting and foraging. It is unlikely that a significant number of bats from Ebernoe Common SAC use the Application Site or its immediate surrounds as the available radio-tracking data indicated that these bats do not travel east from their roost site. The bats are of County (Medium) value.

#### *Hazel Dormouse*

7.115 The surveys revealed no evidence of dormouse in the habitats surrounding the Application Site. Furthermore, there are no confirmed records of dormouse within 1km of the Application Site. Whilst the presence of dormouse cannot be completely discounted, in the absence of any evidence of presence, dormouse are considered to be of Site (Very Low) value.

#### *Birds*

7.116 It is likely that a number of species of birds use the woodland for foraging and nesting. Furthermore, skylark may nest in the arable field on or close to the Application Site. However, the Application Site itself represents a small area of relatively poor-quality

habitat for birds and the immediate surrounds include similar intensively managed arable land and a small section of woodland edge which could support only a limited number of birds compared to the number of birds in the wider landscape. The birds using the Application Site and adjacent habitats are of Site (Very Low) value.

### *Reptiles*

7.117 The grassy field margin and woodland edge may support low numbers of common reptiles, such as grass snake, slow worm and common lizard. Due to the very low numbers that the grassland could support, reptiles are assessed as being of Site (very Low) value.

### *Evaluation Summary*

7.118 Receptors that have been valued at Local value or above will be assessed further to determine whether there is the potential for significant effects as a result of the Proposed Development. Where a receptor has been assessed as being of less than Local value, but receives a degree of statutory protection (as is the case with breeding birds, reptiles and dormouse and badger), recommendations are made to ensure the scheme complies with relevant wildlife legislation.

7.119 These receptors include:

- The Mens and Ebernoe Common SSSI/SACs;
- Dunhurst & Northup Copses SNCI/Ancient Woodland and Trees; and
- Bats.

### ***Proposed Development Description, Embedded Avoidance and Mitigation Measures***

7.120 A description of the Proposed Development including details on the engineering operations, equipment and infrastructure along with phasing and timescales can be found in Chapter 4: Project Description.

- 7.121 The Proposed Development involves the, construction, operation and decommissioning of a temporary (exploration) well site, including an access track and ancillary infrastructure. In response to the presence of barbastelle and other bats, and the woodland habitats and SNCI to the north of the Application Site, the design has been revised to provide a buffer of 15m between the Proposed Development and the woodland edge in order to reduce potential impacts on these receptors. This scale of buffer is consistent with the Natural England Standing Advice for Ancient Woodland (Ref. 7.256). Furthermore, two temporary soil bunds of 2½ - 3m in height will be constructed between the well site and the woodland to the north and east of the site to screen the woodland from visual, noise and light disturbance. Please refer to Chapter 6: Construction Programme & Management for details of construction.
- 7.122 If exploration of the Application Site reveals minerals worthy of extraction on a commercial scale, then the Application Site is likely to be retained without the drilling rig and ancillary drilling equipment, and would remain inactive whilst awaiting a further planning application. However, if the exploration is unsuccessful then the land would be restored to its previous habitats with all of the car park, drilling equipment, lighting and bunds removed and it is expected that the current farming practices will recommence.
- 7.123 A Construction Environmental Management Plan (CEMP) will be compiled prior to works commencing on site to ensure best environmental working practice during construction (refer to Chapter 6 for more information).

### *Lighting*

The lighting scheme has been designed to minimise unnecessary illumination and avoid adverse effects from light spill onto adjacent habitats (See Chapter 4A: Project Description and the assessment within Chapter 12A: Lighting). The access route will not be lit at any time during construction, operation or decommissioning. ~~There will be no artificial lighting used in Phases 1 and 4a. During Phases 1 there will be some limited lighting around the welfare units. This will comprise three 500 watt towers and one 35 watt bulkhead on the welfare unit. There will be no light spill beyond the fenceline~~

~~during Phase 1. There will be no lighting in Phase 4b. During Phases 2, 3a and 3b lighting will comprise of six freestanding 3m high fluorescent lights facing inwards towards the site and pointing downwards angled at 20° below the horizontal plane to reduce light spill; eight tungsten filament bulkhead lights located on site cabins fitted with reflectors to reduce light spill; two horizontal strip lights at cabin level adjacent to the rig; and inward and downward facing lighting within the derrick of the drilling rig. All lamps will use fluorescent and halogen bulbs which emit only low levels of ultraviolet light. Bunds of c.2½ - 3m will be created between the site and the woodland edge **to reduce light spill. The flare will be enclosed and will not contribute to light spill.**~~

~~In addition to the design of the lighting scheme above, the following measures will be implemented to further reduce light spill from the Application Site:  
areas of the site that are not operational will not be lit;  
the power of the lights will be the minimum necessary for purpose;~~

- 7.124 **Figure 12.1 in Chapter 12A: Lighting presents the anticipated light spill from the proposed development based on a worst case scenario with no cowls or shielding on the lights. Based on this scenario, the level of light spill on surrounding the woodland edge would be negligible (estimated to be <0.1 lux) owing to good design, including the installation of a 4m high opaque screen around the entire Application Site. In practice, the light spill would be further reduced by applying cowls to lamps and a 3.4m opaque screen would surround the entire Application Site.**

#### *Noise Attenuation*

- 7.125 Noise attenuation and dust control procedures will operate on site including effective silencers and damping down runways as the weather dictates. Please refer to Chapter 9: Noise and Chapter 6: construction Programme and Management for further details of noise control measures.
- 7.126 During construction, noise levels will vary according to the works being undertaken, but short-term events during this phase could generate noise of up to 70 d(B)A at the source.



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This would be equivalent to the noise of a tractor. There will be no construction activity at night.

- 7.127 During operation, the noise level at the woodland edge is predicted to be c.45 d(B)A, which is comparable to noise levels in a quiet suburb. Operational activity will be undertaken for 24 hours a day.

#### *Protection of Water Resources*

- 7.128 The risk of pollution incidents is low and the incorporation of mitigation measures such as use of water-based, non-toxic drilling fluids and installation of pollution interceptors further reduces this risk (see Chapter 11A: Ground and Groundwater Protection).
- 7.129 Due to the distance between Boxal Brook and the site (approximately 50m), this watercourse is not considered to be at risk from contaminated run-off.

#### *Nesting birds*

- 7.130 The surrounding woodland will be checked for nesting Schedule 1 birds prior to any works beginning on the Application Site. Should any active nests be located then an assessment will be made as to whether the works would disturb them. Any types of work deemed disturbing will be delayed until any dependent young have left the area.
- 7.131 Soil stripping of the arable land and removal of vegetation will be undertaken outside of the bird nesting season (March-September). If this is not possible, a suitably qualified ecologist will check the area for nesting birds. Should an active bird nest be found, then works in the area will be postponed until the chicks have fledged. A suitably qualified ecologist will supervise all vegetation clearance and will move any reptiles or small mammals to a safe location.

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*Mammals*

7.132 Any trenches/pits created during the construction process will include a means of escape to prevent animals becoming trapped in them.

**7.132a Where the security fencing falls within 20m of a badger sett the fence will be installed using hand tools and works will be undertaken under the supervision of a suitably qualified ecologist.**

**7.131b Vehicle movements will generally be planned to be undertaken during daylight hours; however there may be a requirement for vehicles to visit the site after dusk in exceptional circumstances.**

*Woodland and Other Trees (Root Protection)*

7.133 Prior to the commencement of any construction activities the extent of Root Protection Area (RPA) of retained trees will be accurately set out and marked on the ground.

7.134 The construction site compound, bunds, offices and materials storage will be positioned outside the canopy spread and RPA of trees. The proposed access track impinges upon the RPAs of five trees or tree groups and a suitable load-bearing ground protection system will be instated to avoid compaction impacts upon the RPA of these trees (see Appendix 7.5).

7.135 A total of two trees will require crown lifting to 5m above ground level over the proposed access track to facilitate the movement of high-sided vehicles. All works will be undertaken by an Arboricultural Association Approved Contractor in accordance with BS3998 (2010).

7.136 One of these trees one was considered to have some features, with limited potential to support roosting bats. A tree climb and inspection survey will be undertaken to determine if bats are present immediately prior to any arboricultural works on the tree.

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If bats are found a Natural England licence will be obtained to ensure that the bats are protected and suitable compensatory roost sites are provided.

### **Likely Significant Effects**

7.137 In order to assess ecological effects the phases of the Proposed Development have been grouped into Construction Impacts (Phase 1), Operational Impacts (Phase 2 and 3) and Decommissioning Impacts (Phase 4a and 4b). For a full description of each of the phases of the Proposed Development see Chapter 4: Project Description and Chapter 6: Construction Programme and Management.

### ***Construction Effects (Phase 1)***

#### *The Mens SSSI/SAC*

7.138 The primary reason for the designation of The Mens SAC is the presence of Atlantic acidophilous beech forests. The Mens SSSI is also designated for its habitats. No direct impacts on these habitats (such as habitat loss, pollution or disturbance from noise) are predicted during this phase of works due to the distance between the SSSI/SACs and the Application Site.

7.139 It is likely that barbastelle bats (which are qualifying feature, but not a primary reason for the designation of The Mens SAC) from The Mens forage around the boundary of the field in which the Application Site is located; however, there will be no ~~night-time working or illumination of the Application Site or its surrounds~~ **light spill onto habitats outside of the Application Site during the Construction Phase** and no adverse effects on the conservation status of bats or the integrity of The Mens SSSI/SAC is predicted (see Appendix 7.4A for Habitat Regulations Assessment). The effect on The Mens SSSI/SAC is therefore Negligible and of Neutral significance (non-significant)(Table 7.1).

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*Ebernoe Common SSSI/SAC*

- 7.140 The primary reasons for the designation of Ebernoe Common SAC are Atlantic acidophilous beech forests and the populations of Bechstein's bat and barbastelle. No direct impacts on the habitats (such as habitat loss, pollution or disturbance from noise) are predicted during this phase of works due to the distance between the SAC and the Application Site.
- 7.141 Studies on Bechstein's bats indicate that they forage within 1.5km of the SAC (Ref. 7.253) and are unlikely to use land in the vicinity of the Application Site. Whilst barbastelle bats from the SAC may forage around the boundary of the field in which the Application Site is located; there will be no ~~night time working or illumination of the Application Site, or its surrounds~~ **light spill onto habitats outside of the Application Site** during the Construction Phase and no adverse effects on the conservation status of bats or the integrity of Ebernoe Common SAC are predicted (see Appendix 7.4A for Habitat Regulations Assessment).
- 7.142 Ebernoe Common is also an SSSI and is of national importance as an example of a large ancient woodland and holds nationally important maternity roosts for barbastelle bat, and Bechstein's bat **also** occur within the woodland. Due to the distance from the Application Site and the nature and diurnal timing of the works. No adverse effects on the habitats or bats, for which the site, is designated are predicted.
- 7.143 The effect on Ebernoe Common SSSI/SAC is therefore Negligible and of Neutral significance (non-significant)(Table 7.1).

*Dunhurst & Northup Copses SNCI/Ancient Woodland and Trees*

- 7.144 There will be no loss of woodland or trees during the Construction Phase. Two trees at the site entrance will require minor crown lifts. With the proposed embedded mitigation measures, there will be no impacts from pollution or damage to woodland or tree roots.

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A 15m buffer and the soil bund between the Application Site and the woodland edge will reduce visual or noise disturbance.

- 7.145 Noise levels will vary during the construction phase depending on the operation being conducted, but short-term events could generate noise of up to 70 d(B)A at the source (see Chapter 9: Noise). However, the 15m buffer between the Application Site and the woodland edge, together with the bunds will reduce the noise levels at the woodland edge. Whilst there could be some localised disturbance, this will be short-lived and reversible and the ecological integrity of the SNCI and Ancient woodland is not likely to be adversely affected.
- 7.146 Due to the distance between Boxal Brook and the Application Site and the pollution control measures which will be instated, no adverse effects on the brook are predicted.
- 7.147 The effects on Dunhurst & Northup Copses SNCI, the ancient woodland and trees is predicted to be Negligible and of Neutral significance (non-significant)(Table 7.1).

#### *Bats*

- 7.148 The arable land within the Application Site is not considered an important bat foraging habitat. Bats were recorded using the woodland edge for foraging and commuting; however, there will be no ~~night time working or illumination of the Application Site or its surrounds~~ **light spill onto habitats outside of the Application Site** during the Construction Phase and no adverse effects on the conservation status bats are likely to occur.
- 7.149 One tree, which has low potential to support roosting bats will require some minor arboriculture works. As part of good construction practice, the tree will be inspected prior to such works to determine whether bats are present. If bats are found, a Natural England licence will be obtained to ensure that the bats are protected and suitable compensatory roost sites are provided. No other trees that have the potential to support roosting bats will be impacted by the works.

7.150 The effect is therefore Negligible and of Neutral significance (non-significant)(Table 7.1).

### ***Operational Impacts (Phase 2 and 3)***

#### *The Mens SSSI/SAC*

7.151 The primary reason for the designation of The Mens SAC is the presence of Atlantic acidophilous beech forests. The Mens SSSI is also designated for its habitats. No direct impacts on these habitats (such as habitat loss, pollution or disturbance from noise) are predicted during this phase of works due to the distance between the SSSI/SACs and the Application Site.

7.152 It is likely that barbastelle bats (which are qualifying feature, but not a primary reason for the designation of The Mens SAC) from The Mens forage around the boundary of the field in which the Application Site is located. Whilst operations will continue during the night, noise levels at the woodland edge will be attenuated to c. 45dB(A). There has been limited research conducted on the effects of noise on bats, but a recent study concerning the greater mouse-eared bat *Myotis myotis* showed that various types of noise did affect the foraging behaviour of the species (and in some cases reduced the ability of the bat to forage) (Ref. 7.28). However, the effect of noise on the bat was not directly related to the amplitude of the sound (volume), but rather to nature (frequency and time structure) of the sound and how this interacted with the bat's echolocation. For example 'vegetation noise', which was at a lower volume to the traffic noise, had a more disruptive effect on the bats' foraging behaviour due to its similarity in sound character to the bat's prey species.

7.153 Furthermore, the scheme has been designed to reduce artificial light spill levels at the woodland edge, which is the main commuting and foraging route for bats, to **below 0.5-1 lux (see Figure 12.1 Chapter 12A. Lighting). A recent study of the effects of lighting on bats defined a dark site as one where illumination was below 0.5 lux and species of bats, including barbastelle bats, were recorded foraging in these areas (Ref. 7.27). It is concluded that this level of illumination at the site will not impact on bat behaviour.**

7.154 Overall the effects will be localised, temporary, and reversible and therefore no adverse effects on the conservation status of barbastelle bats are likely. Furthermore, no adverse effects on the Integrity of the SSSI or SAC are likely to occur. The effects are Negligible and of Neutral significance (non-significant) (Table 7.1).

*Ebernoe Common SSSI/SAC*

7.155 The primary reasons for the designation of Ebernoe Common SAC are Atlantic acidophilous beech forests and the populations of Bechstein's bat and barbastelle. Ebernoe Common is also an SSSI and is of national importance as an example of a large ancient woodland and holds nationally important maternity roosts for barbastelle bat and Bechstein's bat occur within the woodland. No direct impacts on the habitats (such as habitat loss, pollution or disturbance from noise) are predicted during this phase of works due to the distance between the SAC and the Application Site.

7.156 Studies on Bechstein's bats indicate that they forage within 1.5km of the SAC (Ref. 7.24) and are unlikely to use land in the vicinity of the Application Site. Barbastelle bats from the SAC may forage around the boundary of the field in which the Application Site is located; however, whilst operations will continue during the night, noise levels at the woodland edge will be attenuated to c. 45dB(A). Furthermore, the scheme has been designed to reduce artificial light spill levels at the woodland edge, which is the main commuting and foraging route for bats, to below 0.5–0.1 lux (see Figure 12.1 Chapter 12A. Lighting). It has been demonstrated that bats are unaffected by this level of illumination (Ref. 7.27).

7.157 No adverse effects on the conservation status of bats or the integrity of Ebernoe SSSI/SAC is predicted (see Appendix 7.4A for Habitat Regulations Assessment). The effect on Ebernoe Common SSSI/SAC is therefore Negligible and of Neutral significance (non-significant)(Table 7.1).

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*Dunhurst & Northup Copses SNCI/Ancient Woodland and Trees*

- 7.158 A small stretch of the woodland edge may be subject to some disturbance from noise during the daytime and night time, during this phase of works. However, the 15m buffer between the Application Site and the woodland edge, together with the bunds will reduce this to 45dB(A) at the nearest point of the woodland. Any effects will be localised and temporary in nature, and will be reversed when the operations cease.
- 7.159 Due to the distance between Boxal Brook and the Application Site and the pollution control measures which will be instated, no adverse effects on the brook are predicted.
- 7.160 For these reasons the overall effects on the integrity of SNCI and woodland is assessed as being Negligible and of Neutral significance (non-significant) (Table 7.1).

*Bats*

- 7.161 Activity surveys revealed that a number of bats, including barbastelle, use the woodland edge for foraging and commuting. Furthermore, studies of the foraging behaviour of barbastelle bats have revealed that their preferred foraging habitat are wetlands and aquatic habitats and occasionally woodland. Arable land provides few invertebrates for foraging bats and is rarely used by barbastelle (Ref. 7.24).
- 7.162 Whilst the activities of bats using the woodland edge could be disrupted by illumination of their habitats, the scheme has been designed to avoid illumination of the woodland edge and illumination will be below 0.5 0.1 lux which is considered to qualify as a dark site that is suitable for bats to forage (Ref 7.27). Furthermore, noise levels will be attenuated to around 45 d(B)A at the woodland edge. For these reasons no adverse effects on the conservation status of bats are ~~is~~ predicted. The effect is Negligible and of Neutral significance (non-significant) (Table 7.1)



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***Decommissioning and Restoration (Phase 4a and 4b)****The Mens and Ebernoe SSSI/SACs*

- 7.163 No direct impacts on the SSSI/SACs are predicted during this phase of works due to the distance between the SACs and the Application Site.
- 7.164 It is likely that barbastelle bats from The Mens, and possibly Ebernoe Common, forage around the boundary of the field in which the Application Site is located; however, there will be no ~~night time working or illumination of the site or its surrounds~~ **light spill onto habitats outside of the Application Site** during the Restoration Phase and no adverse effects on the conservation status of bats or the integrity of the Mens or Ebernoe SSSI/SAC designated areas are predicted. The effect on both sites is therefore Negligible and of Neutral significance (non-significant) (see Table 7.1).

*Dunhurst & Northup Copses SNCI/Ancient Woodland and Trees*

- 7.165 There will be no loss of woodland or trees during the Restoration Phase. With the proposed embedded mitigation measures, there will be no impacts from pollution or damage to woodland or tree roots. A 15m buffer and the soil bund between the Application Site and the woodland edge will reduce visual **and** ~~or~~ noise disturbance.
- 7.166 Noise levels could reach 70 d(B)A at the source (see Chapter 9: Noise). However, the 15m buffer between the Application Site and the woodland edge, together with the bunds will reduce the noise levels at the woodland edge. Whilst there could be some localised disturbance, this will be ~~short-lived~~ **temporary** and reversible and the ecological integrity of the SNCI and Ancient woodland is not likely to be adversely affected.
- 7.167 Due to the distance between Boxal Brook and the Application Site and the pollution control measures which will be instated, no adverse effects on the brook are predicted.

7.168 The effects on Dunhurst & Northup Copses SNCI, the ancient woodland and trees is predicted to be Negligible and of Neutral significance (non-significant)(Table 7.1).

#### *Bats*

7.169 The arable land within the Application Site is not considered an important bat foraging habitat. Bats were recorded using the woodland edge for foraging and commuting; however, there will be no ~~night time working or illumination of the site or its surrounds during the Construction~~ **light spill onto habitats outside of the Application Site during the Decommissioning** Phase and no adverse effects on the conservation status bats are ~~likely to occur~~ **predicted**.

7.170 The effect **on bats** is therefore Negligible and of Neutral significance (non-significant)(Table 7.1)

#### *Cumulative Effects*

7.171 Two schemes within 4km of the Application Site have been identified as relevant for the cumulative assessment, these are described below;

1. 31ha solar farm c.3.5km northwest.
2. 30 houses c.1.4km southeast. Due to the nature of these projects, the distance from the Application Site and the intervening habitats, no cumulative impacts are predicted.

#### *Summary of Effects*

7.172 Due the careful design of the Proposed Development, its small scale and temporary nature, no significant adverse effects are predicted. **It is possible that some temporary, low level disturbance may be experienced by badgers using one sett (see Appendix 7.6A); however, badgers are of Site value and so the effects are not significant.**

---

## Mitigation and Enhancement Measures

**7.172a Badger activity will be monitored on a monthly basis during the works so that the mitigation strategy can be updated to take into account any changes in activity.**

**7.172b To minimise the disturbance to badgers, the heavy goods vehicles used to deliver stone to construct the car park will only visit the site during daylight hours. All other heavy goods vehicle movements will be outside of the 30m buffer zone for the setts and so are not at risk of disturbing badgers.** ~~Only in exceptional circumstances which were operation or health and safety led, would deliveries be made at night. Furthermore, vehicle movements will be restricted to a speed limit of 10 miles per hour on the site. A detailed Construction Traffic Management Plan will be prepared to confirm the timings of all heavy goods vehicle movements (see Chapter 10A: Transport and Access). If heavy goods vehicles need to visit the site at night, permission will be sought from West Sussex County Council, except where an emergency dictates that they must enter without waiting for prior approval. In exceptional circumstances, a vehicle may need to enter for health and safety reasons.~~

7.17 In line with current planning policy, enhancements will be made to benefit ecology. Fifteen bat boxes will provided to West Sussex County Council to be installed in the area. These will include at least five boxes designed to specifically support barbastelle bats. The boxes will be installed during the construction phase of the project and left in situ in perpetuity. **The locations of the bat boxes would be agreed between WSCC, the Wildlife Trust, the Applicant and landowner. Baseline surveys show that the eastern site boundary is most attractive to bats and it is considered that the best location for the boxes.**

**7.173a The bat boxes will be monitored for one year after installation to determine whether they are used by bats.**

**7.173b Bat activity will be monitored around the Application Site each month for the duration of the construction, operation and decommissioning phases of the development,**

---

**where these fall within the bat active season. Surveys methods will be consistent with those detailed above so that the activity of bats can be directly compared to the baseline survey data.**

**7.173c All bat monitoring survey results will be issued to WSCC and the West Sussex Wildlife Trust.**

### **Residual Effects**

7.18 A minor beneficial impact on bats is predicted as a result of the enhancement measures (Table 7.2). The majority of residual effects are negligible with minor adverse effects on the Dunhurst and Northup Copses SNCI, Ancient Woodland and Trees during construction and operation.

Table 7.2: Table of Significance – Ecology

Potential Effect	Nature of Effect (Permanent/Temporary)	Significance (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)	Mitigation / Enhancement Measures	Geographical Importance*							Residual Effects (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)
				I	UK	E	R	C	D	L	
<b>Phase 1: Construction of access road and well site</b>											
The Mens and Ebernoe Common SAC/SSSI	No effects	Negligible	None required	*	*	-	-	-	-	-	Negligible
Dunhurst and Northup Copses SNCI, Ancient Woodland and Trees	No effects	Negligible	None	-	-	-	-	*	-	-	Minor adverse
Bats	No effects	Negligible	15 bat boxes to be donated to the Council	-	-	-	-	*	-	-	Minor beneficial
<b>Phase 2: Mobilisation of the drill rig and drilling operations</b>											
The Mens and Ebernoe Common SAC/SSSI	No effects	Negligible	None required	*	*	-	-	-	-	-	Negligible
Dunhurst and Northup Copses SNCI, Ancient Woodland and Trees	No effects	Negligible	None	-	-	-	-	*	-	-	Minor adverse
Bats	No effects	Negligible	15 bat boxes to be donated to the Council	-	-	-	-	*	-	-	Minor beneficial
<b>Phase 3a: Short term testing and evaluation (gas)</b>											
The Mens and Ebernoe Common SAC/SSSI	No effects	Negligible	None required	*	*	-	-	-	-	-	Negligible
Dunhurst and Northup Copses SNCI, Ancient Woodland and Trees	No effects	Negligible	None	-	-	-	-	*	-	-	Minor adverse
Bats	No effects	Negligible	15 bat boxes to be donated to the Council	-	-	-	-	*	-	-	Minor beneficial
<b>Phase 3b: Short term testing and evaluation (oil)</b>											
The Mens and Ebernoe Common SAC/SSSI	No effects	Negligible	None required	*	*	-	-	-	-	-	Negligible
Dunhurst and Northup Copses SNCI, Ancient Woodland and	No effects	Negligible	None	-	-	-	-	*	-	-	Minor adverse

Trees												
Bats	No effects	Negligible	15 bat boxes to be donated to the Council	-	-	-	-	*	-	-		Minor beneficial
<b>Phase 4a: Restoration</b>												
The Mens and Ebernoe Common SAC/SSSI	No effects	Negligible	None required	*	*	-	-	-	-	-		Negligible
Dunhurst and Northup Copses SNCI, Ancient Woodland and Trees	No effects	Negligible	None required	-	-	-	-	*	-	-		Minor adverse
Bats	No effects	Negligible	15 bat boxes to be donated to the Council	-	-	-	-	*	-	-		Minor beneficial
<b>Phase 4b: Retention</b>												
The Mens and Ebernoe Common SAC/SSSI	No effects	Negligible	None required	*	*	-	-	-	-	-		Negligible
Dunhurst and Northup Copses SNCI, Ancient Woodland and Trees	No effects	Negligible	None	-	-	-	-	*	-	-		Minor adverse
Bats	No effects	Negligible	15 bat boxes to be donated to the Council	-	-	-	-	*	-	-		Minor beneficial
<b>* Geographical Level of Importance</b>												
I = International; UK = United Kingdom; E = England; R = Regional; C = County; D = District; L = Local												

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**References**

- Ref. 7.1 Department for Communities and Local Government (2012) National Planning Policy Framework
- Ref. 7.2 Office of the Deputy Prime Minister (2005) Government Circular: Biodiversity and Geological Conservation
- Ref. 7.3 Chichester District Council (1999) Chichester District Local Plan
- Ref. 7.4 West Sussex County Council (adopted July 2003) West Sussex Minerals Local Plan
- Ref. 7.5 Convention on Biological Diversity (2010) Strategic Plan for Biodiversity 2011–2020. Available at: <http://www.cbd.int/decision/cop/?id=12268>
- Ref. 7.6 DEFRA (2006) Natural Environment and Rural Communities Act
- Ref. 7.7 Chichester Biodiversity Action Plan (June 2011)
- Ref. 7.8 JNCC (2012) the State of the UK's Birds 2012
- Ref. 7.9 Her Majesty's Stationary Office (HMSO) (1981) The Wildlife and Countryside Act (as amended)
- Ref. 7.10 HMSO (2000) The Countryside and Rights of Way Act
- Ref. 7.11 HMSO (2006) Natural Environment and Rural Communities Act
- Ref. 7.12 HMSO (2010) The Conservation of Habitats and Species Regulations
- Ref. 7.13 HMSO, (1992) The Protection of Badgers Act
- Ref. 7.14 HMSO (1996) Wild Mammals (Protection) Act 1996
- Ref. 7.15 Bat Conservation Trust (2012) Bat Surveys; Good Practice Guidelines. Bat Conservation Trust
- Ref. 7.16 British Standards Instituted (2012) Trees in Relation to Design, Demolition and Construction to Construction - Recommendations (BS 5837)
- Ref. 7.17 Joint Nature Conservation Committee (JNCC) (2010) Handbook for Phase 1 Habitat Survey: A Technique for Environmental Audit, revised reprint 2003. JNCC. Peterborough.
- Ref. 7.18 Harris S., Cresswell, P. and Jefferies, D. (1989) Surveying Badgers. The Mammal Society 9
- Ref. 7.19 Neal, E. and Cheeseman, C. (1996) Badgers. T&AD Poyser Ltd

- 
- Ref. 7.20 Strachan R. and Moorhouse T. (2006). Water Vole Conservation Handbook: Second Edition. Wildlife Conservation Research Unit. Oxon.
- Ref. 7.21 Chanin P. (2003) Monitoring the Otter *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No. 10, English Nature, Peterborough
- Ref. 7.22 Bright, P., Morris, P. and Mitchell-Jones, T. (2006). The Dormouse Conservation Handbook. Second Edition. Natural England.
- Ref. 7.23 Institute of Ecology and Environmental Management (2006); Guidelines for Ecological Impact Assessment.
- Ref. 7.24 Greenaway, F. (2008) Barbastelle Bats in West Sussex. West Weald Landscape Partners.
- Ref. 7.25 Greenaway, F., Hill, D., Fitzsimons, P. (2001) Bats of Ebernoe Common. A Survey Commissioned by the Sussex Wildlife Trust.
- Ref. 7.26 Natural England (2012) Standing Advice for Ancient Woodland.
- Ref. 7.27** **Murphy, S., Hill, D., & Greenaway, F. (2009) Pilot study of a technique for investigating the effects of artificial light and noise on bat activity. Report for People's Trust for Endangered Species.**
- Ref. 7.278 Schaub A, Ostwald, J, Siemers, BM. (2009). Foraging bats avoid noise. Journal of Experimental Biology.



**APPENDIX 7.2A**  
**PROTECTED SPECIES REPORT**



# Wisborough Green-1

APPENDIX 7.2A:  
Protected Species Report

August 2013

Prepared for:  
Celtique Energy Weald  
Limited

UNITED  
KINGDOM &  
IRELAND



REVISION RECORD					
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## 1. INTRODUCTION

### 1.1 Background

URS Infrastructure and Environment UK Ltd. (URS) was commissioned by Celtique Energy Weald Limited to carry out protected species surveys at a site located in West Sussex in support of a planning application.

The site comprises an area of approximately 1.56 hectares (ha) of land to the north-west of Wisborough Green, West Sussex (hereafter referred to as 'the site') and is centred on Ordnance Survey (OS) grid reference TQ 035 267. The proposed site is situated within an arable field in land south of Boxal Bridge off Kirdford Road.

The Proposed Development comprises the siting and construction of a temporary well site including access track and ancillary infrastructure, for the exploration, testing and evaluation of hydrocarbons.

Habitats identified within the survey area include ancient woodland which lies to the north and west of the site. An arable field forms the main on-site habitat and is bounded by semi-improved grassland field margins which are in turn bordered by ancient woodland to the north, east and south. The proposed access route for the site is planned off Kirdford Road and runs through the arable field and would require the removal of two soil heaps.

The purpose of this report is to inform a planning application for the site and to identify and quantify ecological constraints that might arise as a result of the proposals.

### 1.2 Scope of Work

Following an extended Phase 1 habitat survey of the site undertaken by URS in March 2013<sup>1</sup>, the potential for a number of protected/notable species was noted and recommendations for more detailed survey made. These surveys include:

- Bat habitat assessment;
- Bat activity survey;
- Bat static surveys;
- Badger survey;
- Otter and Watervole survey;
- Dormouse habitat assessment, and;
- Reptile habitat assessment.

This document serves to report the findings of the above suite of surveys undertaken between April and July 2013.

### 1.3 Planning and Legislative Context

#### 1.3.1 Planning Context

This section reviews wildlife legislation that is considered relevant to the site and its specific ecology. In addition, the national, regional and local planning policy requirements that were considered relevant to the site in relation to ecology are addressed.

### **1.3.2 National Planning Policy Framework**

The National Planning Policy Framework (NPPF)<sup>2</sup> states that the planning system should contribute to and enhance the natural and local environment by minimising impacts on biodiversity and providing net gains in biodiversity where possible, including by establishing coherent ecological networks that are more resilient to current and future pressures. The NPPF should be read in conjunction with the Government Circular: Biodiversity and Geological Conservation, ODPM Circular 06/2005<sup>3</sup>.

### **1.3.3 UK Post-2010 Biodiversity Framework**

This document<sup>4</sup> sets a broad enabling structure for action across the UK between now and 2020, including a shared vision and priorities for UK-scale activities to help deliver the Aichi targets and the EU Biodiversity Strategy. A major commitment by Parties to the Convention of Biological Diversity is to produce a National Biodiversity Strategy and/or Action Plan.

The UK Post-Development Framework is relevant in the context of Section 40 of the Natural Environment and Rural Communities (NERC Act) 2006<sup>5</sup>, meaning that Priority Species and Habitats are material considerations in planning. These habitats and species are identified as those of conservation concern due to their rarity or a declining population trend. Fifty-six habitats of principal importance are included on the list and include terrestrial habitats such as upland hay meadows to lowland mixed deciduous woodland, and freshwater and marine habitats such as ponds and sub tidal sands and gravels. There are 943 species of principal importance included on the list.

### **1.3.4 Chichester Local Biodiversity Action Plan**

The Local Biodiversity Action Plan (LBAP) for Chichester District is a strategic document bringing together the Council's planned activities to protect our local biodiversity, as well as proposing new areas of activity such as habitat improvements to some of the Biodiversity Opportunity Areas identified by the wider Sussex Biodiversity Action Plan.

## **1.4 Relevant Legislative Context**

The major pieces of legislation relating specifically to the protection of wildlife and nature conservation are as follows:

- The Wildlife and Countryside Act 1981 (as amended) (WCA)<sup>6</sup>;
- The Countryside and Rights of Way (CROW) Act 2000 (as amended)<sup>7</sup>;
- NERC Act 2006; and
- The Conservation of Habitats and Species Regulations 2010 (as amended) (Habitats and Species Regulations)<sup>8</sup>.

Explanatory notes relating to species that may be of relevance to the site and protected under The Conservation of Habitats and Species Regulations 2010 (as amended) and the Wildlife and Countryside Act 1981 (as amended) are given below.

### **1.4.1 Bats**

All bat species found in the UK are fully protected under the WCA and The Conservation of Habitats and Species Regulations 2010 (as amended), which together make it an offence to intentionally or deliberately capture, kill or injure or disturb bats (whether in a roost or not), and intentionally or recklessly damage, destroy or obstruct access to their roosts.



The following species of bat are listed as species of Principal Importance in England: noctule *Nyctalus noctula*, barbastelle *barbastella barbastellus*, Bechstein's bat *Myotis bechsteinii*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared *Plecotus auritus*, lesser horseshoe *Rhinolophus hipposideros* and greater horseshoe *Rhinolophus ferrumequinum*.

#### 1.4.2 Badger

The Protection of Badgers Act 1992<sup>9</sup> protects badgers against killing, injury or taking. Badger setts are also protected against damage, destruction or obstruction and it is illegal to disturb a badger *Meles meles* whilst it is in its sett.

#### 1.4.3 Dormouse

Dormouse *Muscardinus arvellanarius* is fully protected through its inclusion under Schedule 5 of the WCA 1981 (as amended) and in Schedule 2 of The Conservation of Habitats and Species Regulations 2010 (as amended). Under the legislation, it is an offence to intentionally kill, injure or take a dormouse as well as intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection by a dormouse or disturb an animal while it is occupying a structure or place which it uses for that purpose.

#### 1.4.4 Reptiles

All common reptiles in the UK, i.e. slow-worm *Anguis fragilis*, common lizard *Zootoca vivipara*, adder *Vipera berus* and grass snake *Natrix natrix*, are listed on Schedule 5 of the WCA 1981 (as amended) in respect of Sections 9(1) and 9(5) which makes it an offence to intentionally kill, injure or sell the animals.

#### 1.4.5 Otter and Watervole

Otter and water voles are both fully protected under Schedule 5 of the Wildlife & Countryside Act 1981 (as amended) due to the protection afforded to their places of shelter and protection. They are afforded protection under Section 9 parts 4(a) and 4(b). This makes it an offence to:

- Intentionally kill, injure or take these species;
- Possess or control live or dead these species or derivatives;
- Intentionally or recklessly damage, destroy or obstruct access to any structure or place used for shelter or protection;
- Intentionally or recklessly disturb these species whilst occupying a structure or place used for that purpose;
- Sell these species or offer or expose for sale or transport for sale; and
- Publish or cause to be published any advertisement which conveys the buying or selling of these species.

The otter is also classified under the Habitats Directive (92/43/EEC) as a species requiring special protection in Europe. In the UK this is enabled by the Conservation of Habitats and Species Regulations 2010 (as amended). In effect this legal protection makes it an offence to intentionally or recklessly:

- Kill, take or injure and otter;
- Damage destroy or obstruct access to a place of shelter; and

- Disturb an otter whilst using such a place.

Otter and water vole are also identified as a Priority Species under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

#### **1.4.6 Other Mammals**

All wild mammals, including red fox, are protected by the Wild Mammals (Protection) Act 1996<sup>10</sup>, which makes it an offence to intentionally cause any wild mammal unnecessary suffering.

## **2 METHODOLOGY**

### **2.1 Bat Habitat Suitability Assessment**

A preliminary assessment of the site was undertaken as part of the extended Phase 1 survey in March 2013. This was intended to identify potential roost sites, foraging habitat and navigational routes for bats that may be impacted by the scheme.

A number of trees of potential suitability for roosting bats are located within the survey area. However, only those due to be directly or indirectly impacted by the proposed scheme (i.e. where the tree is to be removed, subject to management measures or where it may be affected by disturbance such as lighting), were scoped into detailed survey works. These trees were then assessed for their potential to support roosting bats in reasonable accordance with Natural England<sup>11</sup> and Bat Conservation trust (BCT)<sup>12</sup>.

This assessment of roost potential of trees located on the site was based on the following scale.

- Confirmed roosting - Evidence indicates the buildings or trees are used by bats, e.g. bats seen roosting or observed flying from a roost or freely in the habitat; droppings, carcasses, feeding remains, etc. found; and/or bats heard 'chattering' inside on a warm day or at dusk and bats recorded/observed using an area for foraging or commuting.
- Category 1\* – Buildings or trees with features of particular significance for roosting bats, habitat of high quality for foraging bats e.g. broadleaved woodland, tree-lined watercourses and grazed parkland and the Site is connected with the wider landscape by strong linear features that would be used by commuting bats e.g. river/stream valleys or hedgerows, Site is close to known roosts;
- Category 1 - Several potential roosting features in the buildings or trees, habitat could be used by foraging bats e.g. trees, shrub, grassland or water and the Site is connected with the wider landscape by linear features that could be used by commuting bats e.g. lines of trees and scrub or linked back gardens;
- Category 2 – A small number of potential roosting features, isolated habitat that could be used by foraging bats, e.g. a lone tree or patch of scrub but not parkland and an isolated Site not connected by prominent linear features (but if suitable foraging habitat is adjacent it may be valuable if it is all that is available); and
- Category 3 - No features that could be used by bats (for roosting, foraging or commuting).

Linear landscape features and habitats such as verges and hedgerows were also identified and assessed for their potential to support foraging and commuting bats. Landscapes with a good diversity of semi-natural habitats that could provide bats with an important foraging

resource, sheltered conditions and good “flight lines” are particularly important for a number of bat species.

**2.2 Bat Survey**

Bat activity surveys were undertaken in May, June, July, August and September 2013 in line with BCT guidelines. On 13<sup>th</sup> May, 22<sup>nd</sup> July, 27<sup>th</sup> August and 24<sup>th</sup> September pre-designated transect routes were walked at dusk and all bat activity was identified with the aid of electronic bat detectors and recorded on a scale map of the site. Furthermore, a dusk/pre-dawn survey was conducted on 11<sup>th</sup>-12<sup>th</sup> June 2013. The dates, times and weather conditions for each survey visit are presented on Table 1. The activity surveys commenced in May (due to the cold weather in earlier months) and involved two suitably qualified ecologists walking the linear features and stopping at eight vantage points for ten minutes along the transect (Figure 7.2.1) to record and assess any activity. The transects were walked from 15 minutes prior to sunset and for two hours following sunset. For the dawn survey the transect was walked for two hours prior to sunrise. The transect was reversed during the dawn survey and July transect and incorporated a walked line through the arable field.

These surveys will continue once a month until September and include a dusk and pre-dawn survey following BCT guidance.

In addition to the transect surveys, static bat detectors (Wildlife Acoustic SM2) were left at up to five different locations for up to seven consecutive nights each month. The detectors were programmed to record bat activity at their locations between half an hour before dusk and half an hour after dawn during the survey period. At the end of the survey, all bat registrations were uploaded and analysed using the bat sound analysis software Analook. Table 2 presents the dates and locations of the static bat detector survey. The recordings aim to support identification of the bat species (or genera) present, and to quantify the indices of activity (e.g. bat passes/hour) on the site during the surveys.

Transect routes and static detector locations are presented on Figure 7.2.1.

**Table 1: Dates and weather of the bat activity survey visits**

Survey Visit	Date	Sunset/ Sunrise	Start	Finish	Weather
Survey 1	13/05/13	20:41	20:15	22:40	Dry, warm (~14°C), with 50% cloud cover and still at survey start
Survey 2 (Dusk/dawn)	10/06/13	21:15	21:00	23:15	Clear, dry (~14°C) with 45% cloud cover and still at survey start.
	11/06/13	04:46	02:45	04:50	
Survey 3	22/07/13	21:03	20:45	23:03	Clear, dry (~25°C) with 10% cloud cover and still
Survey 4	27/08/13	19:58	19:40	22:00	Clear, dry (~24°C), with 25% cloud cover and still
Survey 5	24/09/13	18:56	18:40	21:00	Clear, dry (~22°C), with no cloud cover.

**Table 2: Dates and locations of static detector bat detectors**

Month	Location	Start Date	Finish Date	Grid Reference
April	Location 1- Within tree located along north western edge of woodland pointing south east.	16/04/13	20/04/13	TQ 03641 26743
April	Location 2- Along northern edge of woodland pointing south within ivy covered tree.	16/04/13	20/04/13	TQ 03720 26784
April	Location 3- Within tree eastern edge of woodland pointing west.	16/04/13	20/04/13	TQ 03878 26623
April	Location 4- On southernmost corner of field corner within hedgerow pointing south.	16/04/13	20/04/13	TQ 03862 26530
May	Location 1- Within tree located along north western edge of woodland pointing south east.	01/05/13	07/05/13	TQ 03641 26743
May	Location 2- Along northern edge of woodland pointing south within ivy covered tree.	01/05/13	07/05/13	TQ 03720 26784
May	Location 3- Within tree eastern edge of woodland pointing west	01/05/13	07/05/13	TQ 03878 26623
May	Location 4- On southernmost corner of field corner within hedgerow pointing south.	01/05/13	07/05/13	TQ 03862 26530
June	Location 1- Within tree located along north western edge of woodland pointing south east.	01/06/13	05/06/13	TQ 03641 26743
June	Location 2- Along northern edge of woodland pointing south within ivy covered tree.	01/06/13	05/06/13	TQ 03720 26784
June	Location 5- Along Hedgerow to the south pointing eastward.	11/06/13	17/06/13	TQ 03915 26464
July	Location 1- Within tree located along north western edge of woodland pointing south east.	22/07/13	28/07/13	TQ 03641 26743
July	Location 2- Along northern edge of woodland pointing south within ivy covered tree.	22/07/13	28/07/13	TQ 03720 26784
July	Location 3- Within tree eastern edge of woodland pointing west	22/07/13	28/07/13	TQ 03878 26623
July	Location 4- On southernmost corner of field corner within hedgerow pointing	22/07/13	28/07/13	TQ 03862 26530

	south.			
August	Location 1- Within tree located along north western edge of woodland pointing south east.	01/08/13	07/08/13	TQ 03641 26743
August	Location 2- Along northern edge of woodland pointing south within ivy covered tree.	N/A	N/A	TQ 03720 26784
August	Location 3- Within tree eastern edge of woodland pointing west	01/08/13	02/08/13	TQ 03878 26623
August	Location 4- On southernmost corner of field corner within hedgerow pointing south.	01/08/13	06/08/13	TQ 03862 26530
September	Location 1- Within woodpile on western boundary facing east	05/09/13	23/09/13	TQ 036 267
September	Location 2- Western location on Northern boundary facing south	05/09/13	23/09/13	TQ 037 267
September	Location 3- Middle of northern boundary facing south	05/09/13	25/09/13	TQ 038 267
September	Location 4- Detector did not work	N/A	N/A	

### 2.3 Badger Survey

A badger survey was undertaken at Wisborough Green on 16<sup>th</sup> April 2013 and checks made on subsequent visits in May and June 2013. The site was surveyed following the methodologies of Harris, Cresswell & Jefferies (1989)<sup>13</sup>, whereby the site was systematically searched, for setts and other signs of badger activity, such as spoil, latrines, bedding material, paths, footprints, hairs and feeding signs (holes in the ground and scrapes in the soil). Each sett found was assigned to one of four sett categories (main, annexe, subsidiary and outlying) and the number of disused, partially-used, and well-used holes recorded (See below). The status of the entrances of any setts was assessed according to Roper 2010<sup>14</sup>. The results of the Badger Survey are detailed within a confidential Appendix 2.

- Main setts**-These are in continuous use; they are large, well-established, often extensive and may have large spoil heaps outside the entrances. There are likely to be well-worn paths leading to the sett. It is where the cubs are most likely to be born. There is generally only one main sett per social group of badgers. Main setts are usually built in very specific positions, where there is the right combination of soil (to facilitate drainage and ease of digging), aspect, slope and cover. Since suitable sett sites are at a premium, main setts are usually long-established, and may have been in use for many years. The average number of holes for a main sett is 15.
- Annexe setts**-These occur in close association with the main sett (usually within 150m), and are linked to the main sett by clear well-used paths. Annexe setts consist of six holes on average, but they are not necessarily in use all the time, even if the main sett is very active. If a second litter of cubs are born, this may be where they are reared.

- **Subsidiary setts**-These comprise five holes on average, but are not in continuous use and are usually some distance from the main sett (50m or more). There is no obvious path connecting them to the main sett and their 'ownership' can often only be determined by bait-marking.
- **Outlying setts**-These consist of only one or two holes. They can be found anywhere within the territory and usually have small spoil heaps, indicating that they are not very extensive underground. There are no obvious paths connecting them to other setts, they are only used sporadically and often used by foxes or rabbits when not occupied by badgers.

The size, status and level of activity of each sett can be assessed by counting the number of entrance holes. The degree of use of each entrance hole can then be classified as follows:

- **Well-used holes**-These are clear of any debris or vegetation, are obviously in regular use, and may or may not have been excavated recently.
- **Partially-used holes**-These are not in regular use and have debris such as leaves and twigs in the entrance, or have moss and/or other plants growing in or around the entrance. They could be in regular use after a minimal amount of clearance.
- **Disused holes**-These have not been in use for some time, are partially or completely blocked, and could not be used without a considerable amount of clearance. If the hole has been disused for some time, all that may be visible is a depression in the ground where the hole used to be, and the remains of the spoil heap, which may be covered in moss or plants.

In addition to their setts, badgers occasionally lie-up above ground in small depressions lined with dry grass and leaves, usually under a fallen log or dense patch of bramble. These are termed 'day nests', although it is uncommon for badgers to occupy them during the day; the animals more often use them as shelter for short periods during the night. These structures are not usually given the legal protection afforded to setts.

#### 2.4 Dormouse Habitat Assessment Survey

An initial survey for dormice, to determine potential presence, involved a search for characteristically-chewed hazel nuts using the standard surveying technique<sup>15</sup> (Bright et al, 2006). The surveyor searched five 10m by 10m areas associated with hazel trees and especially below the hazel canopy, for a total of 20 minutes each for at least 100 nuts opened by small rodents, or until positive evidence was found. This survey was carried out within the woodland and its edge on the 16<sup>th</sup> April 2013. An assessment of the habitat suitability was also made during this time.

#### 2.5 Reptile Habitat Assessment Survey

A reptile habitat assessment survey of the site was undertaken during the extended Phase 1 survey, in accordance with National Amphibian and Reptile Recording Scheme NARRS guidance<sup>16</sup> and Natural England's Standing Advice Species Sheet for Reptiles<sup>17</sup>.

This survey evaluates key features such as vegetation structure, extent, aspect, topography, connectivity and site history in identifying the level of suitability of the site for reptiles.

#### 2.6 Otter Survey

The survey methodology concentrated on observations for field signs indicating otter presence or use and was carried out in accordance with guidance provided by Chanin (1993)<sup>18</sup>. Such field signs include:

- **Spraints** - Otter faeces usually identified by its tar-like appearance with fish scales/bones present. Old spraints can be grey and crumbly crumbling to ash.
- **Footprints** - Easily identified in a muddy substrate with the print consisting of an asymmetrical shape with five toes (not splayed).
- **Feeding remains** - Shells of crayfish, parts of fish, eels.
- **Slides** - Flattened patches of vegetation entering/exiting the water side often beneath scrub or similar cover.
- **Holts** - Can be discovered along the embankment or away from the water course (especially natal holts). At least one entrance usually under the water surface making identification difficult.

## 2.7 Watervole Survey

- Surveys were undertaken using the standard methodologies of Strachan and Moorhouse (2006)<sup>19</sup>. This involved searching within at least 5m of the banks of the water course for evidence of water vole activity, including:
  - **Latrine sites** - distinct accumulations of water vole faeces found near nest sites, at the ranges of their territorial boundaries and where the animals enter and leave the water.
  - **Feeding stations** - areas with distinct neat piles of chewed lengths of vegetation along their pathways.
  - **Burrows** - Entrances are typically wider than they are high with a diameter 4 - 8cm usually located at the water's edge.
  - **Lawns** - short grazed areas at the entrance of the burrow.
  - **Prints** - clear prints in exposed areas of the watercourse.
  - **Runways** - Pathways that are identifiable through soft vegetation commonly connected to burrows or feeding stations.

## 2.8 Limitations

All surveys with the exception of the dormouse nut search were undertaken at an optimal time of year for the species specific survey (March – September). Although the nut search was carried out during a sub optimal part of the season hazel nuts can persist on the forest floor for over a year and 100 chewed nuts were collected. Additionally a prolonged cold snap during March is likely to have delayed species emergence and potentially skewed surveys. As such surveys were adjusted where possible to take this into account. The level of survey was considered to be sufficient to assess the suitability of the site to support protected and notable species and therefore reasonably confirms the conditions present on site.

During the initial static surveys in September the static SM2 recorder at location 4 did not record due to a technical fault in the equipment.

## 3 RESULTS

### 3.1 Bat Survey

#### 3.1.1 Desk Study Data

Seven species of bats were recorded within 2km of the site and include: brown long-eared bat *Plecotus auritus*, common pipistrelle *Pipistrellus pipistrellus*, Daubenton's bat *Myotis*

*daubentonii*, Bechstein's *Myotis bechsteinii* and noctule *Nyctalus noctula*, serotine *Eptesicus serotinus* and barbastelle bats *Barbastella barbastellus*. Furthermore, barbastelle bats are a qualifying feature for The Mens SAC which lies approximately 0.6km to the south of the site. The closest identified roost was recorded as an unspecified roost recorded 0.91km north west of the site in 1995. The closest non roost record was identified as a Daubentons bat approximately 0.21km north of the site in 2009. Table 3 below identifies the closest bat records to the site within a 5km radius over the past 20 years.

**Table 3: Locations of closest bat species records**

Bat Species	Grid Reference	Approximate Distance From Site (km)	Date recorded	Type of record
Barbastelle <i>Barbastella barbastellus</i>	TQ033249	1.80 south west	2008	Unspecified Roost
Barbastelle <i>Barbastella barbastellus</i>	TQ0247023555	3.32 south west	2004	Mating Roost
Barbastelle <i>Barbastella barbastellus</i>	TQ0248523769	3.11 south west	2004	Maternity Roost
Barbastelle <i>Barbastella barbastellus</i>	TQ0325	1.76 south west	2001	In flight
Bat sp	TQ046259	1.34 south east	2005	In flight
Bat sp	TQ028265	0.92 west	1999	Unspecified Roost
Serotine <i>Eptesicus serotinus</i>	TQ0353026890	0.25 north west	2009	In flight
Serotine <i>Eptesicus serotinus</i>	TQ032229	3.85 south	1995	Unspecified Roost
Myotis sp	TQ084246	5.00 south east	2010	In flight
Myotis sp	TQ070300	4.63 north east	2004	Unspecified roost
Bechstein's <i>Myotis bechsteinii</i>	TQ0310024840	1.90 south west	2009	In flight
Bechstein's <i>Myotis bechsteinii</i>	SU983258	5.00 east	1999	Maternity Roost
Brandt's <i>Myotis brandtii</i>	TQ030245	2.24 south west	2004	In flight
Daubenton's <i>Myotis daubentonii</i>	TQ0353026890	0.21 north	2009	In flight



Bat Species	Grid Reference	Approximate Distance From Site (km)	Date recorded	Type of record
Whiskered <i>Myotis mystacinus</i>	TQ0304024550	2.18 south west	2009	In flight
Whiskered <i>Myotis mystacinus</i>	TQ030245	2.24 south west	2001	In flight
Natterer's <i>Myotis nattereri</i>	TQ0304024550	2.18 south west	2009	In flight
Natterer's <i>Myotis nattereri</i>	TQ019234	3.65 south west	2007	Dead Bat
Natterer's <i>Myotis nattereri</i>	TQ047311	4.57 north east	1997	Unspecified Roost
Noctule <i>Nyctalus noctula</i>	TQ01122438	3.32 south west	2009	Maternity Roost
Noctule <i>Nyctalus noctula</i>	TQ023252	1.92 south west	2000	In flight
Pipistrelle sp	TQ018265	1.71 west	2005	Unspecified Roost
Pipistrelle sp	TQ023252	1.92 south west	2000	In flight
Pipistrelle sp	TQ055258	2.19 south east	1995	Grounded bat
Pipistrelle sp	TQ006264	2.90 west	1993	Hibernation Roost
Common Pipistrelle <i>Pipistrellus pipistrellus</i>	TQ012275	2.65 north west	2010	Dead Bat
Common Pipistrelle <i>Pipistrellus pipistrellus</i>	TQ0353026890	0.31 north west	2009	In flight
Common Pipistrelle <i>Pipistrellus pipistrellus</i>	TQ014278	2.58 north west	2009	Unspecified Roost
Soprano Pipistrelle <i>Pipistrellus pygmaeus</i>	TQ037235	3.12 south	2009	Unspecified Roost
Soprano Pipistrelle <i>Pipistrellus pygmaeus</i>	SU98362825	5.00 north west	2009	Maternity Roost

Bat Species	Grid Reference	Approximate Distance From Site (km)	Date recorded	Type of record
Soprano Pipistrelle <i>Pipistrellus pygmaeus</i>	TQ011285	3.20 north west	2009	In flight
Brown long eared sp	TQ084246	5.00 south east	2010	In flight
Brown long eared sp	TQ014278	2.58 north west	2009	Feeding Roost
Brown long eared sp	TQ082277	4.61 north east	2005	Unspecified Roost
Brown long eared <i>Plecotus auritus</i>	TQ060278	2.57 north east	2009	Maternity and Hibernation Roost
Brown long eared <i>Plecotus auritus</i>	TQ027249	1.99 south west	2008	Dead bat
Brown long eared <i>Plecotus auritus</i>	TQ0325	1.77 south west	2001	In flight
Brown long eared <i>Plecotus auritus</i>	TQ028268	0.91 north west	1995	Unspecified Roost

### 3.1.2 Habitat Description and Suitability

The site consists of a mix of species-poor semi-improved grassland, semi-natural broadleaved woodland, scrub, tall ruderals and running water in the form of Boxal Brook. A number of woodland rides and hedgerows provide linkage of the wood to the north of the site (Northup Copse) and woodland blocks to the south (Nonesuch Copse) providing potential foraging and commuting corridors. These linear features also connect other areas in the wider context such as the Arun Valley and floodplain further east, a complex of woodland blocks to the north and along the Kird River flowing west to east. A number of small urban conurbations are located in the vicinity of the survey area, namely Wisborough Green and Kirdford linked by Kirdford Road.

A study of aerial photography and maps in combination with a scoping survey of the site carried out in April 2013 indicated that the majority of the site is made up of arable land with woodland habitats surrounding the site to the north and east. This ancient woodland habitat could have the potential to contain bat roosts, particularly where mature trees are present. There are no buildings that could be used by roosting bats within the survey area.

There is potential for the linear watercourse and woodland edges to be utilised by commuting and foraging bats. This potential is greatest in areas where there is linear woodland or where grassland vegetation is located adjacent to the woodland edge such as the shelter belt to the north east of the site and to the south east of the survey area where habitat mix is greatest.

### 3.1.3 Bat Activity Survey

Two suitably qualified bat surveyors (Licence Number CLS02849) visited the site on 13<sup>th</sup> May 2013 to conduct the first transect survey. During this survey two barbastelle bats were seen flying westwards along the tree line north of the site, and then turning sharply and returning easterly. No foraging behaviour was noted during the survey but the bats were seen to be flying low (approximately 2m above the ground) above the grassland edge of the arable field. These bats were recorded at 21:56 hours, approximately 1hr and 15 minutes following sunset. The first bat recorded during this survey occurred at 21:14 hours, approximately 33\* minutes after sunset, and was identified as a soprano pipistrelle recorded commuting northwards towards Northup Copse. No bats were recorded along the arable field section of the transect. A summary of the bat activity for May is shown on Figure 7.2.2a.

The second survey consisted of a dusk and pre-dawn survey and was undertaken by two suitably qualified ecologists between 11<sup>th</sup> and 12<sup>th</sup> June 2013. During this survey bat activity levels were relatively high with a total of 87 bat passes recorded consisting of at least three species of bat. No barbastelle were recorded during this survey, however, two *Myotis sp* were recorded at 22:43 hours and at 03:42 hours respectively. The first bat recorded was identified as a soprano pipistrelle at 21:45 hours, approximately 40 minutes after sunset. The last recording was at 03:59 hours consisting of two soprano pipistrelle bats. This occurred at approximately 47 minutes prior to sunrise. Foraging behaviour was recorded predominately in the south-east portion of the transect. No bats were recorded within the walked section through the arable field part of the transect. Figure 7.2.2b shows the locations of bat activity recorded during this survey.

The third survey consisted of a dusk survey undertaken on the 22<sup>nd</sup> July 2013. During this survey bat activity was concentrated along the woodland edge in the southern part of the transect. A total of 30 bat passes were recorded consisting of at least two species of bat including common pipistrelle and an unidentified pipistrelle species. The majority of passes were identified as common pipistrelle. No barbastelle or *Myotis* species were recorded during this survey. The first bat recorded was identified as a common pipistrelle at 21:45 hours, approximately 42 minutes after sunset. Feeding behaviour was noted predominately in the south-east portion of the transect. No bats were recorded within the walked section through the arable field part of the transect. The activity recorded during this survey is summarised within Figure 7.2.2c.

The fourth bat survey consisted of a dusk survey undertaken on the 27<sup>th</sup> August 2013. During this survey bat activity was concentrated along the woodland edge and field margins. The most recorded species was common and soprano pipistrelle with 8 and 7 passes respectively. Barbastelle was noted flying low and fast past the surveyors 55 minutes after sunset towards the east of the site. No bats were recorded flying over the arable field.

The fifth bat survey comprised a dusk survey undertaken on the 24<sup>th</sup> September 2013. Activity was higher in September than August, with a total of 86 bat passes recorded compared to 20. Again this was dominated by common and soprano pipistrelles which made up 79 of the bat passes. The majority of the bats were heard and not seen and thought to be picked up within the woodland. Two barbastelle bats were recorded during the survey but these were seen briefly along the woodland edge before going back within the woodland. The first bat recorded was a soprano pipistrelle at 19:18 which is 20 minutes after sunset.

The results of this survey are summarised below in Table 4.

**Table 4: Summary of bat activity surveys**

Transect Visit	Number of bat passes recorded						TOTAL
	Common pipistrelle	Soprano pipistrelle	<i>Pipistrelle species</i>	<i>Myotis species</i>	<i>Barbastelle</i>	Un-identified	
Transect Visit 1 13/05/13	6	20	0	0	2	0	28
Transect Visit 2 11/06/13	38	13	34	2	0	0	87
Transect Visit 3 22/07/13	28	0	2	0	0	0	30
Transect Visit 4 27/08/13	8	7	0	3	1	0	20
Transect Visit 5 24/09/13	55	24	2	3	2	0	86

### 3.1.4 Bat Static Survey

#### April

Static detectors were set out and left to record for the period 16<sup>th</sup> to 20<sup>th</sup> April 2013. The prevalent weather during this time was cool temperatures with an average maximum of 12°C and a minimum of 6°C and low levels of precipitation. A total of 307 bat passes were recorded for the site with 52% of those records occurring at location 2 (Figure 7.2.3). A further 38% of the passes were recorded at location 4. The lowest number of bat passes per hour occurred at location 1 with an average of 1.13 passes recorded per hour. At least four species of bat were recorded across the site during the April static detector survey with the highest proportion consisting of common pipistrelle. Twenty-two barbastelle passes were recorded at location 4 which was the southern-most point of the survey area. Barbastelle were not recorded at any other of the static detector locations. *Myotis sp.* were only recorded at location 2 on 19<sup>th</sup> April during the period of survey. No bats were recorded at location 1 and 4 on the 18<sup>th</sup> April.

The earliest call relative to sunrise occurred at 20:30 hours on the 19<sup>th</sup> of April identified as a common pipistrelle at location 4. This record occurred approximately 26 minutes following sunset. The earliest barbastelle pass was recorded at 21:22 hours on the 19<sup>th</sup> April, approximately 1 hour and 18 minutes following sunset. A summary of the barbastelle activity recorded during the April static survey is given in Table 5. The static situated at location 2 was the only detector to record activity over the whole survey period in April.

**Table 5: Summary of barbastelle static data for April**

Date	Sunset/Sunrise Time	First Recording	Last Recording	No. of Passes
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Date	Sunset/Sunrise Time	First Recording	Last Recording	No. of Passes
16/04/13	20:00 hours	23:54 hours	23:54 hours	1
17/04/13	06:03/20:01 hours	Continuing from 23:54 hours	03:07 hours	7
18/04/13	06:01/20:03 hours	N/A	N/A	0
19/04/13	05:59/20:04 hours	21:22 hours	23:51 hours	11
20/04/13	05:57/20:06 hours	00:15 hours	00:58 hours	3

### May

Static detectors were set out and left to record for the period 1<sup>st</sup> of May through to the 7<sup>th</sup> May. The weather conditions during this week were dry with an average wind speed of 12km/h. Peak temperature was 23°C on the 3<sup>rd</sup> of May with the lowest night time temperature being 4°C on the 2<sup>nd</sup> of May. A total of 1061 passes were recorded across the survey area with the highest proportion consisting of common pipistrelle, making up 51% of records. Soprano pipistrelle made up 24% of records. One hundred and eighty-five barbastelle passes were recorded during May with all but one record occurring at location 3. The passes logged at location 3 were spread throughout the week with 37 recorded on the 1<sup>st</sup>, 23 passes recorded on the 2<sup>nd</sup>, 13 passes recorded on the 3<sup>rd</sup>, with no barbastelle passes identified on the 4<sup>th</sup> of May. Six passes were logged on the 5<sup>th</sup> with 48 and 57 passes recorded on the 6<sup>th</sup> and 7<sup>th</sup> respectively. A high proportion of *Myotis* sp. passes were recorded during this month with *Myotis* identified at locations 1, 2 and 3. Some of the calls at location 1 were identified as daubentons, a common *Myotis* species closely associated with riverine habitats. The highest rate of bat passes per hour occurred at location 3 with an average of over 14 passes per hour. The lowest rate of passes occurred at location 4.

The earliest bat recorded relative to sunset was a common pipistrelle recorded 34 minutes after sunset at location 4. The earliest barbastelle was recorded at 21:03 hours on the 1<sup>st</sup> May, approximately 39 minutes following sunset. A summary of barbastelle activity across the site is shown below in table 6.

**Table 6: Summary of barbastelle static data for May**

Date	Sunset/Sunrise	First Recording	Last Recording	No. of Passes
01/05/13	05:36/20:24 hours	21:03 hours	22:42 hours	37
02/05/13	05:32/20:27 hours	21:08 hours	22:18 hours	23
03/05/13	05:32/20:27 hours	21:39 hours	22:53 hours	13

Date	Sunset/Sunrise	First Recording	Last Recording	No. of Passes
04/05/13	05:30/20:28 hours	0	0	0
05/05/13	05:29/20:30 hours	21:07 hours	23:48 hours	6
06/05/13	05:27/20:32 hours	(00:02 hours end of previous night) 21:15 hours	22:28 hours	48
07/05/13	05:25/20:33 hours	21:14 hours	23:08 hours	56
08/05/13	05:23/20:35 hours	03:00 hours (end of previous night)	N/A	1

### June

Static detectors were set out and left to record for the period 1<sup>st</sup> June to the 5<sup>th</sup>. Over the five day survey period two static detectors were placed out at locations 1 and 2 only. The weather conditions during this survey were predominately dry with an average wind speed of 20km/h. A further detector was placed at location 5 for seven days from the 11<sup>th</sup> to the 17<sup>th</sup> of June. The lowest temperature during the June survey was 6°C on the 3<sup>rd</sup> June and 5°C on the 14<sup>th</sup> June respectively.

A total of 1086 bat passes were recorded at location 2 with common pipistrelle, soprano pipistrelle and pipistrelle species making up 95% of the records. The 1<sup>st</sup> June had the most bat passes with an unidentified pipistrelle recorded earliest at 21:26 hours. This was approximately 20 minutes after sunset. A soprano pipistrelle was the last recorded bat on the first dawn at 04:20 hours, approximately 30 minutes before sunrise. The detector placed at location 5 only recorded two soprano pipistrelle bats during the survey period. Five *Myotis* species were recorded primarily at location 2 with a single pass recorded at location 1. A total of four barbastelle were recorded, the earliest of which occurred at 22:35 hours on the 2<sup>nd</sup> June. This was approximately 1 hour and 28 minutes after sunset.

### July

Static detectors were set out and left to record for the period 22<sup>nd</sup> to 28<sup>th</sup> July. The prevalent weather during this time was warm temperatures with an average maximum of 22°C and a minimum of ~14°C and low levels of precipitation (consisting of short rain showers).

A total of 3339 bat passes were recorded for the site with 49% of those records occurring at location 4. A further 19% of the passes were recorded at location 2. The lowest number of bat passes per hour occurred at location 1 with an average of 13.81 passes per hour. At least four species of the bat were recorded across the site during the July static detector survey with the highest proportion consisting of common pipistrelle. No barbastelle passes were recorded throughout the July static survey period. *Nyctalus* bats including a single noctule and five Leisler's bat *Nyctalus leisleri* passes were recorded for the first time on site with a Leisler's bat pass recorded at location 2 and both species identified at static location 4. The earliest record of a *Nyctalus* species was identified as a noctule on the 23<sup>rd</sup> July at 21:57 hours at location 4. This record was approximately 57 minutes after sunset. *Myotis* sp. were recorded across the site at all locations during the July survey period.

Overall there was an increase in the total number of bat passes during this survey and this is likely to reflect the increase in activity during the core maternity period for bats.

### August

Static detectors were left to record from the 1<sup>st</sup> to 6<sup>th</sup> August. The weather was predominantly warm, between 24.4°C and 16°C. The detector at location 3 only recorded for two days in August. The detector at location 2 did not record in August.

A total of 2503 bat passes were recorded for with site with 74.7 % of passes occurring at location 4. Location 3 had the lowest bat passes (with only 1.9% of passes) but this could be due to the detector only working for two days.

No barbastelle bat passes were recorded in August during the static recording period. The earliest bats recorded at location 1 were all between 21:20 and 21:38 and were common and soprano pipistrelles. At location 4 the first bats were recorded between 21:07 and 21:24 and again were common and soprano pipistrelles. Five different species were recorded at location 4 including Leisler's and noctule. *Myotis* sp. were only recorded at location 3.

### September

Static detectors were left to record for 19 days from 5<sup>th</sup> to 23<sup>rd</sup> September over a period of 66.5 hours. Location 1 recorded the highest amount of *Myotis* sp. passes since April with 250 passes (23%). There is a significant difference in the amount of bat passes from location 2 and 3 even though they were located along the same hedgerow as location 2 had 2016 more bat passes than location 3.

The first bats recorded ranged from 19:36 to 20:15 and included common and soprano pipistrelles, *Myotis* sp and one possible barbastelle. The barbastelle was recorded at 19:57 on 16<sup>th</sup> September when sunset time was 19:17.

### Summary

In summary, during the April Static survey at least five species of bat were recorded including common pipistrelle, soprano pipistrelle, barbastelle, Daubenton's and *Myotis*. The highest pass rate was recorded at location 2 with 5.78 passes per hour and the lowest rate was recorded at location 1 with 1.13 passes per hour.

The May static survey identified at least five species of bat including common pipistrelle, soprano pipistrelle, barbastelle, Daubenton's and *Myotis*. The highest pass rate was recorded at location 3 with 14.29 passes per hour and the lowest rate was recorded at location 4 with 0.96 passes per hour.

During June the highest pass rate was recorded at location 2 with 39.49 passes per hour. The lowest pass rate was recorded at location 5 with 0.05 passes per hour. At least four species of bat were recorded including common pipistrelle, soprano pipistrelle, barbastelle and *Myotis*.

In July, species diversity remained the same with at least four species recorded. Species identified during this survey included common pipistrelle, soprano pipistrelle, *Myotis* and *Nyctalus* bats. The highest pass rate was recorded at location 4 with 52.38 passes per hour whilst the lowest pass rate was recorded at location 1 with 13.81 passes per hour.

In August, there were high counts of common pipistrelle at location 4 but species diversity remained similar to that recorded previously.

September bat numbers remained high and it is thought that this is due to bats foraging intensely to prepare for the hibernation period.

This data is summarised with Table 7 below.

**Table 7: Summary of bat static surveys**

Static location	Number of bat passes recorded								TOTAL
	Common pipistrelle	Soprano pipistrelle	<i>Pipistrelle species</i>	<i>Myotis species</i>	<i>Barbastelle</i>	Unidentified	<i>Nyctalus sp.</i>	Pass/Hour	
April Static Location 1	20	3	5	0	0	3	0	1.13	31
April Static Location 2	147	4	0	6*	0	2	0	5.78	159
April Static Location 3	N/A	N/A	N/A	N/A	N/A	N/A	0	N/A	N/A
April Static Location 4	100	14	1	2	22	0	0	4.25	117
May Static Location 1	73	18	0	6*	1	0	0	2.55	98
May Static Location 2	218	138	10	10	0	0	0	9.77	376
May Static Location 3	247	98	0	21	184	0	0	14.29	550
May Static Location 4	35	2	0	0	0	0	0	0.96	37
June Static Location 1	160	15	26	1	3	22	0	8.26	227
June Static Location 2	453	431	144	4	1	53	0	39.49	1086
June Static Location 5	0	2	0	0	0	0	0	0.05	2
July Static Location 1	241	6	33	11	0	144	0	13.81	435
July Static Location 2	371	128	85	7	0	43	1	28.22	635
July Static Location 3	278	67	225	5	0	44	0	19.65	619

\* Note that some of the *Myotis* species recorded were identified as Daubenton's bat however *Myotis* bats can be difficult to identify to species level as positive identification of these species is problematic without visual observation of behaviour as well as audio detection.



Static location	Number of bat passes recorded								TOTAL
	Common pipistrelle	Soprano pipistrelle	<i>Pipistrelle species</i>	<i>Myotis species</i>	<i>Barbastelle</i>	<i>Unidentified</i>	<i>Nyctalus sp.</i>	Pass/ Hour	
July Static Location 4	1062	149	347	10	0	77	5	52.38	1650
August Static Location 1	257	14	2	0	0	1	0	11.2	274
August Static Location2	0	0	0	0	0	0	0	0	0
August Static Location 3	24	21	1	2	0	0	0	8.73	48
August Static Location 4	1307	168	13	0	0	2	5	61.02	1495
September Static Location 1	614	190	2	250	1	7	0	16	1064
September Static Location 2	1987	208	3	58	9	1	4	34.14	2270
September Static Location 3	126	47	0	13	0	0	5	2.87	191

### 3.1.5 Bat Tree Assessment

An assessment of the trees adjacent to the site for their potential to provide roosting opportunities for bats was carried out by a licenced bat ecologist (Licence Number CLS02849) on the 30<sup>th</sup> April 2013. Fourteen trees supporting a number of suitable features for use by bats were identified, resulting in the trees being Category 1 in accordance with the BCT (2012) Guidelines. Ten trees with were also categorised as Category 2 in terms of roosting potential. The remaining trees located within the survey area were classified as Category 3 and identified as offering negligible roosting opportunities for bats are not included within this assessment. The details of the bat tree assessment are recorded within Table 8 below and locations shown in Figure 7.2.4.

**Table 8: Summary of Tree Assessment Survey**

Tree Reference	Feature	Evidence of roosting	Roost potential
1	Knot-hole on oak species tree	Not seen	1
2	Tear-out with upward hole	Not seen	1
3	Ivy branches wrapped around oak tree	Not seen	2
4	Tear-out with large hole. Bird nest located right at base not near hole	Not seen	1
5	Ivy covered tree leaning out onto site	Not seen	2
6	Protruding knot-hole (donut formation)	Not seen	1
7	A few trees down from 6. Split in branch (hollow looking), South facing hole	Not seen	1
8	Ivy covered tree. Close to tree 6 and 7	Not seen	2
9	Ivy covered tree.	Not seen	2
10	Oak near chalk pile with small hole (possibly woodpecker)	Not seen	1
11	Branch with tear-out (hole underneath)	Not seen	1
12	Ivy covered tree by entrance to site (east)	Not seen	2
13	Ivy covered oak tree to the west of site entrance	Not seen	2
14	Ivy covered oak tree to the west of site entrance / Loose bark	Not seen	2
15	Ivy covered oak tree to the west of site entrance / Loose bark	Not seen	2
16	Ivy covered oak tree to the west of site entrance / Loose bark	Not seen	2
17	Ivy covered oak tree to the west of site entrance / Loose bark	Not seen	2
18	Mature oak tree with ivy cladding and loose bark	Not seen	1
19	Mature oak tree with ivy cladding and loose bark	Not seen	1
20	Mature oak tree with ivy cladding and loose bark	Not seen	1
21	Mature oak tree with ivy cladding and loose bark	Not seen	1

22	Mature oak tree near road with ivy cladding and loose bark	Not seen	1
23	Mature oak tree near road with ivy cladding and loose bark	Not seen	1
24	Mature oak tree near road with ivy cladding and loose bark	Not seen	1

**3.2 Dormouse**

Due to the scarcity in numbers of hazel trees, only one hundred hazelnuts were collected within the woodland and edge habitat (Figure 7.2.5) to the west of the Site. An examination of each nut by a suitably qualified ecologist revealed no evidence of dormouse activity. Of the 100 nuts 60% had been eaten by small rodents such as voles and wood mice with the remainder showing evidence of use by birds and other rodents. Furthermore, an assessment of the woodland edge habitat revealed that this was gappy with a poor vertical structure, sparse understory vegetation and contained few dormouse food plants on the northern extent. The woodland edge included dominant oak *Quercus robur* and a few occasional stands of hazel *Corylus avellana* with occasional birch *Betula pendula*, frequent ash *Fraxinus excelsior* and rare field maple *Acer campestre*. Teasel *Dipsacus fullonum* and nettle *Urtica dioica* was also identified in a sparse understory.

The surveys identified that the habitat immediately to the north of the proposed site is not suitable to support high numbers of dormouse. The nut search identified no evidence of dormouse activity in the habitats surrounding the site. Furthermore, there are no confirmed records of dormouse within 1km of the site.

**3.3 Reptiles**

The widespread reptiles, grass snake *Natrix natrix*, slow worm *Anguis fragilis* and common lizard *Zootoca vivipara*, have been recorded within 1km of the site. Whilst grass snakes are associated with aquatic habitats, slow worm and common lizards may be found in areas of scrub and grassland. None of these species are likely to occur sheltering within arable land.

The habitat suitability assessment of the Site identified predominately arable land with associated woodland edge and thin strips of grassland adjacent to the track. Two spoil piles were also identified to the west of the track and contained early growth from ruderal species. The woodland edge and associated patches of grassland are likely to form some suitable vegetation structure to support limited numbers of reptiles such as slow worms and common lizards; however, this is not true of the well managed arable habitat. Additionally the areas of suitable habitat were very small in extent and were relatively well shaded. As such and gauging the extent of habitat features present, the site is thought to offer poor habitat suitability for reptiles.

**3.4 Otter and Watervole**

Water levels in the stream were considerably high during the Phase 1 survey visit, potentially obscuring or washing away evidence of presence of both species. As such an additional survey for signs of these species on Boxal Brook was carried out on 22<sup>nd</sup> August 2013. The stream surveyed extends south eastwards approximately 50m from the north eastern part of the proposed development site. Figure 7.2.6 shows the location of the watervole and otter and survey in context to the proposed site.

During the August survey sections of the brook were not in flow with pools of water present along parts of the northern parts of the stream channel. These were approximately 20cm deep with areas of bare mud surrounding them. The stream channel was approximately 3m at its widest with the majority of its bankside being un-vegetated except for occasional woodland species such as enchanter's nightshade *Circaea lutetiana*. The stream banks were compacted (possibly due to previous flooding) and there were no areas of prominent tall high-layered vegetation present that could provide suitable resting cover for otter or watervole. No holes were present within the areas of the brook that were surveyed.

The proposed site is located within arable habitat which is unlikely to support otter and watervole resting places.

The watercourse was searched thoroughly for evidence of otter and watervole presence. No evidence of otter, (such as spraints or prints) or watervole was recorded in association with the habitat adjacent to the brook within the survey area.

## 4 CONCLUSIONS

### 4.1 Bats

The site supports at least six species of bat, which use the site for both foraging and commuting purposes. These species include common pipistrelle, soprano pipistrelle, Daubenton's bat and other unidentified *Myotis* species, noctule, Leisler's bat and barbastelle. The dominant species on almost all survey visits were common and soprano pipistrelles. Both species are common and widespread across the UK and in West Sussex; whereas barbastelle prefer deciduous woodland and wet meadows and are very rare in the UK, found predominately in southern and central England and Wales. Daubenton's are found throughout the UK commonly associated with wetland habitat and is fairly widespread up to northern Scotland and Ireland. Noctule bats are a widespread species distributed in much of England, Wales and to south-west Scotland. Leisler's bat is found throughout the British Isles, with the exception of northern Scotland.

There are 18 species of bat in the UK and all species have been recorded in Sussex, in varying degrees of frequency and at different times of the year.

The automated detector survey results showed that barbastelle were using the eastern and south-eastern woodland edge habitats, with the highest proportion of activity occurring along the southern and eastern woodland edges. Due to the short length of the barbastelle echolocation call, it is not possible to rule out foraging on-site as the static detectors may not record feeding activity. However, the high number of passes recorded in May indicate that bats may be circling suggesting that they are using the site for foraging.

During April and May, three out of the four static detector locations recorded barbastelle passes showing quite a widespread range away from their radio-tracked commuting routes (which show the bats flying north from the Mens SAC and eastwards). A small proportion of barbastelle passes were recorded in June to the north of the site. No barbastelle were recorded during the July activity and static surveys.

The timings of first and last recordings of soprano pipistrelle after sunset and before sunrise respectively would indicate that there may be roosts in close proximity of the location at which they were recorded.

Very low numbers of *Myotis* sp. activity was recorded throughout the automated surveys with a peak of 37 passes over the four static locations in May. The activity surveys only recorded *Myotis* sp. during the June transect and these were recorded adjacent to the road to the north of the site. *Myotis* bats were recorded in low numbers at all locations during the July static surveys.

The main foraging areas throughout May to July were along the woodland edge and above adjacent set aside. Foraging behaviour was noted predominately along the east and south of the survey area with limited feeding noted adjacent to the proposed site. No foraging behaviour was recorded above the arable onsite habitat.

Overall the surveys identified that good numbers of passes of relatively common/widespread bat species were recorded (common pipistrelle, soprano pipistrelle). In comparison, fewer passes by rarer bats were also recorded (barbastelle and *Myotis* species) along the woodland edge to the east of the site. It is probable that a proportion of barbastelle bats from The Mens SAC use the woodland edge for commuting and foraging. The proposed development is sited within arable habitat with a proposed buffer of 20m from the woodland proposed. No bats were recorded using the onsite habitat for foraging or commuting. As such it is unlikely that there

would be any impact on bats as a result of direct habitat loss. Some *Myotis* sp. are known to be more sensitive to light compared to soprano and common pipistrelle species and there is some potential for impacts as a result of changes to ambient lighting.

#### 4.2 Dormouse

The woodland adjacent to the site is not likely to be directly impacted by the proposed works which are proposed within the arable field to the south and east of the woodland and no fragmentation will occur during the development. Based on a preliminary habitat suitability assessment and nut search the woodland edge was identified as offering poor structure to support dormouse and that they are unlikely to be using the woodland edge as a foraging resource.

#### 4.3 Reptile

If present, reptiles are likely to be limited to marginal areas where scrub and ruderal plants have colonised adjacent to the woodland and within spoil heaps adjacent to the Site entrance. Where possible these areas should be retained and enhanced within the development scheme. Enhancement could include linking up areas of suitable vegetation to allow reptiles to move through the Site and into the wider countryside. Encouraging a diverse sward of tussocky grasses and herbs would further attract the invertebrates that reptiles feed on. These measures would increase the carrying capacity of the land in respect of reptiles and allow these areas to act as recipient sites for any reptiles displaced by works on other parts of the Site.

#### 4.4 Otter and Watervole

Due to the absence of local records and field signs the site was considered to be of negligible interest for otter or watervole. Therefore, these species are not considered to represent a statutory constraint and no further survey or mitigation is considered necessary.

### 5 MITIGATION AND ENHANCEMENT

#### 5.1 Bats

Bats receive full legal protection under the WCA and The Conservation of Habitats and Species Regulations 2010 (as amended). It is considered unlikely that any roosts are present on the proposed Site itself which consists of arable habitat; although it has been confirmed that adjacent woodland habitat is of importance for commuting bats that use the wider survey area. There is potential for commuting bats to be disturbed if the level of disturbance caused by the proposed development was deemed to be significant, that is it would impair their ability of bats to survive, breed, reproduce, or to rear or nurture young and/or to hibernate or migrate and/or affect the local distribution or abundance of that species.

Therefore, this mitigation scheme aims to help ensure that the level of disturbance to commuting bats, especially along the woodland edge, by lighting is kept to a minimum and is not considered to be significant. The following mitigation has been recommended using the guidance provided in Jones (2000)<sup>20</sup> and the Institute of Lighting Engineers (2009)<sup>21</sup>.

##### 5.1.1 Pre-Construction

The following works could be implemented prior to construction:

- Specifying the use of low pressure sodium lamps instead of mercury or metal halide lamps where glass glazing is preferred due to its Ultra Violet filtration characteristics.

- Lighting to be designed to direct to required locations and light spillage avoided/minimised. The use of luminaires and accessories such as hoods, cowls, louvers and shields would direct light to the intended areas only. The use of lighting design computer programs is recommended in order to simulate lighting levels and light spill on the site prior to installation and to better inform the mitigation process.
- The height of lighting columns should be designed as to reduce the ecological impacts on bats.
- If any trees are to be impacted by the development then they should be subject to further surveys to determine whether they support roosting bats.

### **5.1.2 During Construction and Operation**

The following measures could be implemented during construction and operation works:

- Ecological tool box talks for all contractors.
- Installation of lighting and works associated with this should be carried out outside the active bat season (Late March to late September) to insure limited disturbance to active bats and to allow appropriate mitigation to be in place and established prior to the next active season. Carrying out works during pre-breeding (March-April) and pre hibernation (September-October) would allow for a low relative impact of disturbance.
- Lighting levels to be as low as legally possible and should fall below 3 lux at ground level and lighting should only be used where necessary. Lighting levels should be reduced or lights switched off when not needed;
- Maintain a watching brief throughout construction and ensure that no impacts on commuting routes arise;
- Implementation of a code of construction practice including measures to prevent adverse effects on bats;

### **5.1.3 Post Construction**

The following measures could be implemented after construction works:

- Bat boxes could be installed on the outside of trees and structures on site;
- General landscape proposals could be implemented to promote the occurrence of bats. Measures could include the planting of species (Night flowering species) that encourage the presence of insects.
- Post installation monitoring of bat activity should be carried out to ensure that proposed mitigation remains effective and to inform any on-going management.

## **5.2 Reptiles**

The following recommendations are based on the likely absence of common reptiles within the Site;

- Every effort should be made to retain suitable reptile habitat in the final design and construction of the proposed scheme
- Where possible, works and storage compounds should be placed away from potential reptile habitat, to avoid unnecessary damage during construction.

- The small areas of more optimal reptile habitat should be subject to habitat manipulation. This should occur during the active season (March-September) and when ambient temperatures are between 9°C and 20°C. This manipulation should take place in one direction towards suitable adjacent habitat in order to give any reptiles an opportunity to leave the area.
- Watching brief and destructive searches within the limited suitable terrestrial habitat. This should include hand searches by an Ecologist prior to works. Piles of debris, wood, brash or rubble within the working area will need to be dismantled by hand by the contractor under the supervision of an Ecologist.
- All excavations will be backfilled as soon as possible to prevent animals falling into, and becoming trapped in the excavations.
- Should a reptile species be encountered at any time during the works, all works should cease immediately and ecological advice be sought.

### 5.3 General Mitigation

There are also some general mitigation recommendations that should be implemented during the works phase to ensure that no indirect harm comes to protected or notable species. Such measures include standard best working practice guidelines as outlined below:

- All site works must be carried out in accordance with best environmental working practices e.g. CIRIA and should be legally compliant. This should include compliance with all wildlife legalisation.
- Toolbox talks to be given to all contractors, to make them aware of the presence of protected species nearby, and the legal implications of their presence. All site workers should be instructed to stop works and consult a suitably qualified ecologist if they see or disturb any notable species while working on site;
- The areas which will be disturbed should be kept to a minimum and should be clearly defined prior to commencement of works. This could necessitate the erection of fencing;
- If vehicles have to be temporarily parked onsite, they must be kept within the site construction area to minimise disturbance to the surrounding area; and
- Consideration should be given to any potential noise pollution, especially that arising from construction, and mitigation to minimise noise pollution in the vicinity of the woodland must be employed.



**Appendix 1. Figures**

**Appendix 2. Badger Survey (Confidential)**

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## REFERENCES

- 1 URS (2013) Wisborough Green 1: Ecology Rapid Site Appraisal Report.
- 2 Department for Communities and Local Government, (2012); 'National Planning Policy Framework.'
- 3 Office of the Deputy Prime Minister, (2005); Government Circular: Biodiversity and Geological Conservation.'
- 4 JNCC(2012) 'UK Post-2010 Biodiversity Framework'
- 5 HMSO, (2006); 'Natural Environment and Rural Communities Act 2006.'
- 6 Her Majesty's Stationary Office (HMSO), (1981); 'Wildlife and Countryside Act 1981.'
- 7 HMSO, (2000); 'Countryside and Rights of Way Act 2000.'
- 8 HMSO, (2010); 'The Conservation of Habitats and Species Regulations 2010.'
- 9 HMSO, (1992); 'The Protection of Badgers Act 1992.'
- 10 HMSO (1996) 'Wild Mammals (Protection) Act 1996.'
- 11 English Nature (2004) Bat Mitigation Guidelines, English Nature, Peterborough, UK
- 12 Hundt (2012); 'Bat Surveys; Good Practice Guidelines' Bat Conservation Trust (BCT)
- 13 Harris S., Cresswell, P. and Jefferies, D. (1989) Surveying Badgers The Mammal Society 9
- 14 Roper, T (2010) A Survey of British Natural History- Badger. New Naturalist Library, HarperCollins.
- 15 Bright, P. and Morris, P. and Mitchell-Jones, T. (2006). The Dormouse Conservation Handbook (Second Edition). English Nature, Peterborough
16. National Amphibian and Reptile Recording Scheme (2007) Reptile Habitat Guide. Herpetological Conservation Trust (HCT)
- 17 Natural England (2011) 'Standing Advice Species Sheet: Reptiles.'
- 18 Chanin, P. (2003) Monitoring the Otter, *Lutra lutra*. Conserving Natura 2000 Rivers Monitoring Series No 10, English Nature, Peterborough.
- 19 Strachan R. & Moorhouse T (2006) Water Vole Conservation Handbook 2nd Edition. Wildlife and Conservation Research Unit, Oxford
- 20 Dr Jenny Jones (May 2000), 'Impact of Lighting on Bats'
- 21 Bat Conservation Trust and Institute of Lighting Engineers (2009). Bats and lighting in the UK.

**APPENDIX 7.4A**  
**HABITATS REGULATIONS ASSESSMENT**

## **APPENDIX 7.4A - HABITATS REGULATIONS ASSESSMENT**

### **A1.1 This Appendix to the Ecology Chapter updates the ES in respect of the following:**

- **Update of effects of new lighting plans on receptors.**
- **Removal of references to duration of works.**

### **Introduction**

1. URS was appointed by Celtique Energie ('the Client') to produce a report to inform a Habitats Regulations Assessment (HRA) of the proposed development of a temporary well site, including an access track and ancillary infrastructure, at a location near Wisborough Green, West Sussex (the Proposed Development).
2. The aim of this report is to identify any aspects of the Proposed Development that would be likely to lead to significant effects upon sites afforded protection under Article 6(3) of the Habitats Directive, referred to collectively in this Report as "European Sites" (please see paragraph 6 below for a full definition of "European Sites").
3. This Report accompanies and supports the Environmental Statement (ES) and has therefore avoided unnecessarily reproducing information already contained within the ES. This Report should be read in conjunction with Chapter 7 Ecology of the ES and the supporting technical information (specifically relating to bats) contained within Appendix 7.2.

### ***Legislative Context***

4. The need for Habitats Regulations Assessment (HRA) is set out within Article 6 of the Habitats Directive (92/43/EEC), and transposed into UK law by the Conservation of Habitats and Species Regulations 2010 (as amended) (the Habitats Regulations). The ultimate aim of the Habitats Directive is to "maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest" (Article 2(2)). This aim relates to habitats and species, not the European Sites themselves, although the European Sites have a significant role in delivering favourable conservation status.

### Box 1 The legislative basis for Appropriate Assessment

#### Habitats Directive 1992

Article 6 (3) states that:

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

#### Conservation of Habitats and Species Regulations 2010

The Regulations state that:

*“A competent authority, before deciding to ... give any consent for a plan or project which is likely to have a significant effect on a European site ... shall make an appropriate assessment of the implications for the site in view of that sites conservation objectives... The authority shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site”.*

### Key Definitions

5. **Competent Authority** – A “Competent Authority” is not strictly defined in the legislation but for development projects that require planning permission is generally taken to be the local planning authority. Regulation 61(3) requires the competent authority to consult with the appropriate nature conservation body (in this case Natural England<sup>1</sup>) in order to carry out the Appropriate Assessment.
6. **European Site** - The legal definition of “European site” is those sites designated under the EC Birds Directive 1979 (Special Protection Areas, or SPA's) and EC Habitats Directive 1992 (Special Areas of Conservation, or SAC's). The Habitats Regulations do not provide statutory protection for potential Special Protection Areas (pSPAs) or candidate Special Areas of Conservation (cSACs) before they have been agreed with the European Commission. Nor do the Regulations provide statutory protection for sites designated under the Convention on Wetlands 1975 (known as Ramsar sites). However, the National Planning Policy Statement makes clear that for the purposes of considering development proposals affecting them, the Government wishes pSPAs and cSACs, that are included in a list sent to the European Commission, to be considered in the same way as if they had already been classified or designated. It is also

<sup>1</sup> Natural England, Countryside Council for Wales or Scottish Natural Heritage

Government policy that listed Ramsar sites should receive the same protection as designated SPAs and SACs.

7. **Integrity of a European Site** - As with the term “competent authority”, the integrity of a European site is not defined in legislation. However it is generally regarded as the coherence of the site’s structure and function.
8. In the past, the term “Appropriate Assessment” has been used to describe both the overall process and a particular stage of that process (see below). However, over the years, the term Habitat Regulations Assessment has come into use in order to refer to the process that leads to an “Appropriate Assessment”, thus avoiding confusion. Throughout the remainder of this report, Habitat Regulations Assessment (HRA) is used to refer to the overall procedure required by the Habitats Regulations.

## Methodology

### *The HRA Process*

9. In practice, HRA of projects can be broken down into three discrete stages, each of which effectively culminates in a test. The stages are sequential, and it is only necessary to progress to the following stage if a test is failed. The stages are:

#### *Stage 1 – Screening (Likely Significant Effects Test)*

10. This is essentially a risk assessment, typically utilising existing data (although bespoke data may be used where appropriate and available), records and specialist knowledge. The purpose of the test is to decide whether ‘full’ Appropriate Assessment is required. The essential question is:

*“Is the project, either alone or in combination with other relevant projects and plans, likely to result in a significant adverse effect upon a European site?”*

11. If it can be demonstrated that significant effects are unlikely, no further assessment is required.

#### *Stage 2 – Appropriate Assessment*

12. If it cannot be satisfactorily demonstrated that significant effects are unlikely, a full “Appropriate Assessment” will be required. In many ways this is analogous to an Ecological Impact Assessment, but is focussed entirely upon the designated interest features of the European sites in question. Bespoke survey work and original modelling and data collation are often required. The essential question here is:



*“Will the project, either alone or in combination with other relevant projects and plans, actually result in a significant adverse effect upon European sites, without mitigation?”*

13. If it is concluded that significant adverse effects will occur, measures will be required to either avoid the impact in the first place, or to mitigate the ecological effect to such an extent that it is no longer significant. Note that, unlike standard Ecological Impact Assessment, compensation for significant adverse effects (i.e. creation of alternative habitat) is not permitted at the Appropriate Assessment stage.

*Stage 3 – Imperative Reasons of Overriding Public Interest (IROPI) Test*

14. If a project will have a significant adverse effect upon a European site, and this effect cannot be either avoided or mitigated, the project cannot proceed unless it passes the IROPI test. In order to pass the test it must be objectively concluded that no alternative solutions exist. The project must be referred to Secretary of State on the grounds that there are Imperative Reasons of Overriding Public Interest as to why the plan should nonetheless proceed. The case will ultimately be decided by the European Commission.

***Approach to Stage 1 – Screening***

15. This Report therefore addresses the first test in the HRA process, Stage 1 – Screening. The following approach has been adopted for this assessment:
1. Identification of European Sites to be scoped into the assessment;
  2. Description of the European Sites and their qualifying features;
  3. Description of the Proposed Development and identification of potential impact pathways;
  4. The likely significant effects test; and,
  5. The in-combination test.

**Identification of European Sites**

16. Through consideration of likely impacts associated with the Proposed Development and consultation with Natural England and West Sussex County Council (WSSCC), two European sites have been scoped into the assessment:
- The Mens SAC located approximately 1km south of the Proposed Development; and
  - Ebernoe Common SAC located approximately 5km west of the Proposed Development.

## Description of European Sites

### *The Mens SAC*

17. The Mens SAC is comprised of extensive, mature beech *Fagus sylvatica* woodland rich in lichens, bryophytes, fungi and saproxylic invertebrates, and is one of the largest tracts of Atlantic acidophilous beech forests in the south-eastern part of the habitats UK range. It has been designated under the EU Habitats Directive for the following features:
- Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Illici-Fagenion*) (the primary reason for the site's designation as a SAC); and,
  - Barbastelle bat, for which the area is considered to support a significant presence (a secondary reason for the site's designation).
18. At the last condition survey, compiled on 1 June 2009, Natural England recorded that all of the site's 204.69 hectares were found to be in a 'Favourable' condition.

### *Ebernoe Common SAC*

19. Ebernoe Common supports an extensive block of beech *Fagus sylvatica* high forest and former wood-pasture over dense holly *Ilex aquifolium*, and has a very rich epiphytic lichen flora, including *Agonimia octospora* and *Catillaria atropurpurea*. It represents Atlantic acidophilous beech forests in the south-eastern part of the habitat's UK range. The beech woodland is associated with other woodland types, open glades and pools, which contribute to a high overall diversity. The woods are important for a number of bat species, in particular Bechstein's bat and the Barbastelle bat. It has been designated under the EU Habitats Directive for the following features:
- Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Illici-Fagenion*) (a primary reason for the site's designation as an SAC);
  - Barbastelle bat, for which the area is considered to support a significant presence (a primary reason for the site's designation as an SAC);
  - Bechstein's bat, a maternity colony of Bechstein's bat is associated with the woodland. Roosts are mainly in old woodpecker holes in the stems of live mature oak trees (a primary reason for the site's designation as an SAC).

## The Proposed Development

20. The Proposed Development involves the siting and construction of a temporary well site with key infrastructure including:
- An access track created from crushed stone;
  - A drilling rig and ancillary drilling equipment for an exploratory borehole;
  - Staff car park providing up to ~~112~~ spaces within the compound;
  - Concrete chamber sunk into the ground acting as a cellar including large diameter pipework;
  - Purpose built tanks to store semi-dry drilling mud and cutting rocks;
  - Water storage tankers and a portable skip for onsite water and refuse collection; and,
  - ~~Five portable e~~cabins to provide temporary office accommodation and essential 24-hour staff living accommodation and laboratories.
21. The Proposed Development will be sited within an arable field and will not be located closer than 15m from the edge of the woodland habitats at any point.
22. Construction of the temporary well site will require the excavation and removal of top soil throughout the Application Site totalling an area of approximately 1.43ha.

### ***Avoidance and Mitigation Measures***

23. The lighting scheme has been designed to minimise unnecessary illumination and avoid adverse effects from light spill onto adjacent habitats (See Chapter 4: Project Description and the assessment within Chapter 12: Lighting). The access route will not be lit at any time during construction, operation or decommissioning. ~~There will be no artificial lighting used in Phases 1 and 4a. During Phases 2, 3a and 3b lighting will comprise of six freestanding 3m high fluorescent lights facing inwards towards the site and angled at 20° below the horizontal plane to reduce light spill; eight tungsten filament bulkhead lights located on site cabins fitted with reflectors to reduce light spill; two horizontal strip lights at cabin level adjacent to the rig; and inward and downward facing lighting within the derrick of the drilling rig. All lamps will use fluorescent and halogen bulbs which emit only low levels of ultraviolet light. Bunds of c.2½ - 3m will be created between the site and the woodland edge to reduce light spill. The flare will be enclosed and will not contribute to light spill.~~
24. Lighting models based on a worst case scenario (without cowls or screening) predict the level of light spill at the woodland edge would be <0.5~~1~~ lux. In practice, the light spill would be further reduced by applying cowls to lamps and a 3-4m opaque screen would surround the entire Application Site.
- ~~25. The Proposed Development will be lit for approximately 8 weeks (best case scenario) - 14 weeks (worst case scenario).~~

## Identification of Potential Impact Pathways

### *Barbastelle and Bechstein's Bat*

#### *Disturbance to foraging and commuting bats*

26. There is potential for increased light and noise levels generated by the Proposed Development to disturb barbastelle and Bechstein's bat, if present within the vicinity of the Proposed Development.
27. Increased illumination may reduce the ability of both species to forage within a given area as it can:
  1. Cause bats to avoid an illuminated area (both barbastelle and Bechstein's bats are known to be particularly sensitive to illumination and tend to avoid lit areas<sup>2</sup>); and,
  2. Reduce the availability of prey species (insects) within an area. Insects are often attracted to light and may therefore move from a less lit area to a more illuminated one. This can reduce the availability of prey species for light sensitive bats (such as barbastelle and Bechstein's bat).
28. The illumination of an area can also disturb commuting bats. This is particularly harmful along favoured commuting routes, such as rivers, woodland edges, and hedgerows. Severance to commuting corridors can also potentially reduce the ability of bats to feed if the commuting route leads to a favoured foraging area.
29. There has been limited research conducted on the effect of noise on bats. A recent study concerning the greater mouse-eared bat *Myotis myotis* showed that various types of noise did affect the foraging behaviour of the species (and in some cases reduced the ability of the bat to forage)<sup>3</sup>. However, the effect of noise on the bat was complex and was not directly related to the amplitude of the sound (volume), but rather to nature (frequency and time structure) of the sound and how this interacted with the bat's echolocation. For example, the Schaub study showed that 'vegetation noise', which was at a lower volume when compared to the traffic noise, had a more disruptive effect on the bat's foraging behaviour due to its similarity in sound character to the bat's prey species.
30. The potential for foraging and commuting bats to be affected by increased light and noise levels as a result of the Proposed Development will therefore be considered further.

#### *Disturbance to roosting bats*

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<sup>2</sup> Bat Conservation Trust. 2008; Bats and Lighting in the UK.

<sup>3</sup> Schaub A, Ostwald J, Siemers BM. 2009. Foraging bats avoid noise. *Journal of Experimental Biology*.

31. Illumination of a bat roost, even a transient summer roost, has the potential to disturb bats and cause them to desert the roost. In the case of the Proposed Development, however, there is no reasonable likelihood of potential barbastelle or Bechstein's bat roosts being illuminated. Light levels will depreciate to background levels after 10m and no trees with the potential to support roosting bats are located with this buffer.

### ***Habitats***

#### *Direct loss and degradation to habitats*

32. Direct loss of habitats for which both European Sites are designated will not occur due to the intervening distance between the Proposed Development and the European sites (both sites are located >500m from the Proposed Development).
33. Furthermore, degradation to habitats due to air quality impacts are not anticipated. The requirement for an Air Quality chapter has been scoped out of the Environmental Impact Assessment (EIA) following consultation with WSCC as air quality impacts are not anticipated. Potential adverse effects on the habitats for which both European sites are designated are therefore not anticipated and are not considered further in this assessment.

### **Likely Significant Effects Assessment**

34. In order to assess whether barbastelle and Bechstein's bat are likely to be affected by the Proposed Development, a review of available literature and the collection of bespoke data (collected to inform the Environmental Impact Assessment (EIA)) has been undertaken. The results of this review are presented below.

#### ***Literature Review***

35. A significant amount of data on the foraging and commuting behaviour of barbastelle bats supported by The Mens SAC and Ebernoe Common SAC exists due to studies which have been undertaken by Frank Greenaway over the past 10 years. This includes information contained within:
1. Greenaway, F. (2004) Advice for the management of flightlines and foraging habitats of the barbastelle bat *Barbastellus barbastellus*. English Nature Research Report, Number 657.
  2. Greenaway, F. (2008) Barbastelle bats in the Sussex West Weald 1997 - 2008
36. The above studies identified that the barbastelle of The Mens SAC forage to the east of the site, principally on the floodplain of the river Arun from close to Horsham in the

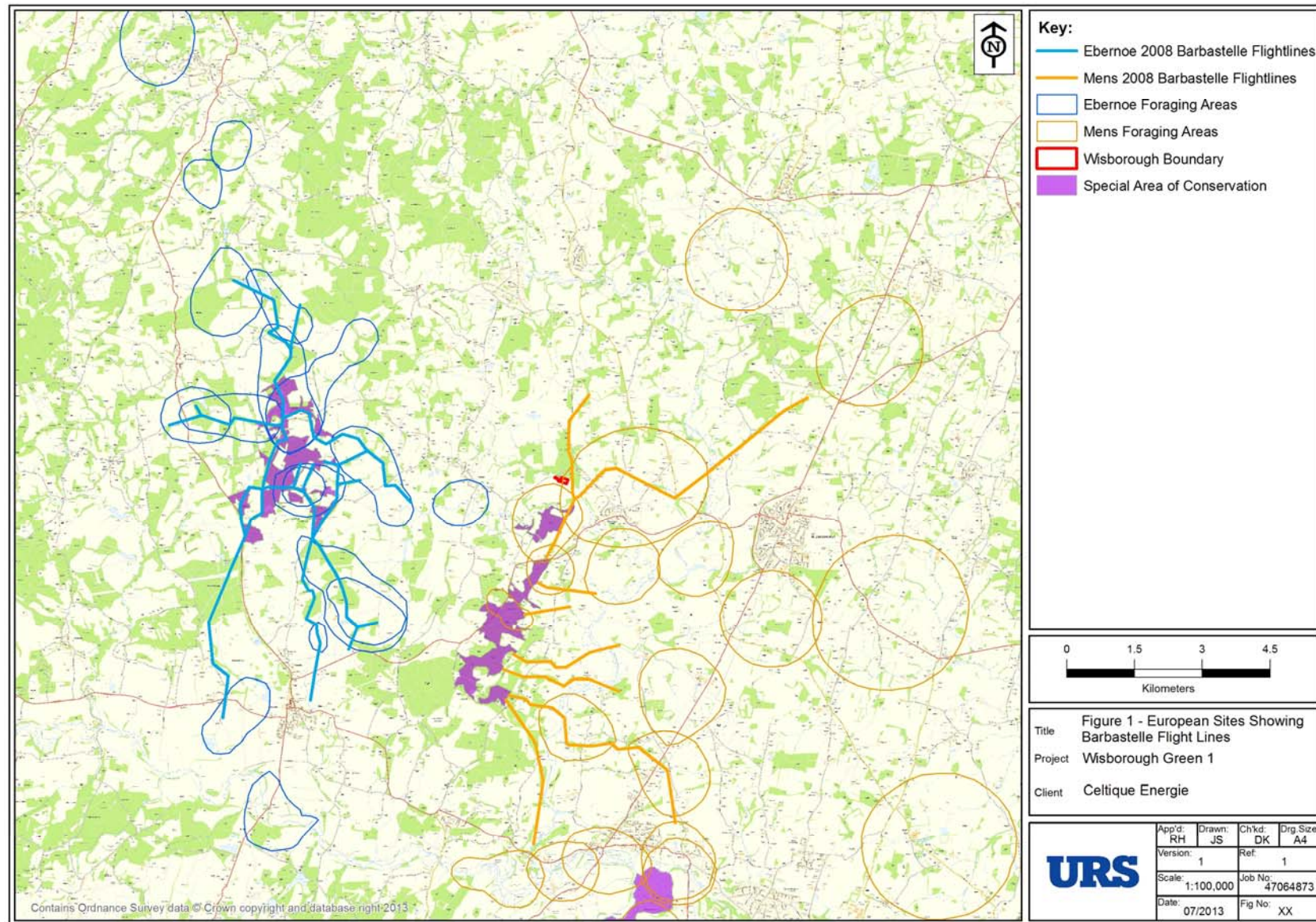
north to Parham in the south. The studies also revealed that barbastelle cross to the Adur floodplain, with bats in some cases travelling up to 7km to visit foraging areas.

37. Greenaway demonstrated that the barbastelle supported by Ebernoe Common SAC had flightlines that followed watercourses, particularly the river Kird, and woodland cover for distances of typically 5km. Flightlines outside the SAC were largely concentrated to the south of the SAC (the Petworth and Tillington area) but also to the west, north and east.
38. The key commuting and foraging areas for barbastelle, as identified by the Frank Greenaway studies, are presented on Figure 1 below.
39. With regards Bechstein's bat, less study of their populations has been undertaken when compared to barbastelle. However, those radio-tracking projects which have been implemented for the species have established that the tracked individuals generally remained within approximately 1.5 km of their roosts<sup>4</sup>. These distances fit with those identified from radio-tracking of Bechstein's that was undertaken at Ebernoe Common SAC from 2001, which identified that the maximum distance travelled by a tagged Bechstein's bat to its foraging area was 1,407m, with the average being 735.7m<sup>5</sup>.
40. As the maximum routine commuting distance for Bechstein's bat is approximately 1.5km, and the Proposed Development is located approximately 5km away from Ebernoe Common (Bechstein's bat are only listed as a qualifying feature for Ebernoe Common and **not** the Mens SAC), it is unlikely that the Proposed Development will significant affect populations of Bechstein's bat. The potential for significant effects on Bechstein's bat are therefore not considered further in this assessment.

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<sup>4</sup> Cited in: Schofield H & Morris C. 2000. 'Ranging Behaviour and Habitat Preferences of Female Bechstein's Bats in Summer'. Vincent Wildlife Trust

<sup>5</sup> Fitzsimmons P, Hill D, Greenaway F. 2002. Patterns of habitat use by female Bechstein's bats (*Myotis bechsteinii*) from a maternity colony in a British woodland



*2013 URS Field Survey Data*

41. Bat activity surveys were undertaken by URS at the Proposed Development site each month between April and September, 2013. These surveys included:
1. Walked transect surveys – undertaken during May (dusk survey), June (dusk and dawn survey), and July (dusk survey); and,
  2. Automated static surveys – undertaken from May – July with recorders left at various locations across the Proposed Development site to record bat activity.
42. All surveys were undertaken in accordance with guidance for bat survey issued by the Bat Conservation Trust (BCT) in 2012<sup>6</sup>. A summary of the findings of these surveys is provided below although for full details with regards the methods and results of this survey please refer to Appendix 7.2.

***Walked transect surveys***

43. During the walked transect surveys, barbastelle were recorded in April, August and September with one or two bats commuting along the woodland edge.
44. The behaviour of barbastelle within the vicinity of the Proposed Development are generally likely to accord to that of the other bat species recorded (more frequently) during the transect surveys. Bats were noted commuting and foraging adjacent to and within the woodland to the north, east and west of the site. No bats were recorded within the arable field within which the Proposed Development is to be sited (please refer to Figure 1 for survey locations and results).

*Automated static surveys*

45. The number of barbastelle passes at each automated static bat detector location is presented in Table 1.2 below. The location of the statics is presented on Figure 2.

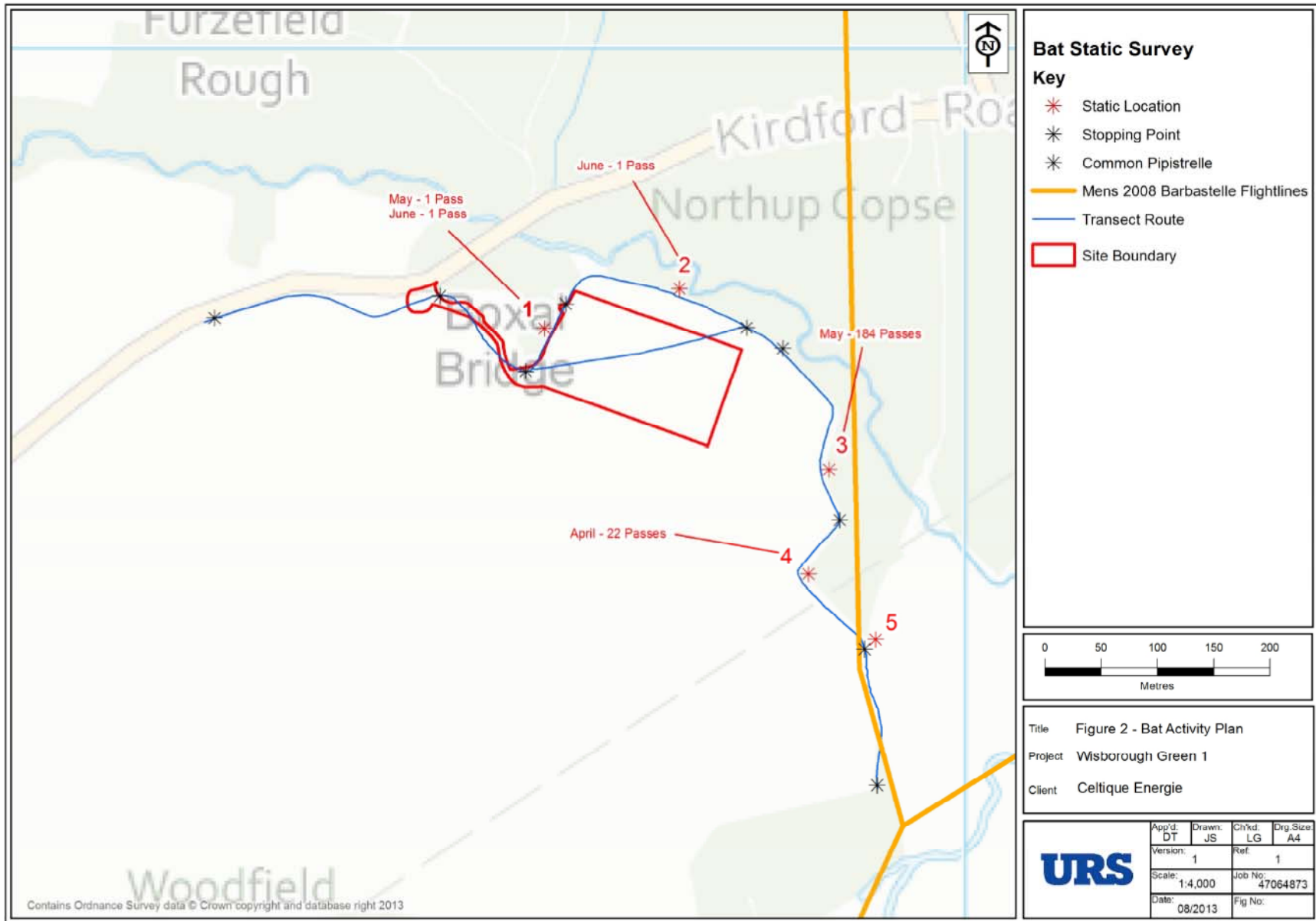
**Table 1.2 Number of Bat Passes Recorded at Each Static Location**

<b>Static Location and Month of Operation</b>	<b>Barbastelle Passes</b>
April Static Location 4	22
May Static Location 1	1
May Static Location 3	184
June Static Location 1	3
June Static Location 2	1
September Static Location 1	1
September Static Location 2	9

<sup>6</sup> Bat Conservation Trust (2012). *Bat Surveys; Good Practice Guidelines*. Bat Conservation Trust, London



46. The highest number of barbastelle passes (passes can provide an indication of bat activity on site, was recorded by statics 3 and 4, located to the east of the Proposed Development site (see Figure 2). The location of the relatively high levels of barbastelle activity (recorded at statics 3 and 4) correlates with the location of a key commuting route as observed by Frank Greenaway in his 2008 study (see Figure 1 for further detail). This commuting route is located approximately 100m east of the Proposed Development, with barbastelle likely to be commuting in a northerly and southerly direction when moving between The Mens SAC and favoured foraging habitat in the north.



## *Discussion*

47. The literature and field surveys identified an important barbastelle commuting route located in the vicinity of the woodland approximately 100m to the east of the Proposed Development (see Figure 1 and static location 3 and 4). The literature review and results of the URS bat activity surveys also indicated that low numbers of barbastelle are present commuting and potentially foraging adjacent to the woodland (see static locations 1 and 2) to the west and north of the site. Barbastelle were not recorded during transect surveys within the arable field during the transect surveys where the Proposed Development is to be sited.
- 7.17 The Proposed Development has been sensitively designed and sited to avoid affecting bats. There will be minimal light spill on to surrounding sensitive habitats (including the woodland) which support commuting and foraging barbastelle. It has been demonstrated through lighting models which indicate that light levels will depreciate to ~~<0.5~~ **<0.1** lux at the woodland edge. A recent study of the effects of lighting on bats defined a dark site as one where illumination was below 0.5 lux and species of bats, including barbastelle bats, were recorded foraging in these areas<sup>7</sup>. It is concluded that this level of illumination at the site will not impact on bat behaviour.
48. There will be elevated levels of noise during the construction and drilling phases of the Proposed Development (~~an approximately 20 week period under a worst case scenario~~). However, construction will not be undertaken at night ~~and the period when noise could potentially affect foraging barbastelle is limited to a 10 week drilling phase (worst case scenario)~~.
49. Furthermore, as the literature review and field surveys demonstrated, the area within the immediate vicinity of the Proposed Development, while potentially supporting small numbers of barbastelle, is not considered to be a significantly important foraging resource for the species. The studies by Frank Greenaway have identified a range of other (and indeed favoured) foraging areas within the wider area, outside of the vicinity of the Proposed Development (see Figure 1).
50. Based on the considerations above, it is unlikely that the Proposed Development would affect the foraging or commuting behaviour of a significant number of barbastelle supported by The Mens SAC and / or Ebernoe Common SAC.
51. **Significant effects on these European Sites are therefore not considered likely.**

## **In-combination assessment**

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<sup>7</sup> Murphy, S., Hill, D., & Greenaway, F. (2009) Pilot study of a technique for investigating the effects of artificial light and noise on bat activity. Report for People's Trust for Endangered Species.

52. Table 1.3 presents three schemes which have been identified in the EIA as having the potential to interact with the Proposed Development. These schemes are considered for their potential to have in-combination effects with the Proposed Development.

**Table 1.3 Number of Bat Passes Recorded at Each Static Location**

Planning Application Number	Description of Scheme	Distance from Proposed Development
08/02511/FUL	The siting of 3 portable containers associated with the harvesting of methane gas	3.7km
13/00593/EIA	Screening for 31ha solar farm – was screened in previous year for a 20ha solar farm.	3.5km
13/01190/EIA	EIA Screening for 30 houses on land south of Petworth Road opposite Meadowbank, Wisborough Green	1.4km

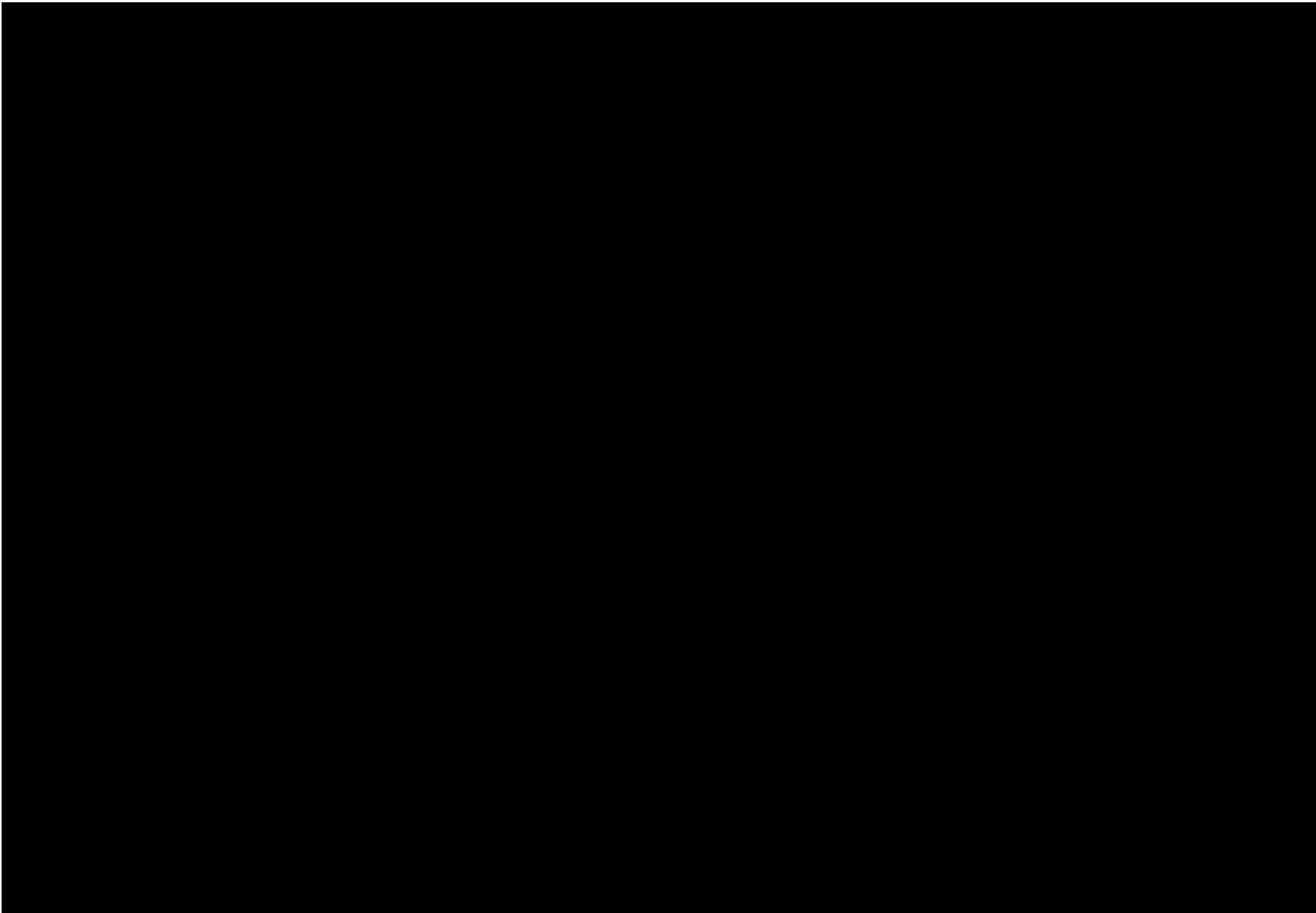
53. Considering the nature and location of the in-combination schemes in relation to the Proposed Development, no obvious interactions or impact pathways have been identified. **It is therefore unlikely that the Proposed Development will have significant effects on any European Site in-combination with another plan or project.**

**APPENDIX 7.6A**

**CONFIDENTIAL APPENDIX**



Figure 1A. Locations of Signs of Badger Activity and Areas of Proposed Works



## Potential Impacts on Badgers

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]

[Redacted]



## Summary

[REDACTED]

[REDACTED]

[REDACTED]

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