

LAND AT CASTLE AVENUE, HAVANT, HAMPSHIRE

ECOLOGICAL ASSESSMENT

Final Rev.2 Document

October 2018

Preliminary Ecological Appraisals • Protected Species Surveys and Licensing • NVC • EclA • Management Plans
Habitats • Badger • Bats • Hazel Dormouse • Birds • Reptiles • Amphibians • Invertebrates • Riparian and Aquatic Species

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ECOSA Quality Assurance Record

This report has been produced in accordance with the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Report Writing 2015¹. The report has been prepared in line with current best practice guidance and survey work has been undertaken in line with references within CIEEM's Source of Survey Guidance².

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¹ Chartered Institute of Ecology and Environmental Management (2015). *Guidelines for Ecological Report Writing*. Technical Guidance Series. <http://www.cieem.net/publications/23/ecological-report-writing>

² www.cieem.net

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ECOLOGICAL ASSESSMENT

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EXECUTIVE SUMMARY

The site is situated on the outskirts of the town of Havant. The site covers approximately 2.2 hectares and comprises two grassland fields separated by a fence line with a small agricultural building. The proposals for the site involve residential development with associated access and landscaping.

ECOSA were commissioned by Persimmon Homes South Coast to carry out an Ecological Assessment of the site to assess its ecological baseline and to determine any impacts and effects of the proposal. The main findings of the Ecological Assessment are:

- There are five statutory and five non-statutory designated sites of nature conservation interest within a one kilometre radius of the site. The site forms part of a wider parcel of land identified in the Solent Waders and Brent Goose Strategy as being “low use” for supporting waders associated with the Solent SPAs.
- The habitats within the site have been assessed as being of generally low ecological value largely comprising common and widespread species. The site has been assessed as supporting foraging/commuting bats and a low population of slow-worm.
- The site has also been assessed as having suitability to support a range of other protected and notable species including foraging badger, breeding birds, hedgehog and common assemblages of invertebrates.
- Given the presence of a low population of reptiles within the site a reptile translocation exercise will need to be completed prior to the commencement of development.
- Recommendations have also been made for mitigation and enhancement measures including new native species planting, hedgerow retention and bolster planting. Additionally, recommendations have been made for the inclusion of a sensitive lighting scheme to minimise potential disturbance impacts on foraging and commuting bats.
- If works have not commenced by October 2019, it is recommended that the Ecological Assessment is updated. This is because many of the species considered during the current survey are highly mobile and the ecology of the site is likely to change over this period. If the planning application boundary changes or the proposals for the site alter, a re-assessment of the impacts may be required.

1.0 INTRODUCTION

1.1 Background

Ecological Survey & Assessment Limited (ECOSA) have been appointed by Persimmon Homes South Coast to undertake an Ecological Assessment to support a planning application for the development of Land at Castle Avenue, Havant, Hampshire PO9 2RY (hereafter referred to as the site).

ECOSA previously undertook a Preliminary Ecological Appraisal of the site in February 2017³. Subsequent to the findings of the Preliminary Ecological Appraisal further surveys in respect of bats, hazel dormouse, wintering birds, reptiles and great crested newt were undertaken with the findings of the Preliminary Ecological Appraisal and further survey work incorporated into this report.

1.2 The Site

The site is located in Havant, Hampshire, centred on National Grid Reference (NGR) SU 7306 0631 (**Map 1**). The Phase 1 habitat map (**Map 2**) depicts the boundary of the site.

The site itself covers approximately 2.2 hectares and comprises two grassland fields separated by a fence line with a single small agricultural building. The majority of the site is bound on all sides by hedgerows or scrubby margins with existing residential development to the west, an active railway line to the north, a field to the east and the A27 to the south.

The wider landscape is dominated by urban development, large areas of open grassland, arable fields, blocks of broad-leaved woodland and hedgerow networks. Emsworth is situated approximately 1.8 kilometres east of the site.

1.3 Aims and Scope of Report

The information within this report is based on a field survey and desktop study carried out during February 2017 and subsequent surveys in respect of bats, hazel dormouse, reptiles and great crested newt undertaken between April and October 2017. The report provides an assessment of any potential ecological impacts⁴ and associated effects⁵, and likely ecological constraints to the proposed development of the site, based on the identified features of ecological interest. It identifies the need for any measures to avoid or mitigate negative effects on habitats and species, outlines enhancements to be implemented as part of the development and provides recommendations for further ecological work, if required. The objectives of the assessment are:

³ ECOSA (2017) Castle Avenue, Havant – Preliminary Ecological Appraisal DRAFT dated February 2017

⁴ Defined by CIEEM as an 'action resulting in changes to an ecological feature' e.g. hedgerow removal.

⁵ Defined by CIEEM as an 'outcome to an ecological feature from an impact' e.g. loss of habitat.

- To provide baseline information on the current habitats and ecological features both on site and in the immediate vicinity of the site, where relevant;
- To identify the proximity of any statutory and non-statutory sites designated for nature conservation importance and provide an assessment of potential effects the proposed development may have on these;
- To identify the presence/potential presence of diverse habitats and protected species and to provide an appraisal of potential effects the proposed development may have on these; and
- To provide recommendations for avoidance, mitigation, compensation and enhancement measures and, where required, recommendations for additional survey work and/or consultation required to support the planning application.

1.4 Site Proposals

The proposals for the site involve residential development with associated access and landscaping. Site access is proposed to be located along St George's Avenue along the northern boundary of the site. The exact timescales for the construction are currently unknown, however for the purposes of this report it is assumed that construction would have commenced by October 2019. Details of the proposals are provided by Persimmon Homes Site Plan drawing number A-02-020-SP dated June 2018 in **Appendix 1**. The application site boundary has been reduced from the original survey boundary with the proposed residential development totalling approximately 1.8 hectares.

2.0 PLANNING POLICY CONTEXT

2.1 Introduction

This section summarises the planning policy in relation to ecology and biodiversity within the Havant Borough Council administrative area. This information is then used to assess the compliance of the scheme in relation to relevant planning policy and where necessary make recommendations for mitigation and enhancements (see Section 6.0).

2.2 Planning Policy

2.2.1 National Policy

The National Planning Policy Framework (NPPF) sets out the government's requirements for the planning system in England. The original document was published in 2012 with the revised NPPF published in July 2018. A number of sections of the NPPF are relevant when taking into account development proposals and the environment. As set out within Paragraph 11 of the NPPF *"Plans and decisions should apply a presumption in favour of sustainable development"*. However, Paragraph 177 goes on to state that *"The presumption in favour of sustainable development does not apply where development requiring appropriate assessment because of its potential impact on a habitats site⁶ is being planned or determined"*.

The general impetus of the NPPF in relation to ecology and biodiversity is for development proposals to not only minimise the impacts on biodiversity but also to provide enhancement. Paragraph 170 states that the planning system should contribute to and enhance the natural environment by *"...minimising impacts on biodiversity and providing net gains in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures..."*.

A number of principles are set out in Paragraph 175, including that where harm cannot be adequately avoided then it should be mitigated for, or as a last resort, compensated for. Where impacts occur on nationally designated sites, the benefits must clearly outweigh any adverse impact and incorporating biodiversity in and around developments should be encouraged. Specific reference is also made to the protection of irreplaceable habitats⁷. Where loss to irreplaceable habitats occur planning permission would normally be refused unless there are wholly exceptional reasons and an adequate compensation strategy is in place. Paragraph 175 also states

⁶ The NPPF defines a habitats site as *"Any site which would be included within the definition at regulation 8 of the Conservation of Habitats and Species Regulations 2017 for the purpose of those regulations, including candidate Special Areas of Conservation, Sites of Community Importance, Special Areas of Conservation, Special Protection Areas and any relevant Marine Sites."*

⁷ The NPPF defines irreplaceable habitats as *"Habitats which would be technically very difficult (or take a very significant time) to restore, recreate or replace once destroyed, taking into account their age, uniqueness, species diversity or rarity. They include ancient woodland, ancient and veteran trees, blanket bog, limestone pavement, sand dunes, salt marsh and lowland fen."*

“development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity”. Protection of sites proposed as Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar sites or acting as compensation for SPAs, SACs and Ramsar sites, should receive the same protection as habitat sites.

In addition to the NPPF, Circular 06/05 provides guidance on the application of the law relating to planning and nature conservation as it applies in England. Paragraph 98 states *“the presence of a protected species is a material consideration when a planning authority is considering a development proposal that, if carried out, would be likely to result in harm to the species or its habitat”.* Whilst paragraph 99 states *“it is essential that the presence or otherwise of a protected species, and the extent that they may be affected by the proposed development, is established before planning permission is granted”.*

2.2.2 Local Policy

Local planning policy within Havant Borough is provided by the Havant Borough Core Strategy March 2011 with two policies referring in part ecology and biodiversity:

- **Policy CS11:** Protecting and Enhancing the Special Environment and Heritage of Havant Borough. This policy refers in part to biodiversity stating that planning permission will be granted for development that:
 - Protects and where possible enhances the borough’s statutory and non-statutory designated habitats and features of biological interest. Protection and enhancement will be achieved by appropriate adaptation and mitigation measures;
 - Has particular regard for nature conservation designations with international designations given the highest regard;
 - Supports an ongoing programme of survey of habitats, species and designations of SINC’s;
 - Incorporates partnership working with conservation organisations to improve public understanding of biodiversity and to manage public access to designated sites, particularly associated with the coasts, in order to minimise harm;
 - Incorporates partnership working with landowners and developers to ensure land management practices restore, enhance and where appropriate create new valued landscapes, habitats and their soil structure, particularly the ancient woodland remnants of the Forest of Bere and coastal salt marsh;

-
- Protects wildlife habitats and corridors to prevent fragmentation and to allow species to adapt to climate change; and
 - Responds to the emerging evidence from the Solent Disturbance and Mitigation Project and published recommendations and further research.
-
- **Policy DM9:** Development in the Coastal Zone. This policy refers to the protection of the coastal zone as defined on the Proposals Map. Permission will only be granted in the coastal zone where the following criteria are met:
 - Has no harmful effects on nature conservation within the Chichester and Langstone Harbour SSSIs and SPA, Solent Maritime SAC and Ramsar site, or any SINC and Local Nature Reserves;
 - Maintains and enhances the appearance and distinctiveness of existing settlements and landmarks along the coast;
 - Contributes positively to the landscape and has regard to best practice on the design of new buildings in coastal locations;
 - Upgrades existing footpaths and ensures that public access is retained and provided to connect existing paths along the waterfront where appropriate;
 - Would result in improvements to or redistribution of moorings, marine berths or launch on demand facilities (dry berths) in the harbours;
 - Would not be detrimental to infrastructure for, and quality of, water-based recreation, or be detrimental to the safety of navigation; and
 - Provides recreational opportunities that do not adversely affect the character and appearance of the coast

3.0 METHODS

3.1 Introduction

This section details the methods used during the field survey and desktop study carried out as part of the Ecological Assessment. This section also considers any significant limitations to the appraisal.

3.2 Zone of Influence

To define the total extent of the study area for this appraisal (Zone of Influence⁸), the proposed scheme was reviewed to establish the spatial scale at which ecological features could be affected. The appropriate survey radii for the various elements of the appraisal (i.e. desktop study and field survey) have been defined in the relevant sections below. These distances are determined based on the professional judgement of the ecologist leading the appraisal, taking into account the characteristics of the site subject to appraisal, its surroundings and the nature and scope of the proposals.

3.3 Scoping

Protected species considered within this appraisal are those species/species groups considered likely to be encountered given the geographical location and context of the site. These are discussed within the results section (Section 4.0) of the current report. Where such a species is unlikely to be present on site a justification for likely absence is provided. Species considered likely absent from the site are not then considered in the potential development impacts and ecological effects section (Section 5.0), and recommendations and conclusions section (Section 6.0) of this report.

3.4 Desk Study

3.4.1 Biological Records Centre

Hampshire Biodiversity Information Centre (HBIC) was consulted on 10th February 2017 for the following data:

- Records of non-statutory designated sites (Local Wildlife Sites (LWSs), Sites of Importance for Nature Conservation (SINCs), Site of Nature Conservation Interest (SNCIs) etc.) within one kilometre of the site boundary; and
- Records of legally protected and notable species (flora and fauna) within one kilometre of the site boundary, including priority species and Species of Principal Importance for the Conservation of diversity in England notified under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 and as listed in the England Biodiversity List (**Appendix 4**); and

⁸ The Zone of Influence (Zoi), as defined by CIEEM, is the area over which ecological features may be subject to significant effects as a result of the proposed project and associated activities.

- Records of bats within two kilometres of the site boundary. Bat species are highly mobile and therefore the search radius is increased for this species group.

HBIC were subsequently re-consulted on 4th October 2018 in order to obtain any further records of wintering birds at the site in relation to the Solent Waders and Brent Goose strategy.

3.4.2 Multi-Agency Geographic Information for the Countryside

The Multi-Agency Geographic Information for the Countryside (MAGIC)⁹ database was reviewed on 1st February 2017 to establish the location of statutory designated sites located within the vicinity of the site. This included a search for all internationally and nationally designated sites such as Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Wetlands of International Importance (Ramsar sites), Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs) within one kilometre of the site. Where appropriate, the desk study search area has been extended to take account of any appropriate statutory designated sites which need consideration in terms of potential in-direct effects and which support particularly mobile species¹⁰. The Impact Risk Zones (IRZ) were also obtained from MAGIC, which are used to help guide and assess planning applications for likely effects on SSSIs.

Sites within two kilometres of the site boundary where European Protected Species Mitigation (EPSM) licences have been granted were reviewed. This information allows a greater understanding of the potential for European Protected Species to be present in the local area.

Online mapping resources, at an appropriate scale, were used to identify the presence of habitats such as woodland blocks, ponds, watercourses and hedgerows, in the vicinity of the site.

3.5 Field Survey

The field survey broadly followed standard Phase 1 habitat survey methodology¹¹ and included a search for evidence of the presence of, and an assessment of the site's suitability to support, protected and notable species as recommended by CIEEM¹². The field survey covered all accessible areas of the site, including boundary features. Habitats described in Section 4.0, have been mapped (**Map 2**) and photographs

⁹ www.defra.magic.gov.uk

¹⁰ Search areas for bat records are based upon information contained within Collins, J. (Ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Third Edition). The Bat Conservation Trust, London. Relevant distances for consideration of impacts on SPAs, SACs, Ramsar sites have been based on current published guidance available through web-based sources.

¹¹ Joint Nature Conservation Committee (2010) *Handbook for Phase 1 habitat survey: A technique for environmental audit*

¹² CIEEM (2013). *Guidelines for Preliminary Ecological Appraisal*

provided, where relevant. For ease of reference, Target Notes (TN) depict locations of particular ecological interest or features which are too small to map.

3.5.1 Phase 1 Habitat Survey

An assessment was made of all areas of vegetation within the site based on the standardised Phase 1 habitat survey methodology¹¹. This involved identification of broad vegetation types, which were then classified against Phase 1 habitat types, where appropriate. A list of characteristic plant species for each vegetation type was compiled and any invasive species¹³ encountered as an incidental result of the survey recorded.

3.5.2 Protected and Notable Species Appraisal

A preliminary appraisal of the site's suitability to support legally protected and notable species was carried out. The following species/species groups were considered during the appraisal.

Bats

The survey conformed to current Bat Conservation Trust guidelines¹⁴. An assessment was made of the suitability of buildings and trees on the site and immediately on the site boundary to support roosting bats based on the presence of Potential Roosting Features such as loose or missing roof tiles or lifted lead flashing for buildings and holes, cracks, splits, loose bark and ivy cladding for trees. A detailed external and internal inspection of accessible structures was undertaken to compile information on potential and actual bat entry/exit points; potential and actual bat roosting locations; any evidence of bats found and the number of ecologists that may be required for any subsequent surveys.

An assessment was made of the suitability of the site and the surrounding landscape to support foraging and/or commuting bat species. The assessment of the suitability of the site to support roosting, foraging and commuting bats is based on a four-point scale as detailed in **Appendix 3**.

Badger

The survey involved an assessment of the suitability of the site to support badger. Evidence of the species was recorded as an incidental result of the Phase 1 habitat survey and included locating badger setts, paths, and signs of territorial activity such as latrine sites.

¹³ Plant species included on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). The survey was not specifically aimed at assessing the presence of these species and further specialist advice may need to be sought.

¹⁴ Collins, J. (Ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Third Edition). The Bat Conservation Trust, London

Hazel Dormouse

The appraisal for the suitability of the site to support hazel dormouse was based on an assessment of habitat features that may indicate that the species is present. This includes the presence of key food sources such as hazel and bramble, or plants used as nesting material such as honeysuckle and clematis. Additionally, the species requires a continuum of food supply so that habitat structure, diversity and connectivity to adjacent areas of woodland/scrub are important features in determining the suitability of the site for hazel dormouse.

Birds

The appraisal of breeding birds on the site was based on the suitability of habitat present to support nesting bird communities, the presence of bird species that may potentially nest within the available habitat and evidence of nesting such as old or currently active nests.

The assessment of wintering birds was based on an assessment of the suitability of the habitat on site to support important wintering bird species and populations. Particular attention was paid to the suitability for the site to support wintering farmland bird species, waders and wildfowl.

Reptiles

The reptile appraisal was based on an assessment of the suitability of the habitat present within the site to support a population of reptiles. Reptiles particularly favour scrub and rough grassland interfaces and the presence of these is a good indication that reptiles may be present on-site. In addition, reptiles may utilise features such as bare ground for basking, tussocky grassland for shelter and compost heaps and rubble piles for breeding and/or hibernating.

Great Crested Newt

The appraisal of the site to support great crested newt included establishing the presence of suitable aquatic habitats such as ponds, lakes or other waterbodies within or adjacent to the site and the presence of suitable terrestrial habitat. Waterbodies that are densely shaded, highly eutrophic or that contain fish are likely to be less suitable for this species.

In addition, online mapping resources at a minimum scale of 1:25,000 were used to identify the presence of ponds or other waterbodies within a 500 metre radius of the site. The 500 metre radius is a standardised search radius to assist in the assessment

of the suitability of a site and its surrounding habitat to support this species, based on current Natural England guidance¹⁵.

Invertebrates

An assessment was made of the suitability of the site to support diverse communities of invertebrates. The assessment was based on the presence of habitat features which may support important invertebrate communities. These features include, for example, an abundance of dead wood, the presence of diverse plant communities, varied woodland structure, sunny woodland edges with a diverse flora, waterbodies and water courses and areas of free draining soil exposures. During the field survey there was no attempt made to identify species present as this is a more specialist area of ecological assessment reserved for targeted surveys.

Other Relevant Species

An assessment was made of site suitability for other notable species such as more rarely encountered protected species, Species of Principal Importance for the Conservation of diversity in England notified under Section 41 of the NERC Act 2006 and as listed in the England Biodiversity List, and Local Biodiversity Action Plan (LBAP) species¹⁶, specific to the study region.

Invasive Species

During the field survey any incidental records of invasive species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) were recorded. However, it should be considered that the survey was not specifically aimed at assessing the presence of these species and further specialist advice may need to be sought.

3.5.3 Field Survey Details

The field survey was carried out by Richard Chilcott of ECOSA on 1st February 2017. The weather conditions were raining with approximately 100% cloud cover, an ambient temperature of 9°C and no wind.

During the survey, the surveyor was equipped with 10x40 binoculars, a high powered torch and a digital camera.

3.5.4 Limitations

Ecological surveys are limited by factors which affect the presence of plants and animals such as the time of year, migration patterns and behaviour. The field survey has therefore not produced a complete list of plants and animals and in the absence of

¹⁵ English Nature (2001) Great Crested Newt Mitigation Guidelines. Peterborough

¹⁶ LBAPs identify local priorities for biodiversity conservation by translating national targets for species into effective action at the local level and identifying targets for species important to the local area.

evidence of any particular species should not be taken as conclusive proof that the species is absent or that it will not occur in the future.

The Preliminary Ecological Appraisal was undertaken at a time of year when many species of plant and animal are either dormant, not visible above ground or simply not present in the UK (such as migratory birds). Therefore, the survey was based upon an assessment of the habitat present on site and the suitability of this habitat to support protected species. However, further surveys were undertaken during the summer month with any additional habitat information gathered, as necessary.

The desk study data mainly originates from ad-hoc surveys by volunteers and other records from members of the public. Therefore, the data search results cannot be taken as an exhaustive list of species present in the area.

It is not always possible to provide definitive assessments of a species' presence/likely absence at a site and so in the absence of direct evidence, assessments and recommendations are based on the presence of suitable habitat within/adjacent to a site and the results of species records within the desk study data.

3.6 Bat Tree Climb and Inspect Survey

3.6.1 Survey Methods

The bat tree climb and inspect survey was undertaken in line with current best practice guidelines as set out in the Bat Conservation Trust guidelines¹⁴. Following the completion of the ground level tree assessment those trees with suitability to support roosting bats were subject to tree climb and inspect surveys in order to provide a detailed assessment of the suitability of Potential Roost Features to support roosting bats.

The climb and inspect survey involved the use of rope access techniques to climb those trees assessed as having suitability to support roosting bats from the ground level and ascertain whether Potential Roost Features previously identified on the trees were suitable for bat roosting and whether any further features were present at height which were otherwise not visible from the ground level

The tree climb and inspect survey then allowed surveyors to either confirm presence of a roost through bat roosting evidence such as droppings or staining or rule out features which otherwise may have appeared suitable from the ground level tree assessment.

Where bat roosts are identified or confirming likely absence of bat roosts within suitable features is not possible further emergence/re-entry surveys may be required.

3.6.2 Survey Details

The climb and inspect survey was carried out by qualified tree climbers and licenced bat surveyors Edward Venables, Field Ecologist (Natural England Bat Licence 2015-16701-CLS-CLS) and Brian Hicks, Field Ecologist (Natural England Bat Licence 2015-14880-CLS-CLS) of ECOSA on 5th September 2017. The weather conditions were warm, cloudy with approximately 50% cloud cover, an ambient temperature of 18°C and a light breeze.

During the surveys the trees were accessed using climbing ropes and the surveyors were equipped with high powered torches and endoscopes.

3.6.3 Survey Limitations

As a health and safety precaution, the willow species tree overhanging the pond on the site's western boundary could not be climbed for further inspection. No other significant limitations were encountered as part of the tree climb and inspect survey.

3.7 Bat Transect Survey

3.7.1 Survey Methods

Bat transect surveys were undertaken with reference to current best practice guidelines as set out in the Bat Conservation Trust Guidelines¹⁴. Given that the site has been assessed as having moderate suitability for supporting foraging and commuting bats a single survey visit was undertaken on a monthly basis between April and September 2017 to allow an assessment of the status and importance of foraging/commuting bats at the site to be made.

A team of two surveyors walked a pre-determined transect route across the site on each occasion (see **Map 3**), walking the same transect route on each survey with start and end points varied on each survey visit in order to vary the coverage of the site. The transect route ensured that the surveyors visited key areas of foraging and commuting habitat within the site, such as mature hedgerows and woodland edge as well as less suitable habitats. The dusk transects surveys commenced at sunset and lasted for at least two hours depending on the level of bat activity recorded.

The transect survey was punctuated by regular point counts, during which the surveyors stopped walking for a period of five minutes to record bat activity at that point. Point count locations were situated at key habitat features on site. The point count locations were the same on each survey.

3.7.2 Survey Details

The bat transect surveys were undertaken between April and September 2017 with a total of six dusk bat transect surveys. **Table 1** provides details of each survey.

Table 1: Bat transect survey details

Survey Date	Survey Type	Duration	Weather Conditions	Sunset/ Sunrise Time
25 th April 2017	Dusk	20:13 – 21:47	9-5°C, dry, 15-10% cloud cover and a light breeze	20:16
31 st May 2017	Dusk	21:00 – 23:07	16-14°C, dry, 5-0% cloud cover and no wind	21:07
28 th June 2017	Dusk	21:21 – 23:21	16-15°C, overcast, 100% cloud cover and a light breeze	21:21
27 th July 2017	Dusk	20:57 – 22:57	16-15°C, dry, 80-40% cloud cover and a moderate to light breeze	20:57
23 rd August 2017	Dusk	20:10 – 22:10	19-16°C, dry, 50-80% cloud cover and a light breeze	20:10
28 th September 2017	Dusk	18:45 – 20:45	15-14°C, dry, 50-20% cloud cover and a light breeze	18:48

During the bat transect survey the surveyors were equipped with Pettersson D240x time expansion bat detectors. The Pettersson detectors were connected to Edirol R-05 recorders for the full duration of the survey. Recordings made with the detectors were later analysed using Sonobat® (v2.9.7) to confirm the identity of any species encountered.

The bat transect surveys were coordinated by Richard Chilcott of ECOSA (Natural England Bat Licence No. 2015-16561-CLS-CLS), assisted by suitably qualified and experienced ECOSA surveyors.

3.7.3 Survey Limitations

Some bat species, e.g. long-eared bats *Plecotus* species¹⁷, generally emerge from their roosts in total darkness and do not produce strong echolocations, and therefore these bats can be difficult to observe and record during bat surveys, leading to under-recording.

The quality of both hand-held bat detector recordings is based, to a large extent, on the proximity of a bat to the detector's microphone. Obstructions such as vegetation or environmental variables such as rainfall and wind noise from vegetation will all influence the quality of sound reaching the microphone and thus some bat echolocation recordings are of insufficient quality for specific identification. Bats routinely alter their

¹⁷ There are two species of long-eared bat, the brown long-eared bat *Plecotus auritus* and the grey long-eared bat *Plecotus austriacus*. These species can only be separated by examination of physical characteristics and Phylogenetic Analysis Identification of bat droppings. Unless confirmation of identification has been made by visual identification the two species shall be referred to in this report as long-eared bat. The brown long-eared bat is the commonest of the two species typically being found roosting within large roof voids although small voids and trees are also utilised. The grey long-eared bat is rare and confined to southern England and like the brown long-eared typically roosts in roof voids.

echolocations in relation to behaviour and their environment. It is not always possible to make a robust identification of every bat recording.

The use of bat detectors is likely to result in the under-recording of a percentage of bats present, such as those flying at height¹⁸, which would be out of the recording range for the detectors.

No transect survey was undertaken in October nor was a dusk and dawn survey undertaken throughout the season. However, given the simple nature of the habitats present it is considered that a robust assessment of the status of foraging and commuting bats at the site has been undertaken.

3.8 Automated Bat Detector Survey

3.8.1 Survey Methods

In addition to the transect surveys automated detector surveys were undertaken in line with current best practice guidelines as set out in the Bat Conservation Trust Guidelines¹⁴ between April and early October 2017 inclusive.

Two Wildlife Acoustics Song Meter 2 (SM2) detectors were deployed at the site for five consecutive nights each month between April and September¹⁹ 2017.

The SM2 detectors were secured in vegetation using bungee cords. The microphone was positioned to face towards the nearest open space. The devices were programmed to record between 30 minutes before sunset, until 30 minutes after sunrise the following morning on each night they were deployed. The settings utilised on the SM2 detectors are provided in **Appendix 5**.

The location at which each detector was deployed was varied throughout the survey period. The suitable habitat within the site was equally divided into a number grid. The location at which each detector was located on each month was determined through the use of a random number generator. Where the generator determined that a detector would be deployed within a single grid on more than one month the program was re-run until detectors were at varied location throughout the survey period. The locations at which the SM2's were deployed are provided in **(Map 3)**.

At the end of each automated survey period, the remote bat detectors were retrieved from the site, data was downloaded and then analysed using Kaleidoscope Pro[®] (Version 4.5.4). This program is designed to analyse large volumes of bat call data

¹⁸ Collins, J., Jones, G. (2009). Differences in Bat Activity in Relation to Bat Detector Height: Implications for Bat Surveys at Proposed Windfarm Sites. *Acta Chiropterologica*, 11(2), 343-350.

¹⁹ The September deployment was carried out in early October

using an automated classifier (Bats of United Kingdom Version 4.3.0). More information on the settings used for the conversion process are provided in **Appendix 5**.

The species calls were subsequently checked manually by a suitably qualified ecologist using the Kaleidoscope software, to verify their identities. Sonobat® (v2.9.7) was used to confirm the species identity for ambiguous bat calls. Where suitable recordings were obtained, bats were identified to species level. For some groups, notably long-eared bat species¹⁷ and *Myotis*²⁰ bat species, specific identification was not always possible.

The data was then exported to Microsoft Excel for detailed analysis (i.e. counts of bat registrations) of various parameters.

The number of registrations recorded is not a measure of the number of bats present on site; the number of registrations can only be used to provide a quantitative assessment of the level of bat activity at a particular location (i.e. the greater the number of registrations, the greater the level of bat activity). The data cannot differentiate between, for example, a single bat passing the detector 10 times or 10 bats passing the detector on a single occasion. The detectors were programmed to count each two second call as a single bat pass.

In order to standardise the number of bat calls recorded the data was then used to calculate an “Activity Index” for various different parameters to be assessed. This involved dividing the number of registrations by the number of nights which detectors were deployed. This data is then represented as number of registrations per night.

3.8.2 Survey Details

The automated detector surveys were undertaken between April and early October 2017 with a total of 30 nights recording undertaken. **Table 2** provides details of each recording period.

Table 2: Automated detector survey details²¹

Survey Period	Date	Weather Conditions			Sunset	Sunrise
		Temperature (°C)		Wind (km/h)		
		High	Low			
April 2017	27 th	11	-2	7	20:20	05:46
	28 th	13	6	8	20:22	05:44
	29 th	13	2	7	20:24	05:42
	30 th	13	9	15	20:25	05:41

²⁰ There are seven species of *Myotis* bats in Britain. *Myotis* bats are very difficult to identify specifically, this can generally only be done by examination of physical features and Phylogenetic Analysis Identification of bat droppings. Many of these bats are common and will utilise buildings for roosting often occupying small and inaccessible voids. For the purpose of this report all species shall be referred to as *Myotis* bats unless a specific identification has been possible.

²¹ Information obtained from Southampton International Airport Weather Station

Survey Period	Date	Weather Conditions			Sunset	Sunrise
		Temperature (°C)		Wind (km/h)		
		High	Low			
	1 st	12	6	6	20:27	05:39
May 2017	25 th	23	9	5	21:02	05:03
	26 th	23	10	10	21:03	05:02
	27 th	17	12	13	21:04	05:01
	28 th	19	12	5	21:06	05:00
	29 th	17	13	4	21:07	04:59
June 2017	26 th	21	11	4	21:23	04:53
	27 th	20	13	4	21:23	04:53
	28 th	16	13	7	21:23	04:54
	29 th	15	11	4	21:23	04:54
	30 th	20	13	8	21:22	04:55
July 2017	27 th	19	13	15	20:58	05:24
	28 th	18	14	18	20:57	05:26
	29 th	17	13	7	20:55	05:27
	30 th	18	13	15	20:54	05:28
	31 st	19	12	14	20:52	05:30
August 2017	18 th	18	12	13	20:20	05:57
	19 th	18	11	12	20:18	05:59
	20 th	18	7	7	20:16	06:00
	21 st	22	16	4	20:14	06:02
	22 nd	21	16	6	20:12	06:03
October 2017	2 nd	17	10	14	18:41	07:07
	3 rd	15	5	7	18:35	07:09
	4 th	15	9	11	18:36	07:10
	5 th	16	9	16	18:34	07:12
	6 th	15	5	6	18:32	07:14

The automated detectors were deployed by a suitably experienced ECOSA ecologist. The detector programming and data analysis was conducted by Richard Chilcott and Lucy Grable of ECOSA.

3.8.3 Survey Limitations

Some bat species, e.g. long-eared bats¹⁷, do not produce strong echolocations, and therefore these bats are not always picked up on automated detectors which can lead to under-recording.

The quality of automated bat detector recordings is based, to a large extent, on the proximity of a bat to the detector's microphone. Obstructions such as vegetation or environmental variables such as rainfall and wind noise from vegetation will all influence the quality of sound reaching the microphone and thus some bat echolocation recordings are of insufficient quality for specific identification. Bats routinely alter their echolocations in relation to behaviour and their environment. It is not always possible to make a robust identification of every bat recording.

The use of bat detectors is likely to result in the under-recording of a percentage of bats present, such as those flying at height¹⁸, which would be out of the recording range for the detectors.

As a result of equipment failures, a restricted number of nights recording were made in April 2017 and June 2017. However, given that data was recorded throughout the remainder of the survey season it is considered that an adequate level of bat survey data has been gathered in order to allow a robust assessment of the impacts of the proposed development on foraging and commuting bats. In addition, the use of an activity index (the number of registrations per night) helps provide a month by month comparison of the data when adjusted for the number of nights recording actually made. The detectors were also deployed in early October as opposed to September, however, given the unseasonably warm autumn it is not considered that this would have gathered any significantly different data than a September deployment.

3.9 Hazel Dormouse Survey

3.9.1 Survey Methods

The hazel dormouse survey was undertaken in line with current best practice guidelines as set out in the Dormouse Conservation Handbook²².

The hazel dormouse survey involved the erection of 50 dormouse tubes within suitable hazel dormouse habitat throughout the site at intervals of approximately 15 metres. The locations of these tubes are marked on **Map 4**. The nest tubes were subsequently checked for evidence of hazel dormouse on a monthly basis between May and September 2017.

²² Natural England (2006) Dormouse Conservation Handbook. Peterborough

In accordance with survey guidance, a value is assigned to each month, which is weighted depending on the likelihood of finding evidence of hazel dormouse in a given month. These scores are based on the erection of 50 dormouse nest tubes. The values for each month that the tubes are in place are then added together. In accordance with survey guidance, absence of hazel dormouse should not be assumed for a search effort of less than 20 points²³. **Table 3** shows points assigned for each month during the survey undertaken.

Table 3: Hazel dormouse survey scores

Month	Score
May	4
June	2
July	2
August	5
September	7
Total	<u>20</u>

The level of survey effort carried out at site currently provides a search effort of 20, which allows a robust assessment of the presence/likely absence of hazel dormouse at the site to be undertaken.

3.9.2 Survey Details

The dormouse tubes were erected on 25th April 2017 with monthly visits undertaken between May to September 2017. **Table 4** provides details of each hazel dormouse survey.

Table 4: Hazel dormouse survey details

Survey Date	Weather Conditions
30 th May 2017	Overcast, cool, dry, 17°C ,100% cloud cover with a light wind
26 th June 2017	Warm, dry, 21°C, 60% cloud cover with a light wind
27 th July 2017	Warm, dry, 15°C, 80% cloud cover with a light wind
30 th August 2017	Rain, 14.5°C, 100% cloud cover with a light wind
25 th September 2017	Overcast, 16°C, 100% cloud cover with a light wind

²³ Each month, between April and November, inclusive is assigned an index of probability score, based on optimum survey timings.

The hazel dormouse surveys were co-ordinated and led by Richard Chilcott of ECOSA assisted by suitably qualified ECOSA surveyors.

The survey was undertaken using 50 dormouse tubes comprising 65 millimetres wide x 65 millimetres high x 250 millimetres long corrugated plastic tubes with plywood insert secured in the relevant habitat with heavy duty garden wire.

3.9.3 *Survey Limitations*

The survey work was undertaken in line with current best practice guidelines for establishing the presence/likely absence of hazel dormouse with no significant limitations encountered.

3.10 *Wintering Bird Survey*

3.10.1 *Survey Methodology*

A mixture of walked transect and vantage point surveys were undertaken the site at between February 2017 and March 2017 inclusive, to determine the usage of the site by wintering birds. The survey largely consisted of the surveyor/s scanning the site using a telescope and binoculars to identify the bird species utilising the site.

The wintering bird survey methodology was based on that carried out as part of the Solent Waders and Brent Goose Strategy²⁴. Four wintering bird surveys were carried out across the site between February 2017 and March 2017. The surveys aimed to determine the presence of notable or protected wintering bird species with particular reference to those associated with the internationally designated sites in the vicinity of the survey site and those associated with the Solent Waders and Brent Goose Strategy. The survey also covered adjacent habitat to the site which could be observed from the site.

3.10.2 *Survey Details*

A total of four survey visits were undertaken between February and March 2017 to assess the usage of the site. **Table 5** provides details of each survey visit.

Table 5: Wintering bird survey details

Survey Date	Duration	Weather Conditions	Tide State
9 th February 2017	08.36-10.06	100% cloud cover, cold, overcast, 3°C, light to moderate breeze	High 10:06
15 th February 2017	14:15-16:15	Showers, occasionally heavy, 12°C, moderate to fresh westerly breeze	High 14:16

²⁴ King, D. (2010) The Solent Waders and Brent Goose Strategy 2010. Hampshire and Isle of Wight Wildlife Trust, Botley, Hampshire

Survey Date	Duration	Weather Conditions	Tide State
21 st February 2017	07.00-08.30	100% cloud cover, 11°C, breezy south-westerly wind	High 07:49
14 th March 2017	11:00-13:00	Overcast, 6°C, fresh to strong north-easterly breeze	High 12:08

The wintering bird surveys were carried out by experienced ornithologists Simon Boswell, Principal Ecologist of ECOSA and Simon Colenutt, Principal Ecologist of ECOSA.

During the survey the surveyors were equipped with 10x32 Swarovski or 10x42 Leica binoculars and a Swarovski telescope.

3.10.3 Survey Limitations

As a result of the time of year which the surveys were commissioned no surveys were undertaken between October and January and therefore the surveys did not cover an entire wintering bird survey season as recommended in the Solent Waders and Brent Goose Strategy²⁴. However, given the results of the survey and limited suitability of the site support wintering birds it is considered that an assessment of the impacts of the site in respect of wintering birds can be undertaken.

3.11 Reptile Survey

3.11.1 Survey Methods

The reptile survey was undertaken in accordance with current best practice guidelines as set out in Froglife Advice Sheet 10²⁵.

The reptile survey consisted of the laying 60 bitumen felt mats approximately 500 millimetres x 500 millimetres in areas of suitable habitat on the site. Typically, this included areas of suitable habitat with good exposure to the sun. The mats were distributed in all areas considered to offer suitable reptile habitat.

The use of such refugia is an effective way of surveying for all species of reptile and current survey guidance states that seven inspections are sufficient to confirm presence/likely absence. Surveys visits were undertaken in marginal weather conditions such as cold but sunny weather or hazy and somewhat overcast conditions, as this will maximise the thermal value of the refugia for basking reptiles.

²⁵ Froglife (1999) Froglife Advice Sheet 10 Reptile Survey: An introduction to planning, conducting and interpreting, surveys for snake and lizard and conservation

During each inspection surveyors also undertook a visual inspection survey of other suitable refugia in the site and other suitable basking locations. During the survey a note was also made of any suitable hibernation features present within the site.

3.11.2 Survey Details

The refugia were distributed on 21st August 2017 with seven inspection visits undertaken between September and October 2017. **Table 6** provides details of each reptile survey.

Table 6: Reptile survey details

Survey Date	Temperature	Weather Conditions
4 th September 2017	18°C	Overcast, rained all night and just before survey, 100% cloud cover with a light wind
11 th September 2017	14°C	Windy, overcast, cool. Ground wet, 90% cloud cover with a light wind
14 September 2017	13°C	Sunny, wet on ground, windy, 70% cloud cover with a light wind
22 nd September 2017	16°C	Warm, sunny, 40% cloud cover with a light wind
18 th September 2017	17°C	Mostly sunny, 50% cloud cover with a light wind
25 th September 2017	16°C	Overcast, 100% cloud cover with a light wind
5 th October 2017	13°C	Sunny, 60% cloud cover with a light wind

The reptile survey was co-ordinated by Richard Chilcott of ECOSA assisted by suitably experienced ECOSA surveyors.

The survey was undertaken using 60 reptile refugia comprising approximately 500 millimetres x 500 millimetres square of bitumen roofing felt.

3.11.3 Survey Limitations

There were no significant limitations to the reptile survey, with all areas of the site readily accessible and all refugia remained in situ throughout the survey period. Survey visits were undertaken during suitable weather conditions.

3.12 Great Crested Newt eDNA Survey

3.12.1 Survey Methods

The great crested newt environmental DNA (eDNA) sampling was undertaken following current best practice guidelines²⁶.

²⁶ Biggs *et al* (2014) Analytical and methodological development for improved surveillance of the great crested newt. Appendix 5. Technical Advice note for field and laboratory sampling of great crested newt environmental DNA. Freshwater Habitats Trust, Oxford.

Given the presence of a single waterbody within the site an environmental DNA (eDNA) analysis was undertaken to establish the presence/likely absence of great crested newt from within the pond.

The field sampling entailed the collection of 20 samples of 30 millimetres of water from pre-selected sub-sampling sites around the margin of the waterbody. Sub-sampling sites are chosen to include areas where great crested newt are likely to be present such as areas of vegetation where they may be egg laying and areas of open water where they may be displaying. The 20 samples are then mixed into a single sterile bag from which six samples of water of 15 millimetres are taken each of which is preserved in 35 millimetres of ethanol. The samples are then refrigerated until analysis at the lab. The samples were sent to SureScreen Scientifics eDNA testing service for analysis which were analysed in line with current guidance²⁶. The samples were taken within the required season (mid-April to June) when great crested newt eDNA is likely to be present within the pond and therefore, the analysis result indicates the presence or likely absence of the species from a given waterbody.

3.12.2 Survey Details

The eDNA sampling was carried out by Lucy Grable of ECOSA and Jack Medley, Assistant Field Ecologist of ECOSA on 25th April 2017. The weather conditions were dry with approximately 100% cloud cover, an ambient temperature of 9°C and a light breeze.

3.12.3 Survey Limitations

The waterbody sampled following current Natural England guidance for sampling and analysing. Therefore, there were no significant constraints associated with the eDNA analysis undertaken.

4.0 BASELINE ECOLOGICAL CONDITIONS

4.1 Introduction

This section details the results of the Ecological Assessment undertaken for the site. It assesses the baseline ecological conditions of the site at the time the desktop study was completed and based on the ecological features recorded during the field survey carried out on 1st February 2017 and subsequent further surveys undertaken between March and October 2017.

4.2 Desktop Study

4.2.1 Protected Species

A number of protected species have been recorded within one kilometre of the site boundary and a number of bat species within two kilometres. These are discussed further within Paragraphs 4.3 and 4.4²⁷.

4.2.2 Statutory and Non-statutory Designated Sites

There are five statutory designated sites of nature conservation interest situated within one kilometre of the site boundary. There are also five non-statutory designated sites of nature conservation interest situated within one kilometre of the site boundary. The nearest of which is Warblington Castle Farm East D SINC located approximately 210m south-east of the site. The nearest statutory designated site is Warblington Meadow SSSI located approximately 740 metres south-west of the site. Details of these designations are provided in **Table 7**. Further information on sites designated for nature conservation is provided in **Appendix 2**.

Table 7: Designated sites located within the Zone of Influence

Designation	Name	Approximate Relative Location	Reason for Designation
SINC	Warblington Castle Farm East D	210 metres south-east	The site is designated for supporting the notable species dark-bellied brent goose <i>Branta bernicla</i> .
SINC	Brook Farm B	470 metres south-east	The site is designated for supporting the notable species dark-bellied brent goose, weasel's snout <i>Misopates orontium</i> and corn spurrey <i>Misopates orontium</i> .
SINC	Warblington Castle Farm West	550 metres south-west	The site is designated for supporting the notable species dark-bellied brent goose.

²⁷ The full data set is available on request from ECOSA.

Table 7: Designated sites located within the Zone of Influence

Designation	Name	Approximate Relative Location	Reason for Designation
SINC	Conigar Point Meadows	640 metres south-east	The site is designated for supporting semi-improved grassland which contain a significant element of unimproved grassland and semi-natural coastal and estuarine habitats. The site is also designated for supporting the following notable species: ▪ Celery <i>Apium graveolens</i>; ▪ Field brome <i>Bromus arvensis</i>; ▪ Slender hare's ear <i>Bupleurum tenuissimum</i>; ▪ Divided sedge <i>Carex divisa</i>; ▪ Long-bracted sedge <i>Carex extensa</i>; ▪ Golden samphire <i>Inula crithmoides</i>; ▪ Sea lavender <i>Limonium humile</i>; and ▪ Common glasswort <i>Salicornia europaea</i>
SSSI	Warblington Meadow	740 metres south-west	The site is an unimproved grazing marsh adjoining Chichester Harbour and is of special interest for its gradation from freshwater, base-rich marsh to old reclaimed saltmarsh, and for its rich associated flora. The grassland sward contains a number of locally distributed herbs, such as marsh arrow-grass <i>Triglochin palustris</i>, southern marsh orchid <i>Dactylorhiza praetermissa</i>, ragged robin <i>Lychnis flos-cuculi</i>, bog pimpernel <i>Anagallis tenella</i>, creeping jenny <i>Lysimachia nummularia</i> and corky-fruited water-dropwort <i>Oenanthe pimpinelloides</i>.
SINC	Warblington Castle Farm East E	760 metres south	The site is designated for supporting the notable species dark-bellied brent goose.
Ramsar site	Chichester and Langstone Harbours	965 metres south-west	The site is designated under Ramsar Criterion 1, 5 and 6. Criterion 1 – Two large estuarine basins linked by the channel which divides Hayling Island from the main Hampshire coastline. The site includes intertidal mudflats, saltmarsh, sand and shingle spits and sand dunes. Criterion 5 – Assemblages of international importance: ▪ 76,480 waterfowl, count in winter (5 year peak mean 1998/99 – 2002/2003) Criterion 6 – species/populations occurring at levels of international importance.

Table 7: Designated sites located within the Zone of Influence

Designation	Name	Approximate Relative Location	Reason for Designation
			Qualifying species/populations (as identified at designation) Species with peak counts in spring/autumn: - Ringed plover <i>Charadrius hiaticula</i>; - Black-tailed godwit <i>Limosa limosa islandica</i>; and - Common redshank <i>Tringa totanus totanus</i>. Species with peak counts in winter: - Dark-bellied brent goose; - Common shelduck <i>Tadorna tadorna</i>; - Grey plover <i>Pluvialis squatarola</i>; - Dunlin <i>Calidris alpina alpina</i>. Species/populations identified subsequent to designation for possible future consideration under criterion 6: - Little tern <i>Sterna albifrons</i>.
SPA	Chichester and Langstone Harbours	One kilometre south-west	The site qualifies for supporting the following Annex I species: Breeding - Little tern, 100 pairs representing up to 4.2% of the breeding population in Great Britain; and - Sandwich tern <i>Sterna sandvicensis</i>, 158 pairs representing up to 1.1% of the breeding population in Great Britain. On passage - Little egret <i>Egretta garzetta</i>, 137 individuals representing up to 17.1% of the population in Great Britain. Over winter - Bar-tailed godwit <i>Limosa lapponica</i>, 1,692 individuals representing up to 3.2% of the wintering population in Great Britain; and - Little egret, 100 individuals representing up to 20.0% of the wintering population in Great Britain. This site also qualifies by supporting populations of European importance of the following migratory species: On passage - Ringed plover, 2,471 individuals representing up to 4.9% of the

Table 7: Designated sites located within the Zone of Influence

Designation	Name	Approximate Relative Location	Reason for Designation
			Europe/Northern Africa - wintering population. Over winter ▪ Black-tailed godwit, 1,003 individuals representing up to 1.4% of the wintering Iceland - breeding population; ▪ Dark-bellied brent goose, 17,119 individuals representing up to 5.7% of the wintering Western Siberia/Western Europe population; ▪ Dunlin, 44,294 individuals representing up to 3.2% of the wintering Northern Siberia/Europe/Western Africa population; ▪ Grey plover, 3,825 individuals representing up to 2.5% of the wintering Eastern Atlantic - wintering population; ▪ Redshank, 1,788 individuals representing up to 1.2% of the wintering Eastern Atlantic - wintering population; and ▪ Ringed plover, 846 individuals representing up to 1.7% of the wintering Europe/Northern Africa - wintering population. The site qualifies by regularly supporting in excess of 20,000 individual waterfowl over winter.
SSSI	Chichester Harbour	One kilometre south-west	Chichester Harbour is a large estuarine basin in which at low water extensive mud and sandflats are exposed, drained by channels which unite to make a common exit to the sea. The site is of particular significance for wintering wildfowl and waders and also breeding birds both within the Harbour and in the surrounding permanent pasture fields and woodlands. There is a wide range of habitats which have important plant communities. The extensive intertidal mudflats are the feeding grounds, at the relevant times of year for internationally important numbers of ringed plover, grey plover, redshank, black-tailed godwit, dunlin, sanderling <i>Calidris alba</i>, curlew <i>Numenius arquata</i> and greenshank <i>Tringa nebularia</i> (the latter two in autumn particularly). Bar-tailed godwit numbers are of European importance. Amongst the wildfowl, shelduck, teal <i>Anas crecca</i> and dark-bellied brent goose numbers are of international importance with 5% of the world population of the latter.

Table 7: Designated sites located within the Zone of Influence

Designation	Name	Approximate Relative Location	Reason for Designation
SAC	Solent Maritime	One kilometre south-west	Annex I habitats that are a primary reason for selection of this site: ▪ Estuaries; ▪ <i>Spartina</i> swards (<i>Spartinion maritimae</i>); and ▪ Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>). Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: ▪ Sandbanks which are slightly covered by sea water all the time; ▪ Mudflats and sandflats not covered by seawater at low tide; ▪ Coastal lagoons; ▪ Annual vegetation of drift lines; ▪ Perennial vegetation of stony banks; ▪ <i>Salicornia</i> and other annuals colonizing mud and sand; and ▪ Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes). Annex II species present as a qualifying feature, but not a primary reason for site selection: ▪ Desmoulin's whorl snail <i>Vertigo moulinsiana</i>.

The site forms part of a wider parcel of land (noted as H19) identified in the Solent Waders and Brent Goose Strategy as being “uncertain” for supporting waders associated with the Solent SPAs in the 2010 strategy²⁸The subsequent 2017 update²⁹ reclassified H19 as “low use”³⁰.

4.3 Habitats

4.3.1 Desktop Study Results

No notable habitats were identified either on or immediately adjacent to the site as part of the MAGIC search undertaken. A number of notable plant species were returned by HBIC, however, no records were returned from within or immediately adjacent to the site.

²⁸ Hampshire and Isle of Wight Wildlife Trust (2010) Solent Wader and Brent Goose Strategy

²⁹ Hampshire and Isle of Wight Wildlife Trust (2017) Solent Wader and Brent Goose Strategy 2019 Interim Project Report: Year One

³⁰ Low use sites are “Sites that have records of birds but in low numbers (total score 0)”

4.3.2 **Field Survey Results**

Habitats within the site are shown on the Phase 1 Habitat Map (**Map 2**), Target Notes and photographs have been provided as appropriate, Target Notes (TN) are cross referenced to **Map 2**. Habitats are described in general terms using standard Phase 1 habitat survey terminology, with reference to dominant, characteristic and notable species in each vegetation type. The main habitats recorded on site during the Phase 1 habitat survey were as follows:

4.3.3 **Scrub**

Two areas of continuous scrub are present within the site. A scrub margin forms the majority of the southern half of the western boundary (**Figure 1**) and a scrubby bank of predominately bramble *Rubus fruticosus* aggregate is present along the railway line on the northern boundary (**Figure 2**). Additionally, there are small areas of scattered scrub towards the south of the site and areas surrounding the pond on the western side of the site. Species present include bramble, hawthorn *Crataegus monogyna*, ivy *Hedera helix*, Leyland cypress *X Cupressocyparis leylandii* with red dead-nettle *Lamium purpureum* and violet *Viola* species in the ground flora.



Figure 1: Scrub margin along the western boundary



Figure 2: Scrubby bank along railway line

4.3.4 **Broad-leaved scattered trees**

A number of mature scattered trees are present within the site including ash *Fraxinus excelsior*, pedunculate oak *Quercus robur*, willow *Salix* species, elder *Sambucus nigra* and sycamore *Acer pseudoplatanus*.

4.3.5 **Coniferous scattered trees**

A line of Leyland cypress up to 15 metres in height, are present beyond the southern section of the western boundary, bordering neighbouring residential gardens.

4.3.6 **Semi-improved grassland**

The majority of the site comprises semi-improved grassland within two fields that are separated by a fence line (**Figure 3** and **Figure 4**). The northern field is lightly grazed

whilst the southern field is heavily grazed by horses. Species present include ribwort plantain *Plantago lanceolata*, greater plantain *Plantago major*, broad-leaved dock *Rumex obtusifolius*, cleavers *Galium aparine*, Yorkshire-fog *Holcus lanatus*, creeping buttercup *Ranunculus repens*, common ragwort *Senecio jacobaea*, fescue *Festuca* species, common nettle *Urtica dioica*, ground ivy *Glechoma hederacea*, common knapweed *Centaurea nigra*, dandelion *Taraxacum* species, daisy *Bellis perennis*, perennial rye-grass *Lolium perenne*, cock's-foot *Dactylis glomerata*, yarrow *Achillea millefolium* and creeping cinquefoil *Potentilla reptans*.



Figure 3: Semi-improved grassland within the northern field



Figure 4: Semi-improved grassland within the southern field

4.3.7 Standing water

A pond is present on the western edge of the site (**Figure 5**). The pond contained no obvious aquatic vegetation at the time of survey due to the time of year the survey was carried out.



Figure 5: Pond located towards the west of site

4.3.8 Intact species-poor hedgerow

One unmanaged, species-poor hedgerow is present along a fence line on the eastern boundary of the site. Hedgerow **H1** is mature and up to 15 metres in height with some gaps evident along its length (**Figure 6**). Species recorded within the hedgerow include

cherry *Prunus* species, bramble, blackthorn *Prunus spinosa*, hawthorn, elder, ivy and holly *Ilex aquifolium*.



Figure 6: Hedgerow H1 along the southern boundary of the site

4.3.9 Defunct species-poor hedgerow

One managed hedgerow is present beyond the western boundary of the site on an adjacent property. Hedgerow **H2** is approximately 1.5 metres in height dominated by blackthorn (**Figure 7**). Other species recorded include hawthorn, bramble and holly.



Figure 7: Hedgerow H2 beyond the western boundary

Two unmanaged, species-poor hedgerows are also present along the western boundary of the site. Hedgerow **H3** is a scrubby hedgerow bordered by a fence line approximately 4 four metres in height (**Figure 8**). Species recorded along this hedgerow are dominated by bramble and hawthorn with other species recorded including ivy, cherry laurel *Prunus laurocerasus*, wild privet *Ligustrum vulgare* and other ornamental species.

Hedgerow **H4** is also a scrubby hedgerow bordered by a fence line up to five metres in height (**Figure 9**). Species recorded along this hedgerow are dominated by bramble

and hawthorn with other species recorded including ash, conifer species and Wilson's honeysuckle *Lonicera nitida*.



Figure 8: Hedgerow H3 along the western boundary



Figure 9: Hedgerow H4 along the western boundary

4.3.10 Buildings and hardstanding

There is one building located on the south-western site boundary; this is described in detail in **Table 9**.

4.3.11 Summary

The habitats within the site are of low ecological value overall in the local context, comprising common and widespread species with the established boundary hedgerows, scrub margins and mature scattered trees being the features of relatively greater ecological value in the context of the site itself.

4.4 Notable and Legally Protected Species

4.4.1 Bats

Desktop Study Results

A number of records of bats were returned by HBIC as part of the desktop study undertaken. The nearest of which was for *Myotis* bat species²¹ recorded approximately 470 metres south-east of the site in 2010. Other records recorded within two kilometres of the site include common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, Nathusius pipistrelle *Pipistrellus nathusii*, noctule *Nyctalus noctula*, Leisler's bat *Nyctalus leisleri*, serotine *Eptesicus serotinus*, Natterer's bat *Myotis nattereri*, Daubenton's bat *Myotis daubentonii*, Brandt's bat *Myotis brandtii* and long-eared bat¹⁷ *Plecotus* species including confirmed brown long-eared *Plecotus auritus*. The information provided did not distinguish between roost and field records.

No records of EPSM licences in respect of bats were returned by MAGIC within two kilometres of the site.

Building Assessment

No direct evidence of bats such as droppings or urine staining was recorded during inspections of the on-site building. The building is of a construction that would not be suitable for roosting bats and therefore was assessed as having negligible suitability for roosting bats.

The results of the building assessment are provided in **Table 9**.

Tree Assessment

During the Preliminary Ecological Appraisal five trees were assessed as having suitability to support roosting bats. Four of these trees were subsequently subject to tree climb and inspect survey.

Following the climb and inspect survey three trees were assessed as having negligible suitability and one tree with low suitability for supporting roosting bats. No evidence of bats was recorded from any of the trees surveyed. **TN5** could not be climbed for further inspection due to a health and safety precaution, and, therefore the bat suitability remains assessed as having low suitability for roosting bats. Details of the trees surveyed are provided in **Table 8** and on **Map 2**.

Table 8: Details of trees surveyed during climb and inspect survey

Tree No.	Species	Climbed/Not Climbed	Notes	Bat Suitability
TN1	Pedunculate Oak	Climbed	Torn limbs do not extend deep enough for bats to use. No suitable features.	Negligible
TN2	Hawthorn	Climbed	Ivy clad	Low
TN3	Pedunculate Oak	Climbed	Rot hole used by squirrels <i>Sciurus</i> species. However, in the event that this became disused this would provide a suitable roosting feature. Woodpecker damage was recorded as being too shallow to support roosting bats.	Negligible
TN4	Pedunculate Oak	Climbed	Rolled callus is shallow only measuring 5cm and is exposed. No suitable features.	Negligible
TN5	Willow Species	Not Climbed	Torn limbs.	Low

The remainder of the trees within the site were assessed as having negligible suitability to support roosting bats.

Foraging and Commuting Habitat

The woodland to the south of the site, the mature trees and hedgerows within the site itself and the vegetation within the surrounding residential gardens offer good foraging and commuting habitat for bats. These features also allow good connectivity into the wider landscape. Woodland, mature hedgerows, tree lines, including those associated with the adjacent A27 corridor and railway, as well as residential gardens within the vicinity of the site also provide suitable foraging and commuting habitats. Overall, the site is considered to offer moderate suitability to support foraging and commuting bats.

Table 9: Building assessment – Summary of features with bat roost suitability and evidence of bat roost activity

Surveyed Feature	Figure	Building Description	Description of Potential Bat Roost Features	Evidence of Bat Roost Activity and Location	Assessment of Suitability for Roosting Bats
Store building	 Figure 10: Store building within the south of the site	The store building is a single storey timber framed open fronted building with a corrugated tin roof and walls (Figure 10).	The building is not of a construction favoured by roosting bats and lacks any suitable access/egress points. Dense cobwebs are also present throughout, highlighting the disuse of building by roosting bats.	No evidence of roosting bats was recorded during the survey undertaken.	Negligible

Bat Transect Survey Results

A total of six bat transect surveys were undertaken between April 2017 and September 2017 during which time a minimum of six species of bat were recorded within the site including common pipistrelle, soprano pipistrelle, long-eared bat species, *Myotis* species, serotine and noctule. A summary of the findings of each survey is provided in Table 10 with a summary of the bat activity plotted on **Map 5**.

Table 10: Bat activity recorded during transect surveys

Survey Date	General Bat Activity at the Site
25 th April 2017	A single registration of common pipistrelle was recorded during the transect survey undertaken along the western site boundary.
31 st May 2017	A number of registrations were made across the site with a total of four species recorded during the transect survey undertaken. Activity was recorded at the boundaries of the site. The majority of the activity was attributable to common pipistrelle with constant foraging recorded in the north-west corner of the site. Lower levels of soprano pipistrelle were also recorded foraging in the north-west corner and along the eastern site boundary. Two registrations of <i>Myotis</i> bat species along the eastern and western site boundary and a single registration of noctule along the western site boundary were also recorded during the survey.
28 th June 2017	A number of registrations were recorded across the site as part of the transect survey undertaken. A large proportion of the activity recorded was along the northern and southern boundaries. The majority of the activity was attributable to common pipistrelle with smaller numbers of registrations of soprano pipistrelle. Three individual passes of long-eared bat species and a single registration of serotine were also recorded associated with the western boundary.
27 th July 2017	A total of three bat species were recorded during the survey undertaken with the majority of activity recorded along the western site boundary and in association with the north-west corner of the site. The majority of the activity recorded was attributable to common pipistrelle with a single registration of serotine and two registrations of soprano pipistrelle also recorded along the western site boundary.
23 rd August 2017	All of the activity recorded during the transect survey undertaken was attributable to common pipistrelle. The vast majority of activity was associated with the western site boundary with a single registration recorded on the eastern site boundary.
28 th September 2017	Bat activity was recorded associated with the boundary vegetation across the site with the majority associated with the western and southern site boundaries. A total of five bat species were recorded as part of the transect survey undertaken with the majority of activity dominated by common pipistrelle. Individual registrations of noctule and serotine were also recorded associated with the south-east corner of the site. Single registrations of soprano pipistrelle and <i>Myotis</i> bat species were also recorded along the western site boundary and eastern site boundary respectively.

A diversity of bat activity was recorded across the site with activity distributed across all the boundaries of the site. The areas of relatively higher activity noted during the bat transect surveys were along the northern and western boundaries of the site.

Automated Bat Detector Survey Results

The automated bat detector survey results recorded a total of 7,066 bat registrations of at least eight species: common pipistrelle, soprano pipistrelle, Nathusius pipistrelle, long-eared bat, noctule, serotine, *Myotis* bat species and barbastelle *Barbastellus barbastellus*.

Table 11 shows the number of registrations and proportion of recorded bat activity at the site by species.

Table 11: Number of registrations and proportion of bat activity from each species

Species	No. Registrations	% Registrations
Common Pipistrelle	3,712	52.53%
Soprano Pipistrelle	2,475	35.03%
Serotine	448	6.34%
Noctule	188	2.66%
<i>Myotis</i> bat species	147	2.08%
Nathusius' Pipistrelle	87	1.23%
Long-eared Bat	6	0.08%
Barbastelle	3	0.04%
Grand Total	7,066	

The vast majority of activity recorded was attributable to the common and widespread species common pipistrelle (52.53%) and soprano pipistrelle (35.03%). The next most frequently encountered bats were serotine, and noctule. A number of registrations of the rarer Nathusius' pipistrelle were made whilst three registrations of the Annex II species barbastelle were also made.

Table 12 provides the number of registrations of each species recorded within each month.

Table 12: Number of registrations of each month split by species

Period	Species	No. Registrations	Activity Index
April 17	Common Pipistrelle	225	32.1
	Soprano Pipistrelle	184	26.3
	Long-eared Bat	1	0.1
April17 Total		410	58.6
May 17	Common Pipistrelle	2,147	214.7

Period	Species	No. Registrations	Activity Index
	<i>Myotis</i> bat species	50	5.0
	Noctule	15	1.5
	Soprano Pipistrelle	1,747	174.7
	Serotine	25	2.5
	Nathusius' Pipistrelle	60	6.0
May 17 Total		4,044	404.4
June 17	Common Pipistrelle	213	42.6
	<i>Myotis</i> species	5	1.0
	Noctule	19	3.8
	Soprano Pipistrelle	197	39.4
	Serotine	121	24.2
	Nathusius' Pipistrelle	18	3.6
June17 Total		573	114.6
July 17	Common Pipistrelle	67	6.7
	Noctule	9	0.9
	Soprano Pipistrelle	5	0.5
	Long-eared Bat	1	0.1
	Serotine	12	1.2
July17 Total		94	9.4
August 17	Common Pipistrelle	853	85.3
	<i>Myotis</i> species	36	3.6
	Noctule	124	12.4
	Soprano Pipistrelle	185	18.5
	Long-eared Bat	2	0.2
	Serotine	209	20.9
	Barbastelle	1	0.1
August17 Total		1,410	141.0
October 17	Common Pipistrelle	207	23.0
	<i>Myotis</i> bat species	56	6.2
	Noctule	21	2.3
	Soprano Pipistrelle	157	17.4
	Long-eared Bat	2	0.2
	Serotine	81	9.0
	Nathusius' Pipistrelle	9	1.0
	Barbastelle	2	0.2
October17 Total		535	59.4
Grand Total		7,066	138.5

The peak of activity was notably in May 2017 with an average of 404.4 registrations per night throughout that recording period (compared to an average of 138.5). July 2017 had a particularly low number of registrations, the reasons for which are not clear. Common pipistrelle and soprano pipistrelle were recorded across all months which the more notable species Nathusius pipistrelle were recorded in May, June and October. Barbastelle was recorded in only August and October.

Assessment of Value to Foraging and Commuting Bats

The bat activity surveys undertaken at the site recorded at least seven species of bat foraging and commuting with the site.

Current guidance on valuing bats in Ecological Impact Assessment³¹ was consulted to assess the value of the on-site foraging and commuting habitat to bats. **Table 13** shows the geographic level of value of foraging and commuting habitat at the site. Considering the results of the activity surveys and automated surveys, the site and wider survey area is considered to be of local importance to foraging and commuting bats however, given the rarity of barbastelle it maybe that the site and wider survey area has country value in respect of barbastelle.

Table 13: Value of the site to bat species/species complexes

Species	Foraging and Commuting Value
Common pipistrelle	Local
Soprano pipistrelle	Local
<i>Myotis</i> bat species	Local
Noctule	Local
Nathusius pipistrelle	County
Serotine	Local
Barbastelle	County

4.4.2 Badger

Desktop Study Results

A single record of badger *Meles meles* was returned by HBIC from within one kilometre of the site boundary as part of the desktop study undertaken. The record is located within a one kilometre OS grid square to the west of the site.

Field Survey Results

No evidence of foraging or resident badger was recorded during the Preliminary Ecological Appraisal undertaken. The site provides suitable foraging habitat for the species associated with grassland and boundary hedgerows. The site itself offers limited opportunities for resident badger without the cover or structure the species usually requires for sett building. However, there is suitability within the adjacent

³¹ Wray, S. *et al.* (2010) Valuing Bats in EcIA. In Practice No. 70, December 2010, P. 23-25, Chartered Institute of Environmental and Ecological Management (CIEEM)

woodland and A27 corridor. Suitable habitats for badger are also present in the wider area in the form agricultural fields, blocks of woodland and A27 corridor.

4.4.3 Hazel Dormouse

Desktop Study Results

No records of hazel dormouse *Muscardinus avellanarius* were returned by HBIC from within one kilometre of the site boundary as part of the desktop study undertaken. No records of EPSM licences in respect of hazel dormouse were identified within two kilometres of the site as part of the MAGIC search.

Field Survey Results

The majority of the habitats within the site are generally sub-optimal for supporting the species. Hedgerow H1 is intact and well connected to the surrounds, but is limited in species diversity. The site also contains areas of dense scrub although gaps are present along the site boundary. However, the surrounds including areas of woodland in the vicinity, are likely to provide suitable food resources, structure and connectivity the species generally requires, and Hampshire is known to be a stronghold for the species.

Hazel Dormouse Survey Results

The results of the hazel dormouse survey are presented in **Table 14**. Locations of the dormouse tubes used during the survey and the survey results are provided in **Map 4**.

Table 14: Hazel dormouse survey results

Survey Date	Hazel Dormouse Nest	Hazel Dormouse Individual	Notes
30 th May 2017	Nil result	Nil result	A wood mouse <i>Apodemus sylvaticus</i> food cache was recorded within nest tube 48 and 49. Elder flowers were also recorded within nest tube 35.
26 th June 2017	Nil result	Nil result	A wood mouse food cache was recorded within nest tube 28 and 48
27 th July 2017	Nil result	Nil result	No other small mammal nests or activity were recorded
30 th August 2017	Nil result	Nil result	No other small mammal nests or activity were recorded
25 th September 2017	Nil result	Nil result	Wood mouse nests were recorded within nest tubes 20 and

Survey Date	Hazel Dormouse Nest	Hazel Dormouse Individual	Notes
			22. An unknown nest was also recorded within nest tube 30. A wood mouse food cache was recorded within nest tube 48.

Hazel dormouse were not recorded during the surveys. Given the results of the surveys, hazel dormouse are therefore assessed as being likely absent from the site. Therefore, no further consideration for this species is given within this report.

4.4.4 Birds

Desktop Study Results

A number of records of bird species were returned by HBIC as part of the desktop study undertaken. The nearest of which was a record of Mediterranean gull recorded 510 metres south-west of the site in 2006. Other bird species within a one kilometre radius include kingfisher *Alcedo atthis*, Cetti's warbler *Cettia cetti*, black tern *Chlidonias niger*, red kite *Milvus milvus*, whimbrel *Numenius phaeopus*, osprey *Pandion haliaetus*, bearded tit *Panurus biarmicus* and little tern many of which are associated with the coastal SPAs in the vicinity of the site.

The site forms part of a parcel of land (noted as H19) identified in the Solent Waders and Brent Goose Strategy¹⁷ as being uncertain for supporting waders associated with the Solent SPAs. This has subsequently been noted as a "Low use" as part of the 2017 update³².

In addition, a review of the strategy records and further consultation with HBIC in October 2018 identified that four visits have been undertaken at H19 as part of the strategy with the only positive results returned being 13 curlew feeding at the site in 2011. However, it is not clear whether these records are from the site itself or the wider H19 parcel to the east.

Field Survey Results

A small number of bird species were recorded during the field survey including blackbird *Turdus merula*, robin *Erithacus rubecula*, woodpigeon *Columba palumbus*, great tit *Parus major* and pheasant *Phasianus colchicus*.

The site supports habitats for supporting breeding birds in the form of scattered trees, scrub and boundary hedgerows. A variety of suitable habitats for supporting a variety

³² <https://solentwbgs.wordpress.com/page-2/>

of bird species are present in the surrounding areas in the form of agricultural fields, woodland, scrub and residential gardens.

The majority of the site contains limited suitability for wintering birds being largely enclosed by hedgerows and narrow (approximately 65 metres) thus not providing the predator vigilance nor flight lines usually required for waders and brent geese. Other habitats in the surrounds provide optimal habitat for supporting wintering birds including a range of fields to the south of the A27.

Wintering Bird Survey Results

Notable species recorded activity using the site or flying over the site during the wintering bird surveys included black-headed gull *Chroicocephalus ridibundus*, common gull *Larus canus*, dunnoek *Prunella modularis*, great black-backed gull *Larus marinus*, herring gull *Larus argentatus*, house sparrow *Passer domesticus*, kestrel *Falco tinnunculus*, mallard *Anas platyrhynchos*, meadow pipit *Anthus pratensis*, redwing *Turdus iliacus*, song thrush *Turdus philomelos* and starling *Sturnus vulgaris*. A summary of the notable species recorded within the site or flying over are provided

Table 16 with full results provided in **Table 15**

Table 15: Wintering bird survey results*³³

Species	Survey Date			
	9 th February 2017	15 th February 2017	21 st February 2017	10 th March 2017
Black-headed gull	1 (3)		3(12)	
Common gull		(1)		
Dunnoek	1	2	2	2
Great black-backed gull	(2)			
Herring gull	(4)			(3)
House sparrow	10			3
Kestrel	1			
Mallard			1 (3)	2
Meadow pipit		2		
Redwing		7	5 (2)	
Song thrush	1	1	1	2
Starling		(6)	(1)	(8)

* Numbers marked in brackets () were recorded flying over the site.

³³ Results provided within **Table 15** specifically relate to birds recorded actively using or flying over the site itself.

Table 16: Summary of notable bird species recorded within the site*

Species	Peak Count	Schedule 1 ³⁴	Red List ³⁵	Amber List ³⁶	UKBAP
Black-headed gull	3			X	
Dunnock	2			X	
House sparrow	10		X		X
Meadow pipit	2			X	
Mallard	2			X	
Redwing	7	X	X		
Song thrush	2		X		X

In addition, as part of the survey a note was made of any bird species recorded using the field to the east of the site which forms the remainder of H19. The notable species recorded including black-headed gull, dunnock, herring gull and skylark. A summary of the notable species recorded to the east of the site are provided in **Table 17**.

Table 17: Summary of notable bird species recorded to the east of the site

Species	Peak Count	Schedule 1	Red List	Amber List	UKBAP
Black-headed gull	(4)			X	
Dunnock	1			X	
Herring gull	4		X		X
Skylark	1		X		X
Stock dove	(2)			X	

A number of common and widespread species were also recorded as part of the survey work including blackbird, blue tit *Cyanistes caeruleus*, carrion crow *Corvus corone*, feral pigeon *Columba livia domestica*, goldcrest *Regulus regulus*, goldfinch *Carduelis carduelis*, great spotted woodpecker *Dendrocopos major*, great tit *Parus major*, green woodpecker *Picus viridis*, greenfinch *Chloris chloris*, jackdaw *Corvus monedula*, long-tailed tit *Aegithalos caudatus*, magpie *Pica pica*, pied wagtail *Motacilla alba*, robin, woodpigeon and wren *Troglodytes troglodytes*.

³⁴ **Schedule 1** Birds listed on Schedule 1 of the Wildlife and Countryside Act (1981 as amended) are afforded additional protection receive further protection making it an offence to: Intentionally or recklessly disturb any bird while it is nest building, or is at a nest containing eggs or young; or; Intentionally or recklessly disturb the dependent young of any such bird.

³⁵ **Birds of Conservation Concern Red List** The UK's birds are split in to three categories of conservation importance - red, amber and green. Red is the highest conservation priority, with species needing urgent action. Amber is the next most critical group, followed by green. Red List criteria include species which are: globally threatened; have been subject to historical population decline in UK during 1800–1995; are in severe (at least 50%) decline in UK breeding population over last 25 years, or longer-term period, or; subject to severe (at least 50%) contraction of UK breeding range over last 25 years, or longer-term period.

³⁶ **Birds of Conservation Concern Amber List** Amber list criteria include species which are: in unfavourable conservation status in Europe; subject to historical population decline during 1800–1995, but recovering; subject to moderate (25–49%) decline in UK breeding population or contraction of UK breeding range over last 25 years, or the longer-term period; subject to moderate (25–49%) decline in UK non-breeding population over last 25 years, or the longer-term period; rare breeders (1–300 breeding pairs in UK); rare non-breeders (less than 900 individuals), or; internationally important species with at least 20% of European breeding or non-breeding population in UK.

The primary aim of the wintering bird surveys is to assess the importance of the site in relation to wintering birds associated with Chichester and Langstone Harbour SPA. Chichester and Langstone Harbour SPA is designated for supporting populations of European importance of Annex I species and for regularly supporting at least 20,000 waterfowl.

Chichester and Langstone Harbour is also designated as a Ramsar site which largely reflects the reasons for selection of the SPA site. The Ramsar convention defines waterfowl as *“birds which are ecologically dependent on wetlands”*³⁷. Therefore, for the purposes of this report this definition has been applied when considering the designation of the SPAs under the assemblage qualification.

Table 18 provides a summary of the peak counts of birds associated with the Chichester and Langstone Harbours SPA recorded at the site as part of the wintering bird surveys undertaken between February 2017 and March 2017.

Table 18: Summary of bird species recorded on-site associated with the SPA in 2017

Species	Peak Count	Chichester and Langstone Harbours SPA	
		Qualifying Species (Article 4.1)	Assemblage Qualification (Article 4.2)
Black-headed gull	3		X
Mallard	2		X

The assemblage of wintering birds and species recorded is largely of a common and widespread nature and typical of the surrounds. The habitats within the site offer limited foraging resources for the species recorded, however, the habitats are not uncommon in the wider area with a variety of similar habitats in the surrounds. Therefore, no evidence to suggest that the site provides an important resource for wintering species associated with the SPA has been recorded as part of the 2017 surveys undertaken by ECOSA.

The site was highlighted within the Solent Waders and Brent Goose Strategy 2010 as being as part of the parcel of land (noted as H19) an “uncertain” site for supporting waders, which is subsequently noted as a “Low Use” Site in the 2017 update. Such sites are offered protection under Policy DM23 of the Havant Borough Local Plan (Allocations) with DM23 stating the following:

³⁷ Convention on Wetlands of International Importance especially as Waterfowl Habitat 1987 (as amended).

“Policy DM23 Sites for Brent Geese and Waders

Planning permission will be granted for developments that avoid important sites for Brent Geese and/or waders outside of the statutory designated areas, identified on the Policies Map.

Where this cannot be avoided, development proposals on or adjacent to an important Brent Goose and/or wader site outside of the statutory designated areas will need to demonstrate levels of impact, alone and in combination with other proposals subject to the tests of the Habitats Regulations. Where a negative impact upon a site cannot be avoided or satisfactorily mitigated, and the tests of the Habitats Regulations are met as necessary, replacement feeding/roosting habitat, on a no net loss basis, will be sought.

Where a negative impact upon an important site cannot be avoided or mitigated and replacement feeding/roosting habitat is not or cannot be provided on a no net loss basis, the proposal will be refused.

Planning permission will be granted for development on or adjacent to uncertain sites for Brent Geese and/or waders outside of the statutory designated areas, where appropriate surveys are undertaken and it is determined that the site has no importance.”

In total four survey visits have been undertaken by ECOSA in 2017 during which time no waders were recorded utilising the site. As part of the Wader and Brent Goose Strategy a total of four survey visits were undertaken during which a single record of thirteen curlew was made in 2011 for H19. However, it is not clear from this record whether this was associated with the site itself or the remainder of H19 to the east. It is considered a reasonable likelihood that these records are associated with the east of H19. It is not clear from the existing strategy the reason for H19 covering two separate parcels of land

Given the generally poor-quality habitat for supporting waders and that no waders were recorded in survey work undertaken in 2002, 2010 or 2017 it is considered highly unlikely that the site is an important site for waders and, therefore, that the “low use” classification is primarily associated with the remainder of the H19 parcel

The wintering bird surveys undertaken identify that the site supports a common and widespread assemblage of wintering bird species considered to be of low local importance.

4.4.5 Reptiles

Desktop Study Results

Consultation with HBIC produced no records of reptiles within the desktop study area, however, this does not confirm the absence of this species group in the local area.

Field Survey Results

The majority of the site comprises grazed, semi-improved grassland which provides poor suitability for supporting common species of reptiles. However, a number of areas of scrub along the field margins are less well managed and provide suitable habitat to support foraging, breeding, basking and hibernating reptiles. The field immediately east of the site also has suitability for reptiles, containing long tussocky unmanaged grassland.

Reptile Survey Results

A summary of the reptile surveys undertaken at the site is provided in **Table 19** with the location of the species recorded provided on **Map 6**. The survey recorded one species of reptile at the site, with peak counts of two adult and five juvenile slow-worm *Anguis fragilis*.

Table 19: Summary of reptile survey results

Survey Date	Number of Individuals Recorded			
	Slow-worm			
	Male	Female	Unsexed	Juvenile
4 th September 2017	1	-	-	5
11 th September 2017	-	1	-	3
14 th September 2017	-	-	-	4
18 th September 2017	-	-	-	-
22 nd September 2017	-	2	-	5
25 th September 2017	-	1	-	5
5 th October 2017	1	-	-	-
Adult Peak Count	2			5

Assessment of Population Size

Table 20 shows the current guidance³⁸ for assessing the population size of reptiles based on a refugia density of ten per hectare. The refugia density used at the site was 27 per hectare (i.e. 2.7 times greater). The survey recorded a peak adult count of one adult slow-worm. Adjusted for the greater refugia density, this represents a count of under one slow-worm at a refugia density of ten per hectare. The site is therefore considered to support a “low” population of this species.

Table 20: Criteria for slow-worm population size assessment*

Species	Low Population	Good Population	Exceptional Population
Slow-worm	<5	5 - 20	>20

4.4.6 Great Crested Newt

Desktop Study Results

No records of great crested newt *Triturus cristatus* were returned by HBIC from within one kilometre of the site boundary as part of the desktop study undertaken. A review of online 1:25,000 OS mapping and aerial imagery suggests there are no waterbodies within a 500 metres radius of the site.

Field Survey Results

A small pond is present within the site which is largely sub-optimal for supporting great crested newt, with only limited suitable egg laying vegetation present. The absence of a network of ponds in the surrounds reduces the likelihood of great crested newt utilising the on-site pond.

The site provides generally sub-optimal terrestrial habitat for supporting terrestrial great crested newt with the majority of the site comprising grazed grassland. However, the areas of scrub and hedgerows along the site boundary and the boundary woodland provide suitable foraging and refuge opportunities for the species during their terrestrial stage.

Great Crested Newt eDNA Survey Results

A negative result was returned for the on-site pond, indicating that great crested newt are likely absent from the site. The results of the eDNA survey are provided in **Appendix 6**. The absence of a network of ponds from the site means great crested newt are unlikely to disperse to the site. Therefore, the species is considered likely

³⁸ Froglife (1999) *Reptile Survey: A Guide to Planning, Conducting and Interpreting Surveys for Snake and Lizard Conservation*, Froglife Advice Sheet 10

absent from the site and no further consideration to great crested newt is given within this report.

4.4.7 Invertebrates

Desktop Study Results

A number of notable terrestrial invertebrates were returned by HBIC from within one kilometre of the site boundary as part of the desktop study undertaken, including the Species of Principal Importance stag beetle *Lucanus cervus*, small square-spot *Diarsia rubi*, grayling *Hipparchia semele* and wall *Lasiommata megera*. The nearest of which was a record for wall (butterfly) located approximately 135 metres west of the site in 2006.

Field Survey Results

The site offers some suitable habitat for supporting invertebrates in the form of the semi-improved grassland and boundary hedgerows. The site largely supports common and widespread habitats which are considered unlikely to support any rare or notable assemblages of terrestrial invertebrate species.

4.4.8 Other Relevant Species

Desktop Study Results

A single record of the Species of Principal Importance hedgehog *Erinaceus europaeus* was also returned by HBIC as part of the desktop study undertaken recorded 260 metres south-west of the site in 2010.

Field Survey Results

The site supports some suitable habitat for hedgehog in the form of the semi-improved grassland and boundary hedgerows and scrub.

4.5 Summary of Key Ecological Features

The site mainly comprises horse grazed semi-improved grassland with associated boundary vegetation and is of relatively limited value. The following features are those with greatest ecological value:

- Scattered trees and boundary hedgerows with linkages to offsite woodland;
- Presence of at least seven species of foraging and commuting bats including notable species *Nathusius pipistrelle* and *barbastelle*;
- Suitability of the site to support breeding birds; and
- Presence of a low population of slow-worm.

5.0 POTENTIAL DEVELOPMENT IMPACTS AND ECOLOGICAL EFFECTS

5.1 Introduction

This section considers, in outline, the potential impacts of the proposed development scheme and effects on the features of ecological interest as identified in Section 4.0 and summarised in Paragraph 4.5. The impacts considered may have either a positive or a negative effect and are considered unmitigated i.e. prior to any mitigation or compensation being implemented.

The proposed development entails residential development of the site with associated access and landscaping. This will result in the loss of approximately 1.8 hectares of semi-improved grassland. Lighting will also be introduced to the site although lighting proposals were unknown at time of writing this report. In the absence of mitigation, the potential ecological effects of these works are detailed in the sections below.

5.2 Designated Sites

There will likely be an increase in recreational pressure either alone or in-combination with other plans or projects on Chichester and Langstone Harbour SPA/Ramsar site and Solent Maritime SAC. The impacts in relation to the Waders and Brent Goose Strategy parcel H19 are discussed in **Paragraph 5.4.3**.

5.3 Habitats

The proposals will likely largely result in the loss of common and widespread habitats typical of the setting. The features of generally greater ecological value are established boundary hedgerows, scrub margins, pond and mature scattered trees which are largely to be retained within the proposals.

5.4 Notable and Legally Protected Species

Of those notable and protected species identified as being likely present on site during the Ecological Assessment the following potential effects have been identified:

5.4.1 Bats

The proposals may result in losses of suitable foraging and commuting habitats whilst the increase of new lighting at the site has the potential to cause disturbance to foraging and commuting bats.

Any lighting utilised during the construction phase of the development also has the potential to result in disturbance to foraging and commuting bats at the site.

Should any works be required to trees assessed as having low suitability to support roosting bats (TN2 and TN5) then there is the potential for direct impacts on roosting bats should roosting bats be present.

In England, bats and their habitat are fully protected under the Wildlife and Countryside Act 1981 through inclusion in Schedule 5. In addition, all bat species are protected under the Conservation of Habitats and Species Regulations 2017. Refer to **Appendix 4** for details.

5.4.2 Badger

The proposals would likely result in small scale losses of suitable foraging habitat for badger. However, given that no evidence was recorded and the range of other suitable habitats in the wider area these impacts are not considered to be significant in the context of the surrounds.

5.4.3 Birds

The majority of the Solent Waders and Brent Goose Strategy parcel H19 is not included within the redline boundary however, the proposals will result in the loss in approximately 20-25% of the total land area of the strategy site.

However, given the findings of the survey work undertaken and previous information gathered as part of the desktop study it is not considered that the site itself is of importance for wintering birds and therefore, the site itself would not be classified as a “low use” site

The remainder of H19 is classified as a “low use” site Therefore, should wintering birds be utilising the remaining parcel of land there is the potential for indirect impacts on wintering birds as a result of increased disturbance from the development both during the construction and operational phases

Vegetation clearance and tree removal activities could cause harm to breeding birds if undertaken during the breeding season and will result in a long-term loss of suitable nesting habitats.

All birds, their nests, eggs and young are legally protected, with certain exceptions, see **Appendix 4** for details.

5.4.4 Reptiles

The proposals for the site will result in the loss of reptile habitat which has the potential for direct harm and potential for long-term overall loss in habitat for slow-worm.

Widespread reptile species (slow-worm, common lizard *Zootoca vivipara*, grass snake *Natrix natrix* and adder *Vipera berus*) are protected under the Wildlife and Countryside Act 1981 against harm, see **Appendix 4** for details.

5.4.5 *Invertebrates*

Given that the site only supports common and widespread habitats and therefore, is likely to support a common and widespread assemblage of invertebrates as a result, no significant impacts on invertebrates are anticipated.

5.4.6 *Other Relevant Species*

The proposals will likely result in a loss of habitat suitable for hedgehog and a number of other common and widespread small mammal species.

6.0 RECOMMENDATIONS AND CONCLUSIONS

6.1 Introduction

This section provides a summary of the recommendations resulting from the baseline ecological condition and the outline assessment of impacts and effects. This section also provides an outline of mitigation/enhancement/compensation that is to be provided as part of the development scheme. Methods for addressing potential negative effects on features of ecological interest have been approached in accordance with the mitigation hierarchy³⁹ with avoidance of negative effects prioritised where possible. Where negative effects cannot be avoided mitigation⁴⁰ is prioritised over compensation⁴¹. Enhancement⁴² has been recommended to provide a net gain in biodiversity post-development.

6.2 Mitigation/Compensation

6.2.1 Designated Sites

A contribution will be made to the Bird Aware Strategy for strategic mitigation measures in relation to the Chichester and Langstone Harbour SPA/Ramsar site and Solent Maritime SAC. At the time of writing this contribution is based on a sliding scale of between £337 per dwelling for a one bedroom dwelling to £880 per dwelling for a five bedroom dwelling.

6.2.2 Habitats

Wherever possible the boundary hedgerows are to be retained as part of the development as well as the mature scattered trees present within the site. Existing trees should be retained with Root Protected Zones established in accordance with BS 5837:2012 trees in relation to design, demolition and construction.

Any new landscaping should be designed to incorporate new native species landscaping to include new native shrub and grassland planting wherever possible in order to offset any losses to occur to the existing habitats present at the site.

³⁹ In accordance with CIEEM Ecological Impact Assessment guidance a sequential process is adopted to address impacts on features of ecological interest, with 'Avoidance' prioritised at the top of the hierarchy and Compensation/Enhancement' at the bottom. This is often referred to as the 'mitigation hierarchy'.

⁴⁰ "Measures taken to avoid or reduce negative impacts. Measures may include: locating the development and its working areas and access routes away from areas of high ecological interest, or timing works to avoid sensitive periods." CIEEM (2017) Technical Guidance Series - EcIA Guidelines - Glossary [online]. Available from: <http://www.cieem.net/glossary> [Accessed 9th January 2017]

⁴¹ "Measures taken to make up for the loss of, or permanent damage to, biological resources through the provision of replacement areas. Any replacement area should be similar to or, with appropriate management, have the ability to reproduce the ecological functions and conditions of those biological resources that have been lost or damaged." CIEEM (2017) Technical Guidance Series - EcIA Guidelines - Glossary [online]. Available from: <http://www.cieem.net/glossary> [Accessed 9th January 2017]

⁴² "The genuine enhancement of the natural heritage interest of a site or area because the project includes improved management or new habitats or features, which are better than the prospective management, or the habitats or features present there now. There is, therefore, a net or new benefit to the natural heritage." CIEEM (2017) Technical Guidance Series - EcIA Guidelines - Glossary [online]. Available from: <http://www.cieem.net/glossary> [Accessed 9th January 2017]

The pond is to be retained as part of the proposals. It is proposed that new native species planting is undertaken around the pond. The pond could also be sown with a new margin seed mix such as Emorsgate EP1 (or similar) in order to provide an increase in the diversity of habitats around the site.

6.2.3 Bats

The majority of the suitable foraging and commuting habitat is to be retained as part of the proposals and these should be improved wherever possible in order to maintain existing foraging and commuting habitats.

It is recommended that the lighting to be installed on the new development should comprise hooded luminaires directed away from vegetation. Ideally the bulbs will be LED and at the warmer end of the spectrum (e.g. avoiding blue or white light). LED lights emit much lower levels of UV and therefore have a lower impact on wildlife⁴³. Where possible, the new lighting should be motion-activated and task related. The lux level will be as low as possible to allow the task to be carried out safely and effectively. Guidance on task related lighting levels published by the Chartered Institution of Building Services Engineers (CIBSE)⁴⁴ will be followed.

Should any works be necessary to the two trees assessed as having low suitability to support roosting bats (TN2 and TN5) then these works will be undertaken under the supervision of an ecologist.

6.2.4 Badger

In the unlikely event that a badger becomes trapped in excavations during construction works, a timber ramp should be inserted to allow the animal to escape of its own accord.

6.2.5 Birds

Any wooded vegetation clearance should be undertaken outside the breeding bird season of March to August, inclusive, or if not possible, an ecologist should be present immediately prior to clearance to check vegetation. Active nests should be left with an undisturbed 5-10 metre buffer until nesting ends.

The Solent Waders and Brent Goose Strategy Interim Guidance on Mitigation and Off-setting requirements⁴⁵ states that a contribution of £35,610 per hectare would be required in order to offset loss of low use site. However, based on the impact assessment undertaken in Paragraph 5.4.3 it is not considered that this would be necessary to offset the loss of this habitat.

⁴³ *Wildlife and Artificial Lighting Seminar*, 21st – 22nd March 2014, Arup London, Bat Conservation Trust.

⁴⁴ CIBSE (1992) *Lighting Guide 6: The Outdoor Environment*; CIBSE (2002) *Code for Lighting*, Butterworth-Heinemann, UK.

⁴⁵ SWBGS Steering Group (2018) Solent Waters and Brent Goose Strategy – Interim Guidance on Mitigation and Off-setting Requirements

In order to minimise any potential indirect impacts on wintering birds potentially utilising the remainder of the Waders and Brent Goose parcel H19 it is recommended that the existing hedgerow along the eastern boundary of the site be subject to buffer planting to reinforce the existing separation between the site and the remainder of H19. It is also recommended that any lighting scheme is designed in order to ensure that there is no additional light spill on the retained parcel of H19 to the east.

In order to minimise any potential disturbance impacts through new residents it will be necessary to ensure that no public access is provided to the H19 parcel and that access is actively discouraged through new planting and suitable signage.

6.2.6 Reptiles

Given the presence of a low population of slow-worm within the site it will be necessary to ensure that these animals are not harmed during the necessary ground clearance works prior to development and that the animals are not present within the development area during construction works. Therefore, a translocation exercise will be necessary in order to remove the population from the site.

It is not considered possible to retain the population within the current red line boundary. Therefore, an offsite receptor site would need to be established.

The receptor site will be identified prior to the mitigation works commencing and the details would need to be set out in a reptile mitigation strategy. Natural England's⁴⁶ standing advice in relation to receptor sites would need to be followed which states:

“...you'll have to choose a receptor site:

- *as close as possible to the development site, and within the same local planning authority if possible*
- *that is at least the same size as the habitat that will be lost, and larger if the habitat to be lost is high quality (you can provide smaller habitat if it's substantially better quality)*
- *that will serve the same function as the habitat to be lost, e.g. it has hibernation features*
- *with similar habitat to the area that will be lost, including water bodies*
- *that doesn't currently support the same species, but can be improved to make it suitable*
- *that will be safe from future development and managed in the long term”*

⁴⁶ Natural England (2015) Environmental Management Guidance. Reptiles: Survey and Mitigation for Development Projects Available from: <https://www.gov.uk/guidance/reptiles-protection-surveys-and-licences>

Any receptor site may require appropriate enhancements, for example, the creation of tussocky grassland and reptile hibernacula. An appropriate habitat creation and management plan may be necessary for the receptor site.

Should the identified receptor area be unsuitable for supporting reptiles in its current form then it will need to be allowed to mature in order to become a suitable receptor site for reptiles before translocation can commence. The commencement of the translocation will be determined by a suitably qualified ecologist.

Prior to the commencement of the translocation exercise it is proposed that reptile proof fencing is erected around the boundary of the construction zone in order to ensure reptiles do not enter the construction area during works. The indicative location of this reptile fencing is provided on **Map 7**. Fencing will consist of 1000 gauge polythene fence buried into the ground by 100 millimetres with an external return to prevent reptiles burrowing beneath it. Posts will be erected at approximately one to two metre intervals to support the fence. The fence is to be 750 millimetres to one metre in height. The fencing will remain in place until the completion of the translocation exercise.

Following the installation of the reptile fencing reptile capture and removal will be undertaken between April and October when reptiles are not in hibernation by a suitably qualified ecologist. A high density of refugia will be distributed throughout areas of suitable habitat and inspected on a daily basis until five 'clear' visits have been achieved or sufficient effort has been deemed to be expended by the ecologist leading the translocation. It is envisaged that the translocation exercises will take a minimum of 30 days. All captured animals will be placed in a secure container and transported to the receptor area at the end of each visit capture.

Following the five clear days, a destructive search will be undertaken of the on-site habitat under supervision of a suitably qualified ecologist. This will entail the methodical removal of any suitable habitat within the site. Any additional reptiles encountered as part of the destructive search will be captured by the ecologist and relocated to the receptor area. Once the destructive search has been completed, and all suitable reptile habitat has been removed from the site, the development work will be able to proceed.

The reptile fencing will remain *in situ* for the remainder of the construction period and until the completion of the proposed development. The reptile fencing will need to be monitored by on-site contractors with any repairs made necessary in order to remove the risk of reptile re-colonising at the site. During the construction period the construction zone will also be maintained clear of vegetation in order to minimise the likelihood of any reptiles re-colonising the site.

Following the completion of the development the reptile fencing should be removed under the supervision of a suitably qualified ecologist.

6.2.7 Other Relevant Species

Where possible, gaps should be created under new installed fencing in order to allow continued permeability for small mammals, such as hedgehog, across the site. These would need to be approximately 13 centimetres x 13 centimetres in order to be effective.

6.3 Enhancement

6.3.1 Habitats

The boundary hedgerows could be subject to new native species bolster planting in order to increase habitat connectivity within the site.

Any new areas of grassland could incorporate a new native species wildflower meadow mix such as Emorsgate EM3 or similar. An ecologist should be consulted on any forthcoming landscaping plans for the site.

6.3.2 Bats

As an enhancement measure new bat boxes should be installed on retained trees in order to provide new roosting opportunities. Five Schwegler 1FF or similar would provide suitable enhancement.

6.3.3 Birds

As an enhancement measure it is recommended that five new bird boxes (Schwegler 2H and 1B or similar) are erected on retained trees or new buildings within the site.

6.4 Conclusion

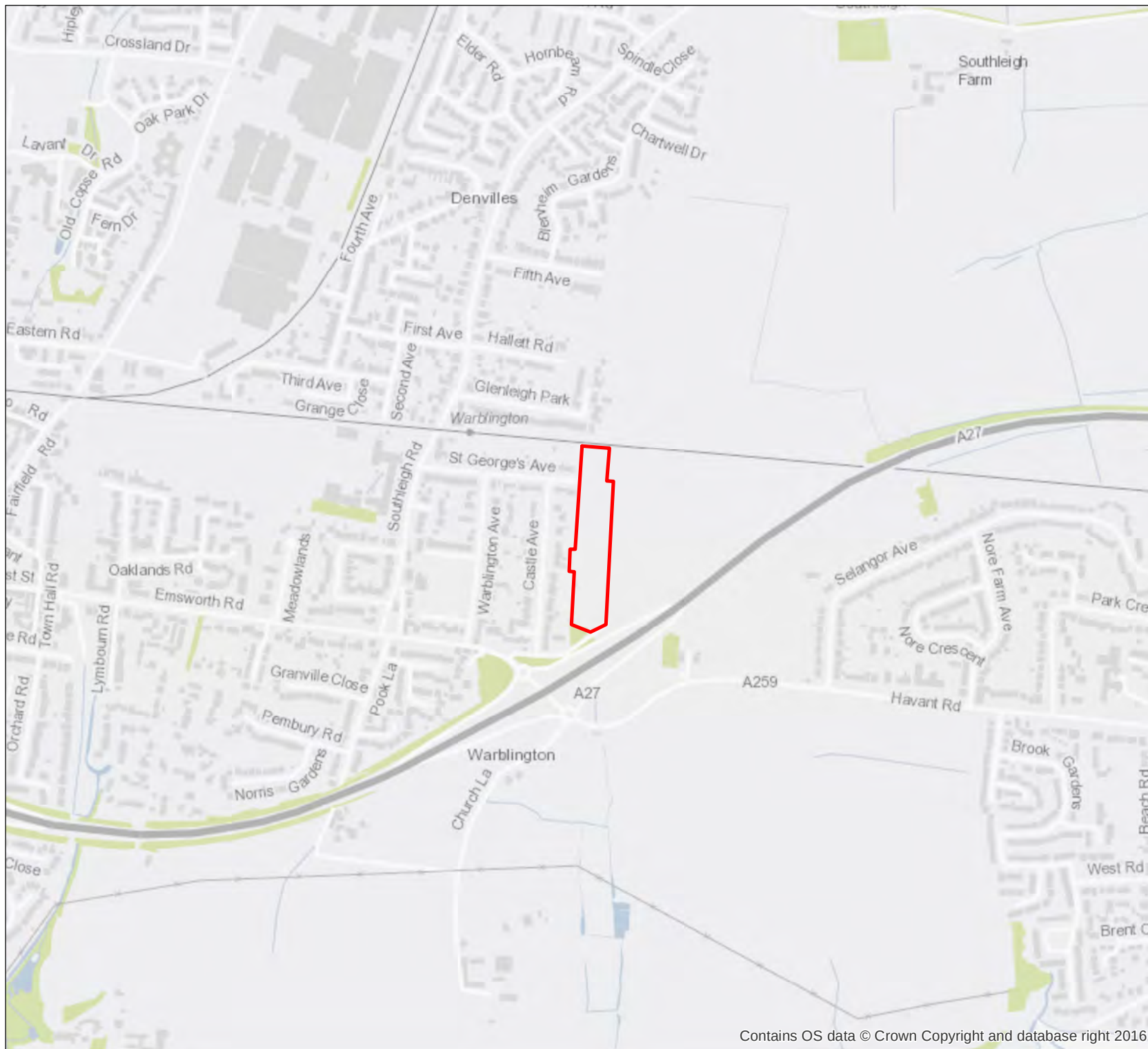
The site has been assessed as being generally low ecological value, comprising both common and widespread habitats. The habitats of relatively greater ecological importance are the established boundary hedgerows, areas of scrub and scattered mature trees. The site has been recorded as supporting a diversity of foraging and commuting bats and a low population of slow-worm. The site has also been assessed as having suitability to support protected species including tree roosting bats, foraging badger, breeding birds with limited potential for supporting rare assemblages of invertebrates.

Mitigation and enhancement measures have been proposed in order to offset the impact of the development on protected species and subject to the implementation of the measures set out, it is considered that there is the potential for the proposals to deliver a net ecological gain at the site, and, therefore the proposals will accord with all relevant planning policy in relation to ecology.

6.5 Updating Site Survey

If works have not commenced by October 2019, it is recommended that the Ecological Assessment is updated. This is because many of the species considered during the current survey are highly mobile and the ecology of the site is likely to change over this period. If the planning application boundary changes or the proposals for the site alter, a re-assessment of the impacts may be required.

Map 1 Site Location Plan



LAND AT CASTLE AVENUE, HAVANT, HAMPSHIRE

ECOLOGICAL ASSESSMENT

Map 1 - Site Location

Client:	Persimmon Homes South Coast
Date:	December 2017
Status:	Final

KEY

 Site Boundary

Scale at A4: 1:10,000

0 40 80 160 240 320 Metres



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Map 2 Phase 1 Habitat Map

LAND AT CASTLE AVENUE, HAVANT, HAMPSHIRE

ECOLOGICAL ASSESSMENT

Map 2 - Phase 1 Habitat Map

Client: Persimmon Homes South Coast

Date: September 2018

Status: Final

KEY

	Site Boundary
	Target Note
	Hedgerow Number
	Scrub
	Scattered Broadleaved Trees
	Scattered Coniferous Trees
	Semi-Improved Grassland
	Standing Water
	Intact Species-Poor Hedgerow
	Defunct Species-Poor Hedgerow
	Building
	Fenceline

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Map 3 Location of Bat Transect Route and SM2 Automated Detectors

LAND AT CASTLE AVENUE, HAVANT, HAMPSHIRE

ECOLOGICAL ASSESSMENT

Map 3 - Location of Bat Transect Route and SM2 Automated Detectors

Client: Persimmon Homes South Coast

Date: September 2018

Status: Final

KEY

	Site Boundary
	Scrub
	Scattered Broadleaved Trees
	Scattered Coniferous Trees
	Semi-Improved Grassland
	Standing Water
	Intact Species-Poor Hedgerow
	Defunct Species-Poor Hedgerow
	Building
	Fenceline

Location of SM2 Automated Detectors Month

	April
	May
	June
	July
	August
	September
	Bat Transect Route
	Five Minute Point Count

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Map 4 Location of Dormouse Tubes

LAND AT CASTLE AVENUE, HAVANT, HAMPSHIRE

ECOLOGICAL ASSESSMENT

Map 4 - Location of Dormouse Tubes

Client: Persimmon Homes South Coast

Date: September 2018

Status: Final

KEY

-  Site Boundary
-  Scrub
-  Scattered Broadleaved Trees
-  Scattered Coniferous Trees
-  Semi-Improved Grassland
-  Standing Water
-  Intact Species-Poor Hedgerow
-  Defunct Species-Poor Hedgerow
-  Building
-  Fenceline
-  Location of Dormouse Tubes (x50)

N.B. No hazel dormouse or their nests were recorded during the hazel dormouse survey undertaken from April to September 2017 inclusive.

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Map 5 Bat Transect Survey Results

LAND AT CASTLE AVENUE, HAVANT, HAMPSHIRE

ECOLOGICAL ASSESSMENT

Map 5 - Bat Transect Survey Results

Client: Persimmon Homes South Coast

Date: September 2018

Status: Final

KEY

- | | |
|--|--|
|  | Site Boundary |
|  | Scrub |
|  | Scattered Broadleaved Trees |
|  | Scattered Coniferous Trees |
|  | Semi-Improved Grassland |
|  | Standing Water |
|  | Intact Species-Poor Hedgerow |
|  | Defunct Species-Poor Hedgerow |
|  | Building |
|  | Fenceline |
|  | Key Area of Bat Activity (Dominated by Common Pipistrelle and Soprano Pipistrelle) |
|  | <i>Myotis</i> Bat Species |
|  | Long-eared Bat |
|  | Serotine |
|  | Noctule |
|  | Daubenton's Bat |

N.B. Bat species plotted on map represent single registrations of bat activity recorded during the bat transect surveys undertaken between April to September 2017 inclusive.

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Map 6 Location of Reptile Refugia and Reptile Survey Results

LAND AT CASTLE AVENUE, HAVANT, HAMPSHIRE

ECOLOGICAL ASSESSMENT

Map 6 - Location of Reptile Refugia and Reptile Survey Results

Client: Persimmon Homes South Coast

Date: September 2018

Status: Final

KEY

	Site Boundary
	Scrub
	Scattered Broadleaved Trees
	Scattered Coniferous Trees
	Semi-Improved Grassland
	Standing Water
	Intact Species-Poor Hedgerow
	Defunct Species-Poor Hedgerow
	Building
	Fenceline

Reptile Survey Results

	Location of Reptile Refugia (x60)
	Juvenile Slow-worm
	Adult Slow-worm

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Map 7 Reptile Fencing Layout

LAND AT CASTLE AVENUE, HAVANT, HAMPSHIRE

ECOLOGICAL ASSESSMENT

Map 7 - Reptile Fencing Layout

Client: Persimmon Homes South Coast

Date: September 2018

Status: Final

KEY

-  Site Boundary
-  Scrub
-  Scattered Broadleaved Trees
-  Scattered Coniferous Trees
-  Semi-Improved Grassland
-  Standing Water
-  Intact Species-Poor Hedgerow
-  Defunct Species-Poor Hedgerow
-  Building
-  Fenceline
-  Reptile Fencing
-  Area to be Retained

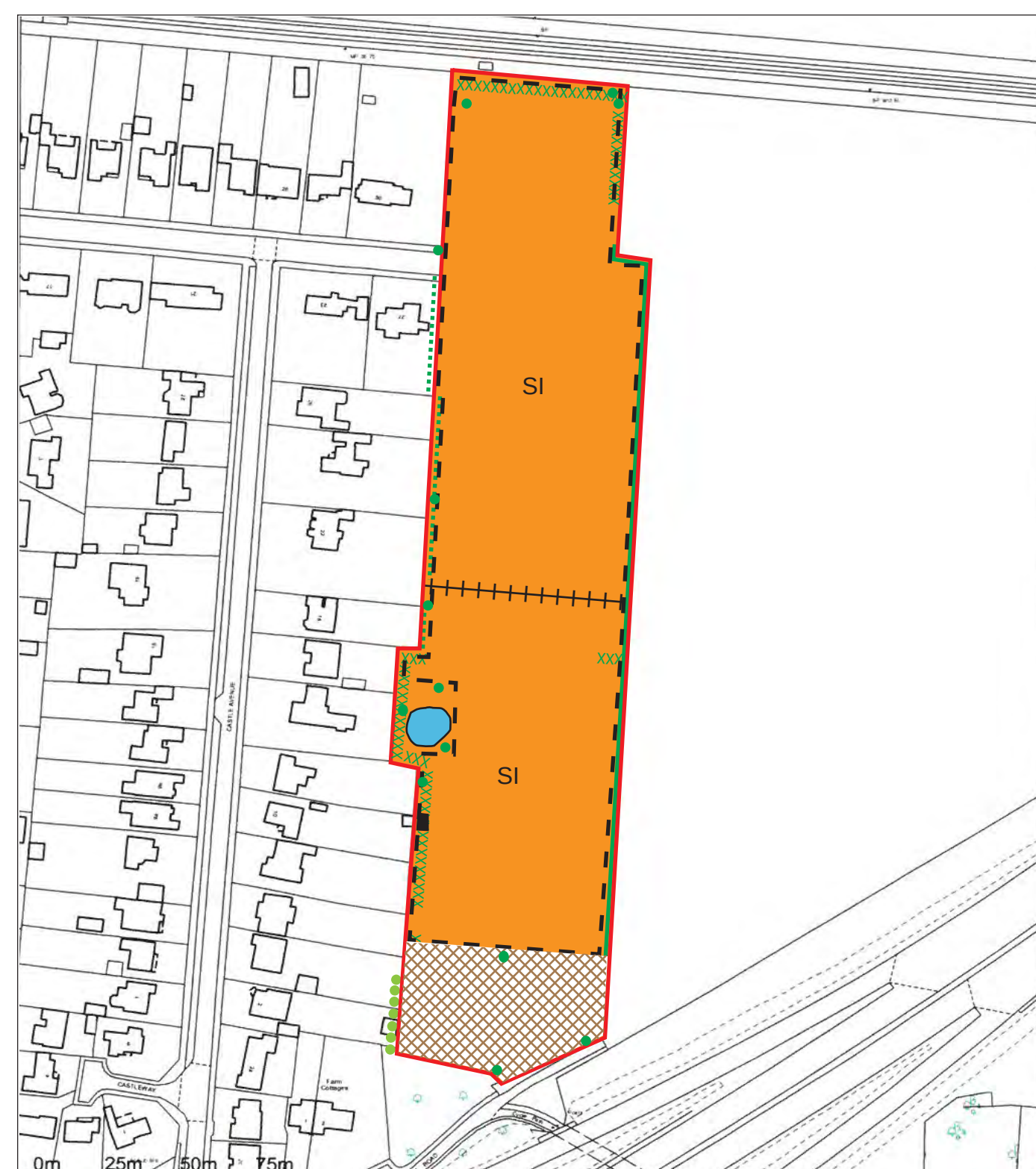
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Appendix 1 Site Proposals Plan



Land potentially
allocated for new access
road (details unknown).

Eastern boundary planting
retained where possible

Local Area of Play

Public Open Space

Existing western boundary
screen planting retained

Tree to be removed

Access point for
future development

Acoustic mitigation zone
(20m from rail tracks)

Rev	Date	Revision Details	Dr	Ch
 PERSIMMON Together, we make a home				
Job Title Land East of Castle Avenue, Havant				
Drawing Title Site Plan				
Job No 507	Drawing No A-02-020-SP		Rev -	
Drawn br	Checked ke	Date 22.06.18		
Scale 1:500 @ A1 / 1:1000 @ A3				
				
Status PLANNING				

Appendix 2 Sites Designated for Nature Conservation

Statutory Sites

Internationally Designated Sites - Ramsar Sites, Special Areas of Conservation and Special Protection Areas

Special Protection Areas (SPA) and Special Areas of Conservation (SAC) form a network of protected sites across the European Union called Natura 2000 sites. In the United Kingdom the primary legislative protection is afforded to these sites under the Conservation of Habitats and Species Regulations 2017 (as amended).

Ramsar sites are designated as wetlands of international importance which are afforded similar legislative protection to Natura 2000 sites.

SACs are sites which support internationally important habitats or internationally important assemblages or populations of species. SPAs are designated for supporting internationally important populations of birds listed in the annexes of the Birds Directive. SACs, SPAs and Ramsar sites are generally also designated as Sites of Special Scientific Interest.

Under Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended) there is a legal requirement that competent authorities, such as local planning authorities, need to consider whether plans or projects are likely to have a significant adverse effect on Natura 2000 sites or Ramsar sites, either alone, or in combination with other plans or projects. In the event that a likely significant effect cannot be ruled out, on the basis of objective information, then the competent authority must undertake an “Appropriate Assessment” to fully assess the plan or project against the site’s conservation objectives. Unless certain defined derogation tests can be met, the competent authority may not authorise nor undertake any plan or project which adversely affects the integrity of a Natura 2000 site or Ramsar site.

Nationally Designated Sites – Sites of Special Scientific Interest and National Nature Reserves

Sites of Special Scientific Interest (SSSI) receive legal protection under the Wildlife and Countryside Act 1981 (as amended). Such sites are designated to protect specific areas of biological or geological interest of national importance. Such sites also generally receive strict protection through the planning system.

National Nature Reserves (NNR) are also usually designated as SSSIs and are specifically managed for their wildlife value. They receive legal protection through the National Parks and

Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981 (as amended). As with SSSIs, these sites generally receive strict protection through the planning system.

Locally Designated Sites – Local Nature Reserves

Local Nature Reserves (LNR) are designated by local authorities under the National Park and Access to the Countryside Act 1949. These are generally designated not only for their local wildlife value but also for education, scientific and recreational purposes. These sites generally receive protection from development through the planning system.

Non-Statutory Sites

Locally Designated Sites

In addition to statutory designations, local authorities often designate sites of nature conservation importance at the local level. Such designations are named differently by each local authority and may be referred to as Local Wildlife Sites (LWSs), Sites of Importance for Nature Conservation (SINCs) or Sites of Nature Conservation Importance (SNCIs), amongst others. The exact level of protection afforded to these sites varies and is normally defined through local planning policy.

Appendix 3 Assessment Criteria for Bats

Criteria used to Assess Suitability of the Site for Bats

The criteria used to assess the suitability of roosting and foraging/commuting habitat for bats is based on industry guidelines and outlined in **Table 21**⁴⁷.

Table 21: Criteria used to assess suitability of roosting and foraging/commuting habitat for bats

Suitability	Description of roosting habitats	Commuting and foraging habitats
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status.	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically/structure that does not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation). A tree of sufficient size and age to contain potential roost features but with none seen from the ground or features seen with only very limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerows or un-vegetated stream, but isolated (i.e. not very well connected to the surrounding landscape by other habitat). Suitable, but isolated, habitat that could be used by small numbers of foraging bats such as a lone tree or a patch or scrub.
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.

⁴⁷ Table adapted from Collins, J. (Ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Third Edition). The Bat Conservation Trust, London

Appendix 4 Protected Species Legislation

Bats

All UK bat species are listed in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of the Conservation of Habitats and Species Regulations 2017. They are afforded full protection under Section 9(4) of the Act and Regulation 43 of the Regulations. These make it an offence to:

- Deliberately capture, injure or kill any such animal;
- Deliberately disturb any such animal, including in particular any disturbance which is likely:
 - To impair its ability to survive, breed, or rear or nurture their young;
 - To impair its ability to hibernate or migrate;
 - To affect significantly the local distribution or abundance of that species;
- Damage or destroy a breeding site or resting place of any such animal;
- Intentionally or recklessly disturb any of these animals while it is occupying a structure or place that it uses for shelter or protection; or
- Intentionally or recklessly obstruct access to any place that any of these animals uses for shelter or protection.

In addition, five British bat species are listed on Annex II of the Habitats Directive. These are:

- Greater horseshoe bat *Rhinolophus ferrumequinum*;
- Lesser horseshoe bat *Rhinolophus hipposideros*;
- Bechstein's bat *Myotis bechsteinii*;
- Barbastelle *Barbastella barbastellus*; and
- Greater mouse-eared bat *Myotis myotis*.

In certain circumstances where these species are found the Directive requires the designation of Special Areas of Conservation (SACs) by EC member states to ensure that their populations are maintained at a favourable conservation status. Outside SACs, the level of legal protection that these species receive is the same as for other bat species.

Breeding Birds

With certain exceptions, all wild birds, their nests and eggs are protected by Section 1 of the Wildlife and Countryside Act 1981 (as amended). Therefore, it is an offence, to:

- Intentionally kill, injure or take any wild bird;
- Intentionally take, damage or destroy the nest of any wild bird while it is in use or being built; or
- Intentionally take or destroy the egg of any wild bird.

These offences do not apply to hunting of birds listed in Schedule 2 subject to various controls. Bird species listed on Schedule 1 of the Act receive further protection, thus for these species it is also an offence to:

- Intentionally or recklessly disturb any bird while it is nest building, or is at a nest containing eggs or young; or
- Intentionally or recklessly disturb the dependent young of any such bird.

Reptiles

The four widespread species of reptile that are native to Britain, namely common or viviparous lizard *Zootoca vivipara*, slow-worm *Anguis fragilis*, adder *Vipera berus* and grass snake *Natrix natrix*, are listed in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and are afforded limited protection under Section 9 of this Act. This makes it an offence to:

- Intentionally kill or injure any of these species.

The remaining native species of British reptile (sand lizard *Lacerta agilis* and smooth snake *Coronella austriaca*) receive a higher level of protection via inclusion under Schedule 2 of the Conservation of Habitats and Species Regulations 2017. They are afforded full protection under Section 9(4) of the Act and Regulation 43 of the Regulations (in England and Wales only) and the Wildlife and Countryside Act 1981 (as amended). The distribution of these species are restricted to only a few sites in England.

Species of Principal Importance in England

The Natural Environment and Rural Communities (NERC) Act came into force on 1st October 2006. Section 41 (S41) of the Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The England Biodiversity List is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of the NERC Act 2006, to have regard to the conservation of biodiversity in England, when carrying out their

normal functions. There are currently 943 species of principal importance included on the England Biodiversity List.

Appendix 5 Automated Detector Settings

SM2 Detector Settings

SM2 detectors can be calibrated in a number of different settings which can result in the potential variations in the way that bat calls are recorded. **Table 22** details the standard settings used by ECOSA during automated detector surveys undertaken.

Table 22: Standard SM2 settings

Option	Basic Setup
Settings - Audio	
Sample rate	192000Khz
Channels	Mono L (left)
Compression	WAV
Gain Left	+0.00
Gain Right	+0.00
Settings - Audio Advanced	
Dig High Pass Filter (HPF) Left	Fs/12
Dig High Pass Filter (HPF) Right	Off
Digital Low Pass Filter (LPF) Left	Off
Digital Low Pass Filter (LPF) Right	Off
Trig Lvl Left	12SNR
Trig Lvl Right	Off
Trg Win Left	2.0s
Trg Win Right	2.0s
Trg Max Length	2s
Bits (Div Ratio)	16
Nap Trg Lvl	Off

Data Conversion Settings

In order to analyse the data efficiently the raw .wav files recorded on the SM2 detector are subsequently converted to zero crossing (.zc) files which are subject to automated classification by Wildlife Acoustics Kaleidoscope Pro. During the conversion process the data is filtered to remove noise files in line with Wildlife Acoustics recommended setting as provided in **Table 23**.

Table 23: Noise File Filtering Settings

Option	Basic Setup
Signal of Interest – Frequency	8 – 120 kHz
Signal of Interest – Call Length	2 - 500ms
Signal of Interest – Minimum Number of Calls	2
Advanced Signal Enhancement	On

All filtered noise files are kept and subsequently assessed for bat calls in order to ensure that no bat calls have been incorrectly classified as noise. The “Advanced Signal Enhancement” setting discards files which Kaleidoscope assessed as being insufficient quality. Any discarded files are subsequently not stored by Kaleidoscope and therefore, not subject to analysis by an ecologist.

Appendix 6 Great Crested Newt eDNA Survey Results

Folio No: Auto Draft
Report No: 1
Order No: CASTLE AVENUE 2689
Client: ECOSA
Contact: Admin
Contact Details: admin@ecosa.co.uk
Date: 04/05/2017

TECHNICAL REPORT

ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS

Date sample received at Laboratory: 04/05/2017
Date Reported: 04/05/2017
Matters Affecting Results: None

RESULTS

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
31333	CASTLE AVENUE	SU 73060631	Pass	Pass	Pass	Negative	0

SUMMARY

When Great Crested Newts (GCN); *Triturus cristatus* inhabit a pond, they deposit traces of their DNA in the water as evidence of their presence. By sampling the water, we can analyse these small environmental DNA (eDNA) traces to confirm GCN habitation, or establish GCN absence.

The water samples detailed below were submitted for eDNA analysis to the protocol stated in DEFRA WC1067 (Latest Amendments). Details on the sample submission form were used as the unique sample identity.

RESULTS INTERPRETATION

Lab Sample No.- When a kit is made it is given a unique sample number. When the pond samples have been taken and the kit has been received back in to the laboratory, this sample number is tracked throughout the laboratory.

Site Name- Information on the pond.

O/S Reference - Location/co-ordinates of pond.

SIC- Sample Integrity Check. Refers to quality of packaging, absence of tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to results errors. Inspection upon receipt of sample at the laboratory. To check if the Sample is of adequate integrity when received. Pass or Fail.

DC- Degradation Check. Analysis of the spiked DNA marker to see if there has been degradation of the kit since made in the laboratory to sampling to analysis. Pass or Fail.

IC- Inhibition Check- PCR inhibitors can cause false results. Inhibitors are analysed to check the quality of the result. Every effort is made to clean the sample pre-analysis however some inhibitors cannot be extracted. An unacceptable inhibition check will cause an indeterminate sample and must be sampled again.

Result- NEGATIVE means that GCN eDNA was not detected or is below the threshold detection level and the test result should be considered as no evidence of GCN presence. POSITIVE means that GCN eDNA was found at or above the threshold level and the presence of GCN at this location at the time of sampling or in the recent past is confirmed. Positive or Negative.

Positive Replicates- To generate the results all of the tubes from each pond are combined to produce one eDNA extract. Then twelve separate analyses are undertaken. If one or more of these analyses are positive the pond is declared positive for the presence of GCN. It may be assumed that small fractions of positive analyses suggest low level presence but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive.

METHODOLOGY

The laboratory testing adheres to strict guidelines laid down in WC1067 Analytical and Methodological Development for Improved Surveillance of The Great Crested Newt, Version 1.1

The analysis is conducted in two phases. The sample first goes through an extraction process where all six tubes are pooled together to acquire as much eDNA as possible. The pooled sample is then tested via real time PCR (also called q-PCR). This process amplifies select part of DNA allowing it to be detected and measured in 'real time' as the analytical process develops. qPCR combines PCR amplification and detection into a single step. This eliminates the need to detect products using gel electrophoresis. With qPCR, fluorescent dyes specific to the target sequence are used to label PCR products during thermal cycling. The accumulation of fluorescent signals during the exponential phase of the reaction is measured for fast and objective data analysis. The point at which amplification begins (the Ct value) is an indicator of the quality of the sample. True positive controls, negatives and blanks as well as spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared so they act as additional quality control measures.

The primers used in this process are specific to a part of mitochondrial DNA only found in GCN ensuring no DNA from other species present in the water is amplified. The unique sequence appropriate for GCN analysis is quoted in DEFRA WC 1067 and means there should be no detection of closely related species. We have tested our system exhaustively to ensure this is the case in our laboratory. We can offer eDNA analysis for most other species including other newts.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. Kits are manufactured by SureScreen Scientifics to strict quality procedures in a separate building and with separate staff, adopting best practice from WC1067 and WC1067 Appendix 5. Kits contain a 'spiked' DNA marker used as a quality control tracer (SureScreen patent pending) to ensure any DNA contained in the sampled water has not deteriorated in transit. Stages of the DNA analysis are also conducted in

different buildings at our premises for added

SureScreen Scientifics Ltd also participate in Natural England's proficiency testing scheme and we also carry out inter-laboratory checks on accuracy of results as part of our quality procedures.

Reported by: Harry Neal

Approved by: Troy Whyte

End Of Report
