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Ecological Survey & Assessment
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OAKCROFT LANE,
STUBBINGTON, HAMPSHIRE

ECOLOGICAL IMPACT ASSESSMENT

Final Document (Rev. 1)

September 2020

Preliminary Ecological Appraisals • Protected Species Surveys and Licensing • NVC • EcIA • HRA • 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 2017 (CIEEM, 2017). The Ecological Impact Assessment and report has been prepared in line with the CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018) and survey work has been undertaken in line with references within CIEEM's Source of Survey Guidance (CIEEM, 2017).

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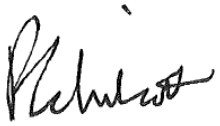
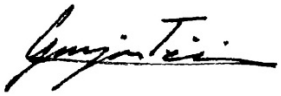
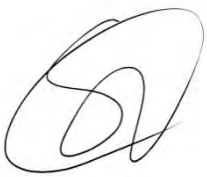
Author:	 **Richard Chilcott MSc MCIEEM** Principal Ecologist
Checked by:	 **Georgina Timmis BSc (Hons) MCIEEM** Principal Ecologist
Reviewed by:	 **Simon Colenutt BSc (Hons) MCIEEM CEnv** Managing Principal Ecologist

OAKCROFT LANE,

STUBBINGTON, HAMPSHIRE

ECOLOGICAL IMPACT ASSESSMENT

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EXECUTIVE SUMMARY

Ecological Survey and Assessment Ltd (ECOSA) have been appointed by Persimmon Homes Limited to undertake an Ecological Impact Assessment to support a planning application for the redevelopment of land at Oakcroft Lane, Stubbington. The site is located on the edge of Stubbington, Hampshire and comprises two agricultural fields with boundary vegetation and a small copse to the south-west of the site. The proposals entail erection of 209 dwellings with new access from Peak Lane and stopping up a section of Oakcroft Lane together with car parking, landscaping, Public Open Space and associated works. The land to the north of Oakcroft Lane is to be removed from agricultural use as a result of the development and delivered as an Ecological Enhancement Area. The main findings of the Ecological Impact Assessment are:

- Solent and Southampton Water SPA/Ramsar site and Titchfield Haven SSSI are present approximately 320 metres to the west of the site. The impact assessment associated with internationally designated sites is considered further within a site-specific Shadow Habitat Regulations Assessment.

- The habitats within the site have generally been assessed as having local value with the key features being the woodland copse, hedgerows and mature trees.

- The site supports foraging and commuting bats, badger, breeding and wintering birds and a low population of common lizard present immediately to the western site boundary. The site has also been assessed as having suitability to support tree roosting bats.

- In the absence of mitigation and compensation the proposals have the potential to result in negative effects on protected species. A range of mitigation measures have been proposed including sensitive clearance methods and retention and protection of key ecological features.

- The proposals will deliver an enhancement over the existing situation with opportunities to deliver new native species planting and habitat features throughout the site. This has been confirmed though the Biodiversity Impact Calculation undertaken which is due to be submitted with the planning application.

- Given the impacts identified, and the mitigation and compensation measures proposed, it is considered that the proposals accord with all relevant local and national planning policy in relation to ecology.

- Given the impacts identified, and the mitigation, compensation and enhancement measures proposed it is considered that the proposals accord with all relevant local and national planning policy.

1.0 INTRODUCTION

1.1 Background

Ecological Survey & Assessment Limited (ECOSA) have been appointed by Persimmon Homes Limited to undertake an Ecological Impact Assessment to support a planning application for the redevelopment of land at Oakcroft Lane, Stubbington, Hampshire PO14 2EB (hereafter referred to as the site).

ECOSA has previously undertaken a range of ecological survey work at the site with an extended Phase 1 ecological assessment originally undertaken in February 2014 (ECOSA, 2015) and subsequent protected species surveys including bat activity, reptile surveys and great crested newt surveys undertaken in 2015 (ECOSA, 2015) and a suite of wintering bird surveys undertaken between 2014 and 2016 (ECOSA, 2015) (ECOSA, 2015) (ECOSA, 2016). It should be noted that the red line boundary of the site has been significantly reduced since the previous survey work and that a large proportion of the site surveyed in the previous reports lies outside of the current redline boundary.

Given the length of time since the completion of this survey work ECOSA were subsequently instructed to undertake an Updating Preliminary Ecological Appraisal of the site in 2017 (ECOSA, 2018). A subsequent update of various elements of the survey work was undertaken in 2018 in order to inform the Ecological Impact Assessment to support the planning application.

A planning application for the development of the site for 261 residential dwellings was submitting to Fareham Borough Council on 14th March 2019. The planning application was subsequently refused on 22nd August 2019 including a number of reasons in relation to the ecology.

The proposals for the site have subsequently been revised and a new planning application for 209 was submitted in June 2020. Following comments received from Hampshire County Council Ecology Team and Natural England and subsequent discussions with the consultees this document has been updated accordingly.

This Ecological Impact Assessment will be submitted in support of the new planning application in combination with a Biodiversity Impact Calculator (ECOSA, 2020), Shadow Habitats Regulations Assessment (ECOSA, 2020) and Ecological Management Plan (ECOSA, 2020). Reference is made to these three documents throughout this report, where relevant.

1.2 The Site

The site is located in Stubbington, Hampshire, centred on National Grid Reference (NGR) SU 5536 0454 (**Map 1**). The Phase 1 habitat map (**Map 2**) depicts the boundary of the site.

The site covers approximately 17.8 hectares and comprises two agricultural fields with boundary vegetation and a small copse to the south-west of the site. The site is bounded to the south and east by existing residential development, to the north-east by Peak Lane, and to the north by agricultural fields, including the area of land proposed for the construction of the consented Stubbington Bypass. Crofton Ditch with associated vegetation and Crofton Cemetery bounds the west of the site whilst a ditch is also present in the south of the site. The northern and southern parcels of land are bisected by Oakcroft Lane.

The wider landscape comprises Stubbington to the south and Fareham to the north and east. To the west lies open countryside comprising agricultural fields with associated boundary vegetation, occasional areas of woodland and the River Meon. The Solent lies towards the south and west separated from the site by open countryside and existing residential development.

1.3 Aims and Scope of Report

The information within this report is based on a field survey and desktop study and relevant species-specific surveys carried out between September 2017 and March 2020. The report describes the habitats and species (hereafter referred to as ecological features) within the site's Zone of Influence (Paragraph 3.2), and provides a detailed assessment of potential ecological effects of the proposed development of the site. It identifies the need for any measures to avoid, mitigate or compensate for significant adverse effects[1] ecological features and outlines enhancements to the site's ecology to be implemented as part of the development. The objectives of the assessment are:

- To provide baseline information on ecological features within the site's Zone of Influence and determine the importance of these features;
- To assess, characterise and quantify the effects on ecological features, including cumulative effects, and identify significant effects in the absence of any mitigation;

[1] For the purposes of this assessment a 'significant' adverse effect is one which will have an adverse effect on the ecological feature at the site level or higher.

- To set out measures to avoid, mitigate and compensate for significant ecological effects in accordance with the 'mitigation hierarchy'[2];
- To provide an assessment of the significance of any residual effects;
- To outline opportunities for enhancement in order to achieve a net gain for biodiversity; and
- To set out the requirements for any post-construction monitoring.

1.4 Site Proposals

The proposals entail erection of 209 dwellings with new access from Peak Lane and stopping up of Oakcroft Lane together with car parking, landscaping, Public Open Space and associated works. The land to the north of Oakcroft Lane is to be removed from agricultural use as a result of the development and delivered as an Ecological Enhancement Area.

The Ecological Impact Assessment is based on the Site Layout produced by Persimmon Homes Limited, dated March 2019 (Drawing No. A-02-015-SL Revision F) (**Appendix 1**).

Planning permission is being sought during 2020 with construction proposed to commence in late 2020/early 2021.

[2] In accordance with CIEEM Ecological Impact Assessment guidance (CIEEM, 2018) 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'.

2.0 PLANNING POLICY CONTEXT

2.1 Introduction

This section summarises the planning policy in relation to ecology and biodiversity within the Fareham 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, compensation and enhancements (see Section 5.0).

2.2 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 a revised NPPF published in February 2019. 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 the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.*".

The NPPF sets out that development proposals should 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 and providing net gains for 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 habitats[3], including ancient woodland[4]. Where loss to irreplaceable habitats occurs planning permission would normally be refused unless there are wholly exceptional reasons and an adequate compensation strategy is in place. Paragraph

[3] 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."*

[4] Natural England defines ancient woodland as "An area that has been wooded continuously since at least 1600 AD. It includes ancient semi-natural woodland and plantations on ancient woodland sites (PAWS)."

175 also states "*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 SPAs, 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*". 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 Project Development, is established before planning permission is granted*".

2.3 Local Policy

Local planning policy within Fareham Borough is provided by the adopted Core Strategy August 2011 and polices within the Fareham Borough Council Local Plan, adopted June 2015. A total of two policies within the Local Plan specifically refer to ecology and biodiversity:

- **Policy DSP13**: Nature Conservation. This policy refers to the protection and enhancement of designated sites and sites of nature conservation and protected species and their habitats. Where development may cause a detrimental impact, it may be considered if the impacts are outweighed by the benefits of the development and adverse impacts can be minimised and provision is made for mitigation and, where necessary, compensation for those impacts is provided.

- **Policy DSP14**: Supporting Sites for Brent Geese and Waders. Development on "uncertain" sites for Brent geese and/or waders may be permitted where studies have been completed that clearly demonstrate that the site is not of 'importance'. Development on 'important' sites for Brent Geese and/or Waders, may be granted planning permission where it can be demonstrated that there is no adverse impact on those sites, or appropriate avoidance and/or mitigation measures to address the identified impacts, and a programme for the implementation of these measures, can be secured.

In addition to these policies, a single policy within the adopted Core Strategy refers to ecology and biodiversity:

- **Policy CS4**: Green Infrastructure, Biodiversity and Geological Conservation. This policy is a largely an all-encompassing policy which refers to the protection of designated sites and important habitats. The policy also refers to the need to have regard for Biodiversity Opportunity Areas and targets within the local, regional and national Biodiversity Action Plans (BAP). The policy also refers to the importance to incorporate networks of green infrastructure and to the implementation of a strategy in order to minimise recreational impacts on European sites.

A number of policies within the draft Local Plan 2036 also make reference to ecology including draft Policies NE2 and NE3 which largely reflect the aims and objectives of the adopted local planning policies.

3.0 METHODS

3.1 Introduction

This section details the methods employed during the Ecological Impact Assessment. Any significant limitations to the assessment are also considered.

3.2 Zone of Influence

To define the total extent of the study area for this assessment, the proposed scheme was reviewed to establish the spatial scale at which ecological features could be affected[5]. The appropriate survey radii for the various elements of the assessment (i.e. desktop study, field survey and species-specific surveys) 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 assessment, its surroundings and the nature of the proposals.

3.3 Scoping

Protected species considered within the Ecological Impact Assessment are those species/species groups considered likely to be encountered given the geographical location and context of the site. Where the site was found to be suitable to support these species/species groups, and adverse effects cannot be avoided from the outset, further species-specific surveys are undertaken. 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 assessment of ecological effects and mitigation/compensation measures section (Section 5.0) of this report.

3.4 Desk Study

3.4.1 Biological Records Centre

Hampshire Biodiversity Information Centre (HBIC) was consulted on 31st March 2020 for the following data:

- Records of non-statutory designated sites (Sites of Importance for Nature Conservation (SINCs) within one kilometres of the site boundary and also records of Solent Wader and Brent Goose Strategy sites. See **Appendix 2** for details; and
- Records of legally protected and notable species (flora and fauna) within one kilometres of the site boundary, including Species of Principal Importance (**Appendix 3**); and

[5] 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 (CIEEM, 2018).

- 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.

3.4.2 Multi-Agency Geographic Information for the Countryside

The Multi-Agency Geographic Information for the Countryside (MAGIC) database (DEFRA, 2020) was reviewed on 25th March 2020 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 two kilometres of the site. See **Appendix 2** for details. 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 species, particularly those specifically mentioned in local planning policy. 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 or Bat Low Impact Class Licences (BLICLs) 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.

3.4.3 Other Sources of Information

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. These habitats may offer resources and connectivity between the site and suitable habitat in the local area, which may be exploited by local species populations.

The presence of ponds or other waterbodies within a 500 metre radius of the site in particular are noted in relation to great crested newt. 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 guidance (English Nature, 2001).

A range of previous ecological survey work has been undertaken at the site by ECOSA between 2014 and 2016 with reference to the following reports made where relevant:

- Extended Phase 1 Ecological Assessment and Wintering Bird Surveys (ECOSA, 2015) dated 9th December 2015;

- Phase 2 Ecological Assessment (ECOSA, 2015) (comprising bat transect surveys, reptile surveys and great crested newt surveys) dated 9th December 2015 (also included in **Appendix 4**);
- Wintering Bird Surveys 2014-2015 (ECOSA, 2015) dated 8th June 2016; and
- Wintering Bird Surveys 2015-2016 (ECOSA, 2016) dated 8th June 2016.

A range of other survey work has been undertaken at the site and the surrounds in order to support planning application for the Stubbington Bypass to the north. Where relevant, this publicly available information is referred in order to inform the baseline ecological condition of the site.

3.5 Field Survey

3.5.1 Survey Methods

The field survey broadly followed standard Phase 1 habitat survey methodology (JNCC, 2010) and included a search for evidence of, and an assessment of the site's suitability to support, protected and notable species as recommended by CIEEM (CIEEM, 2017). 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 provided, where relevant. For ease of reference, Target Notes (TN) depict locations of particular ecological interest or features which are too small to map.

Phase 1 Habitat Survey

An assessment was made of all areas of vegetation within the site based on the standardised Phase 1 habitat survey methodology (JNCC, 2010). 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 species[6] encountered as an incidental result of the survey recorded.

Protected and Notable Species Appraisal

A preliminary appraisal of the site's suitability to support legally protected and notable species was carried out. Specific methods for species/species groups considered during the appraisal are provided in **Appendix 4**.

[6] 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.

3.5.2 Survey Details

The field survey was carried out by Richard Chilcott, Principal Ecologist of ECOSA on 19th October 2017. The weather conditions were drizzle and overcast with approximately 100% cloud cover, an ambient temperature of 15°C and no wind.

A second updating field survey was carried out by Richard Chilcott, Principal Ecologist of ECOSA on 11th March 2020. The weather conditions were dry with approximately 90% cloud cover, an ambient temperature of 11°C and a light easterly breeze.

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

3.5.3 Field Survey 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 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.

Online mapping resources provide an indication of habitat features present in the wider area, but do not provide a detailed assessment of habitat types.

Not all potential bat roosting features are accessible to the surveyor, e.g. holes or cracks in trees, and therefore assessments are based upon the potential for these features to provide suitable roosting opportunities.

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.

A number of areas of the site could not be fully accessed as part of the survey undertaken as a result of areas of dense vegetation present within the woodland and other boundary vegetation.

A large number of trees are present within the site. Therefore, it was not possible to fully inspect each individual tree to make an assessment for its suitability to support roosting bats.

3.6 Bat Survey

3.6.1 Survey Methods

Bat Transect Survey

Bat transect surveys were undertaken with reference to current best practice guidelines (Collins, 2016). A single survey visit was undertaken on a monthly basis between July and October 2018 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, walking the same transect route on each survey with start and end points varied on each survey visit. 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 route was split into equal sections and was walked at a steady speed so that the activity levels on each section and from each survey are comparable.

At the end of each transect survey, data was downloaded and then analysed using BatExplorer (Version 2.0). This program is designed to analyse bat call data by identifying key call characteristics such as call shape, call length, call 'distance' (i.e. the time period between two consecutive calls) and peak frequency,

The species calls were subsequently checked manually by a suitably qualified ecologist using the spectrogram feature of BatExplorer to verify their identities. Where suitable recordings were obtained, bats were identified to species level. For some groups, notably long-eared bat species[7] and *Myotis*[8] bat species, specific identification was not always possible.

The GPS feature of the Batlogger M allows the location of the surveyor at the time of each bat call registration to be recorded. This data is exported to BatExplorer and used to create a 'heat map' of activity at the site for each bat species recorded.

[7] 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.

[8] 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.

The GPS feature shows the location of the surveyor when the registration was recorded, not the location of the bat. Where bats were heard but not seen it has been assumed that they are flying in the vicinity of the surveyor. Where bats were seen some distance from the surveyor the locations of these bats were noted.

Bat Automated Detector Survey

In addition to the transect surveys automated detector surveys were undertaken with reference to current best practice guidelines (Collins, 2016) between July and October 2018 inclusive.

Two Wildlife Acoustics Song Meter 2 (SM2+) with SMX-U1 microphones were deployed at the site for five consecutive nights each month between in July, September and October 2018.

The automated detectors were secured in suitable habitat with the microphone 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 automated detectors are provided in **Appendix 7**.

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 automated detectors were deployed are provided in (**Map 4**).

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 4.5.5). This program is designed to analyse large volumes of bat call data using an automated classifier (Bats of United Kingdom Version 3.1.3). More information on the settings used for the conversion process are provided in **Appendix 7**.

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 species[7] and *Myotis*[8] 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 provides 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.

3.6.2 Survey Details

Bat Transect Survey

The bat transect surveys were undertaken between July and October 2018 with a total of four 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 Time
30th July 2018	Dusk	20:54 – 23:02	21-19°C, dry and overcast, 90% cloud cover and a light breeze	20:54
29th August 2018	Dusk	19:56 – 22:35	18°C, dry and overcast, 80% cloud cover and a light breeze	19:56
25th September 2018	Dusk	18:57 – 20:57	15-10°C, dry and clear, 10% cloud cover and a light breeze	18:57
18th October 2018	Dusk	18:06 – 20:06	16-13°C, dry and clear, 15% cloud cover and a light breeze	18:06

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

Bat Automated Detector Survey

The automated detector surveys were undertaken between July and October 2018 with a total of 25 nights recording undertaken.

Table 2 provides details of each recording period.

Table 2: Automated detector survey details

Survey Period	Date	Weather Conditions[9]				Sunset	Sunrise
		Temperature (°C)		Wind (km/h)	Precipitation (mm)		
		High	Low				
July 2018	26th	31	14	10	0.0	20:59	05:23
	27th	25	16	6	0.0	20:57	05:25
	28th	19	14	20	0.0	20:56	05:26
	29th	18	15	11	0.0	20:55	05:27
	30th	23	15	19	0.0	20:53	05:29
September 2018	21st	17	9	13	0.0	19:05	06:50
	22nd	12	10	9	0.0	19:03	06:52
	23rd	13	8	7	0.0	19:00	06:53
	24th	14	2	0	0.0	18:58	06:55
	25th	16	-1	0	0.0	18:56	06:56
October 2018	18th	14	8	6	0.0	18:06	07:34
	19th	15	4	0	0.0	18:04	07:35
	20th	17	2	2	0.0	18:02	07:37
	21st	18	4	7	0.0	18:00	07:39
	22nd	12	2	4	0.0	17:58	07:40

The automated detectors were deployed by a suitably experienced ECOSA ecologist. The detector programming and data analysis was conducted by Helen Butt, Lucy Bartlett and Hugh Turner of ECOSA.

3.6.3 Survey Limitations

Some bat species, e.g. long-eared bats *Plecotus* species[7], generally emerge from their roosts in total darkness and do not produce strong echolocations, and therefore these

[9] Weather data is sourced from online weather data and taken from the nearest available weather station (Weather Underground, 2018)

bats can be difficult to observe and record during bat surveys, leading to under-recording.

As a result of the time of year which the surveys were commissioned it was not possible to complete a single transect survey and deploy automated detectors each month between April and October as recommended within the Bat Conservation Trust guidelines. However, given that a total of four transect survey visits and three deployments were undertaken coupled with automated detectors surveys between July and October 2018 and the existing baseline data gathered for the site as part of the 2015 surveys, it is considered that a robust assessment of the usage of the site by foraging and commuting bats can be made.

Due to a change in the red line boundary from the original survey boundary a single detector was placed in a field to the west of the current red line during the July survey period. This data has still been included in this report as it provides context on the bat species using habitat directly connected to the site.

Due to equipment failures there was no data from the month of August. In addition, the detector deployed at Location 5 in October also failed. However, a month by month comparison can still be made through adjusting the number of nights recording using an Activity Index.

The quality of both hand-held and 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 height (Collins & Jones, 2009), which would be out of the recording range for the detectors.

3.7 Badger Survey

3.7.1 Survey Methods

The survey involved a detailed investigation of the site and its immediate boundaries where access was possible to identify evidence of badger residence, foraging or territorial activity. This evidence can take the form of latrines, setts, paths between setts or leading to feeding areas, scratching posts at the base of tree trunks, hair traces, snuffle holes formed during foraging, and footprints (Reynolds & Harris, 2005).

Where badger paths were identified these were back tracked in order to establish whether they led to any sett entrances.

Where setts are identified, the location of entrances and direction in which they are travelling are plotted and an assessment of the made of the level of activity of each entrance. If badger setts are considered to be potentially vulnerable to interference, this information, the assessment of impacts on these setts, and proposed mitigation, is provided in a separate confidential annex. The status of setts and level of activity (where appropriate) has been based on standard terminology as detailed in **Appendix 8**.

3.7.2 Survey Details

The badger survey was carried out by Richard Chilcott, Principal Ecologist of ECOSA on 24th October 2018. The weather conditions were clear and sunny with approximately 20% cloud cover, an ambient temperature of 14°C and a gentle breeze.

3.7.3 Survey Limitations

The survey was undertaken at a time of year when vegetation cover was dense. Therefore, it was not possible to access certain areas of dense vegetation. Any areas where obvious paths were present, but which could not be accessed, were noted. However, a number of survey visits have been undertaken across the site between 2014 and 2016 and, therefore, additional records from these survey visits augments this information.

Access was only possible to the site and any publicly accessible areas immediately adjacent to the site. Therefore, inaccessible areas offsite have yet to be fully surveyed for the presence/absence of badger.

3.8 Reptile Survey

3.8.1 Survey Methods

The reptile survey was undertaken in accordance with current best practice guidelines (Froglife, 2015).

The reptile survey consisted of the laying bitumen felt mats approximately 500 millimetres x 500 millimetres in areas of suitable habitat on and immediately adjacent to 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. Survey 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.

During each visit 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.

3.8.2 Survey Details

A total of 60 reptile refugia were distributed on 31st July 2018 with seven inspection visits undertaken between 21st August 2018 and 27th September 2018. **Table 3** provides details of each reptile survey.

Table 3: Reptile survey details

Survey Date	Air Temperature (°C)	Weather Conditions
21st August 2018	20°C	Dry and sunny, 40% cloud cover with a light wind
3rd September 2018	17°C	Warm and sunny, 15% cloud cover with a light wind
7th September 2018	16°C	Dry, 30% cloud cover with a gentle breeze
11th September 2018	18°C	Overcast and mild, 100% cloud cover with a light wind
17th September 2018	16°C	Dry, 70% cloud cover with a light wind
21st September 2018	16°C	Sunny but windy, 40% cloud cover with a moderate breeze
27th September 2018	10°C	Dry and sunny, 0% cloud cover with a light wind

The reptile survey was coordinated by Richard Chilcott, Principal Ecologist of ECOSA assisted by suitably experienced ECOSA surveyors.

3.8.3 Survey Limitations

There were no significant limitations to the reptile survey.

3.9 Great Crested Newt Survey

3.9.1 Survey Methods

Environmental DNA (eDNA) Survey

The great crested newt environmental DNA (eDNA) sampling was undertaken following current best practice guidelines (Biggs, et al., 2014).

eDNA analysis was undertaken to establish the presence / likely absence of great crested newt from within two ponds situated to the south of the site. Pond 1 was recorded as being dry at the time of survey on 13th May 2019.

The field sampling entailed the collection of 20 samples of 30 millilitres of water from pre-selected sub-sampling sites around the margin of each 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 millilitres are taken each of which is preserved in 35 millilitres of ethanol. The samples are then refrigerated until analysis in a laboratory. The samples were sent to SureScreen testing service for analysis which was undertaken in line with current guidance. 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 indicating the presence or likely absence of the species from a given waterbody is a valid result.

3.9.2 Survey Details

Environmental DNA (eDNA) Survey

The eDNA sampling was carried out by Brian Hicks, Senior Field Ecologist of ECOSA (Natural England Great Crested Newt Licence No. 2016-19622-CLS-CLS) and Jack Medley, Field Ecologist of ECOSA on 13th May 2019.

3.9.3 Survey Limitations

There were no significant limitations to the great crested newt survey.

3.10 Criteria used to Assess Ecological Value

The evaluation criteria used in this report are based on ECOSA's professional judgement and publicly available publications, survey data and other sources as referenced in the main text. The evaluation is based on a sliding scale of importance as follows; international and European, national, regional, county, local and site. There are a wide range of characteristics which contribute to the importance of ecological features, and these may justify an increase or reduction in the value of an ecological feature. Where deviations occur, these will be explained in the evaluation section of this report (Section 4.0). Current published relevant guidance, including information sources such as A Nature Conservation Review (Ratcliffe, 1977) and Guidelines for Ecological Impact Assessment in the United Kingdom (CIEEM, 2018) have also been used to inform the assessment.

4.0 BASELINE ECOLOGICAL CONDITIONS AND EVALUATION

4.1 Introduction

This section details the results of the Ecological Impact 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 findings of the field survey and subsequent protected species surveys. This section also provides an assessment of the ecological value of ecological features present at the site.

4.2 Statutory and Non-statutory Designated Sites

4.2.1 Baseline Ecological Conditions

Details of designated sites are provided in the paragraphs below.

Statutory Designated Sites

There are five statutory designated sites of nature conservation interest situated within one kilometre of the site boundary. These are:

- Solent and Southampton Water Ramsar site – located 320 metres west of the site. The site is designated under Ramsar Criterion 1, 2, 5 and 6 for its internationally important wetland habitats, plant and invertebrate diversity and breeding/wintering bird populations;

- Solent and Southampton Water SPA – located 320 metres west of the site. The site is designated for supporting populations of European importance of both breeding and over-wintering wildfowl and waders;

- Titchfield Haven SSSI – located 320 metres west of the site. The site is designated for supporting nationally important wetland habitats and associated plants, bird population and invertebrates;

- Titchfield Haven NNR – located 820 metres west of the site. The site is designated for its open water habitat and is under the ownership of Hampshire County Council; and

- Titchfield Haven LNR – located 980 metres south-west of the site. This is designated as an important winter refuge for ducks, geese and wading birds whilst the site also provides a breeding ground for avocet *Recurvirostra avosetta*.

In addition, there are three sites for which the Zone of Influence has been extended due to potential increase in recreational pressure either alone or in-combination with other plans or projects:

- Portsmouth Harbour Ramsar site – located 2.2 kilometres to the east of the site. Designated for supporting wetlands of international importance and a population of dark-bellied brent goose *Branta bernicla bernicla*.

- Portsmouth Harbour SPA – located 2.2 kilometres to the east of the site. The site is designated for supporting a population of dark-bellied brent goose of European importance.

- Solent Maritime SAC – located five kilometres to the west of the site. Designated for supporting Annex I wetland habitats of European importance.

Further details of the statutory designations listed above are provided in **Appendix 9**.

Non-Statutory Designated Sites

There are four non-statutory designated sites of nature conservation situated within one kilometre of the site boundary. These are:

- Oxleys Copse SINC – 510 metres north-west of the site. This site is designated for supporting semi-natural ancient woodland;

- Tips Copse SINC – 790 metres south-east of the site. This site is designated for the presence of semi-natural ancient woodland.

- Hollam Hill Farm Meadows (Meon Valley) SINC – 930 metres west of the site. This site is designated for semi-improved grassland which retain a significant element of unimproved grassland; and

- Vicarage Meadow SINC – 950 metres south of the site. This site is designated for its grassland which have become impoverished through inappropriate management, but which retain significant elements of relic unimproved grassland to enable recovery.

In addition to the above non-statutory designated sites there are a number of Solent Wader and Brent Goose Strategy sites (Whitfield, 2017) present within the search area including two within the red line boundary. These are a network of sites which have been identified as being used by overwintering birds that functionally support the Solent's SPA's (including those listed above). Those identified within a one kilometre radius of the site are:

- F17C Secondary Support Area – within the site boundary;

- F17D Low Use – within the site boundary;

- F17M Low Use – immediately adjacent to eastern site boundary (separated by Peak Lane);
- F32 Low Use – approximately 80 metres west of the site;
- F28A Low Use – approximately 130 meters west of the site
- F17B Low Use – approximately 150 metres north of the site;
- F76 Secondary Support Area – approximately 240 metres east of the site;
- F31 Low Use – approximately 280 metres west of the site;
- F17N Low Use – approximately 330 metres east of the site;
- F17O Low Use – approximately 360 metres east of the site.
- F17J Low Use – approximately 400 metres north-east of the site;
- F29 Low Use – approximately 740 metres west of the site; and
- F29 Low Use – approximately 950 metres north-west of the site.

Further information on sites designated for nature conservation are provided in **Appendix 2**.

In addition, the northern field and the south-eastern woodland are marked as Network Opportunities in the Hampshire Ecological Network. These are mapped to allow proposals to focus on delivering net gain through retaining and enhancing strategic areas of habitat. Given that these are not designated sites in their own right they are not evaluated as part of this Ecological Impact Assessment. However, consideration is given to this in the development of any mitigation, compensation and enhancement measures.

4.2.2 Evaluation

Ramsar sites are designated at the international level and therefore, of international value, SPAs and SACs are of European value whilst SSSIs and NNRs are of national value. The SINCs returned as part of the desktop study are of county value. Whilst the LNR itself may be of only local value. Titchfield Haven LNR is part of a larger network of international and nationally important sites. The Solent Wader and Brent Goose Strategy Sites are not designated at a geographic frame of reference individually, however, the network as a whole is functional linked to the Solent SPAs and, therefore, taken as a whole the network is of international importance.

4.3 Habitats

4.3.1 Baseline Ecological Conditions

Desktop Study Results

The HBIC search identified a number of records of notable plant species within the search area. Three records were recorded immediately adjacent to the site. A record of the Species of Principal Importance cornflower *Centaurea cyanus* was recorded immediately adjacent to the western site boundary in 2003, a record of strawberry clover *Trifolium fragiferum* to the immediately south-west in 2011 and butcher's-broom *Ruscus aculeatus* to the immediate east in 1999.

A review of the MAGIC database also identified an area of semi-natural ancient woodland, Oxley's Copse, situated approximately 570 metres to the north-west of the site. A review of the MAGIC database also identified the potential presence of the priority habitat broad-leaved deciduous woodland in the south-west of the site.

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 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:

Arable

The vast majority of the site comprises arable farmland which has been recorded in various states of use by ECOSA during surveys undertaken between 2014 and 2020 and is subject to regular ploughing (**Figure 1**). At the time of the updating survey in 2020 the field had begun to recolonise with typical early colonising species such broad-leaved dock *Rumex obtusifolius*, willowherb *Epilobium* species, red dead-nettle *Lamium purpureum*, spear thistle *Cirsium vulgare*, groundsel *Senecio vulgaris* and greater plantain *Plantago major* (**Figure 2**). During the survey work it was also noted that initial works associated with the Stubbington Bypass were commencing at the boundary of the northern field. However, the site is still in active agricultural management.

Figure 1: Arable farmland south of Oakcroft Lane (2018)

Figure 2: Arable farmland south of Oakcroft Lane (2020)

Tall Ruderal Vegetation

A large area of tall ruderal vegetation is present in the south-eastern corner of the site (**TN1** and **Figure 3**) which also contains patches of scrub. Species recorded within this habitat include broad-leaved dock, common nettle *Urtica dioica*, common field-speedwell *Veronica persica*, willowherb *Epilobium* species, common ragwort *Senecio jacobaea* and hogweed *Heracleum sphondylium* as well as areas of scrub including bramble *Rubus fruticosus* aggregate and elder *Sambucus nigra*.

Figure 3: Tall ruderal vegetation situated to the south of the site

Hedgerows

The site contains a number of hedgerows typical of an agricultural setting. These hedgerows are described in **Table 4**.

Table 4: Hedgerows within the site

Target Note Reference on Map 2	Classification	Hedgerow Description
TN2	Intact Species-Rich	This hedgerow is a mature tree line which is present on the eastern boundary of the site. The hedgerow contains occasional gaps and areas dominated by scrub. Species recorded included pedunculate oak *Quercus robur*, blackthorn *Prunus spinosa*, elder, dog-rose *Rosa canina*, hazel *Corylus avellana*, privet *Ligustrum* species, holly *Ilex aquifolium*, ash *Fraxinus excelsior*, *Cotoneaster* species, Leyland cypresses *XCupressocyparis leylandii*, cherry *Prunus* species, hawthorn *Crataegus monogyna*, and bramble. Species recorded within the ground flora include ivy *Hedera helix*, common nettle, creeping thistle *Cirsium arvense*, groundsel, cleavers *Galium aparine*, dandelion *Taraxacum officinale* aggregate, lesser burdock *Arctium minus*, lords and ladies *Arum maculatum*, common field-speedwell and creeping buttercup *Ranunculus repens*. The hedgerow appears to be subject to generally limited management. A ditch runs adjacent to this hedgerow which was dry at time of survey.
TN3	Defunct Species-Rich	This hedgerow contains a number of mature trees and gappy areas of scrub. The hedgerow runs adjacent to a ditch and is connected to the woodland in the south. Species recorded include pedunculate oak, cherry, bramble, dog rose *Rosa cannia*, willow *Salix* species and hawthorn with species within the ground flora largely similar to the adjacent hedgerows with an area of common reed *Phragmites australis* present. The hedgerow appears to be subject to generally limited management. A shallow ditch is present along the hedgerow and this contained some stagnant area of shallow water at the time of survey.
TN4	Intact Species-Rich	Hedgerow running along the western boundary of the southern field which was recorded as being largely scrubby and up to 1.5-2 metres in height. Species present include hawthorn, sycamore, cherry, dog rose, holly and bramble with burdock, honeysuckle *Lonicera periclymenum* and false oat-grass *Arrhenatherum elatius* recorded in the ground flora. This hedgerow appears to be subject to regular management.
TN5	Defunct Species-Poor	This hedgerow is gappy and defunct and forms more of a line of scrub set along a ditch. Species present include blackthorn, ash, alder *Alnus glutinosa* and willow. This has been cut to ground level in part at the time of survey and lacks connectivity to the north. The ditch was recorded as being dry at the time of survey.
TN6	Intact Species-Rich	This hedgerow is situated adjacent to a ditch and is generally unmanaged approximately three metres in height. Species present include pedunculate oak, blackthorn, holly *Ilex aquifolium*, willow, hazel and hawthorn. The hedgerow appears to be subject to generally limited management. The ditch has been recorded as dry on a number of site visits but contained a flow following high rainfall in 2020.

Scattered Scrub

Areas of scrub are present scattered around the margins of the site largely comprising areas of bramble and occasional blackthorn.

Broad-leaved Woodland

The woodland in the south-western corner of the site (**TN7** and **Figure 4**) has an open canopy in a number of places. Species recorded within this woodland include pedunculate oak, yew *Taxus baccata*, hawthorn, blackthorn, sycamore, ash, field maple *Acer campstre*, willow and holly. The ground flora is relatively sparse with species recorded including lords and ladies, lesser celandine, ivy, cleavers, lesser burdock, cow parsley *Anthriscus sylvestris*, wood avens *Geum urbanum*, common nettle and hogweed. A number of areas of fallen and standing deadwood were recorded within the woodland. A well-worn footpath also runs through the woodland connecting south housing estate to the south to Crofton Cemetery to the east.

Figure 4: Woodland in southern area of site

Tree line

The northern boundary of the southern field is formed by a line of poplars *Populus* species with only very limited scrub layer including ash saplings and bramble (**TN8** and **Figure 5**).

Figure 5: Tree line forming northern boundary of southern field

Scattered trees

A number of scattered trees are present throughout the site and at the margins with species including ash and pedunculate oak.

Watercourse

A single wet ditch is present running though the woodland in the south-west of the site (**Figure 6**). This is shallow, with a limited flow and little to no aquatic vegetation.

Figure 6: Wet ditch running through woodland to the south-west of the site

A number of shallow ditches are also present associated with hedgerows which have been recorded as being dry with the exception of the ditch running adjacent to TN6 which has been recorded as dry on many occasions by ECOSA. However, during the 2020 survey after a period of prolonged rainfall this was recorded a supporting a flow into Crofton Ditch to the west.

4.3.2 Evaluation

No material change in habitats was recorded at the site between the survey work undertaken in 2014 and subsequent updates undertaken between 2017 and 2020.The habitats within the site are dominated by arable with occasional areas of grassland and ruderal vegetation which are assessed as having no more than site value. The features of relatively greater ecological interest in terms of the site are the woodland (which is the Habitat of Principal Importance lowland mixed deciduous woodland), mature trees and hedgerows which are assessed as being of local value. However, these habitats are relatively widespread within the wider area and would not meet HBIC criteria for designation as a SINC (and thus of country importance).

4.4 Bats

4.4.1 Baseline Ecological Conditions

Desktop Study Results

A large number of bat records were returned by HBIC within two kilometres of the site boundary including a number of confirmed records of roosts for pipistrelle *Pipistrellus* species[10], common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus* and brown long-eared bat *Plecotus auritus*. The nearest roost record returned was for a maternity roost of pipistrelle species recorded approximately 330 metres to the south-east of the site in 2004.

Field records of other species recorded within two kilometres of the site include serotine *Eptesicus serotinus*, *Myotis* bat species[11], Daubenton's bat *Myotis daubentonii*, whiskered/Brant's bat *Myotis mystacinus/Brandtii*, noctule *Nyctalus noctule,* long-eared bat *Plecotus* species[12], Nathusius pipistrelle *Pipistrellus nathusii*, Leisler's bat *Nyctalus leisleri* and barbastelle *Barbastella barbastellus*.

Previous bat activity surveys undertaken at the site by ECOSA in 2015 recorded the presence of common pipistrelle, soprano pipistrelle, serotine, *Myotis* bat species, long-eared bat and noctule across the site. The activity recorded was dominated by common pipistrelle with the site assessed as being of local value for foraging and commuting bats overall.

A review of the MAGIC database identified a single EPSM licence in respect of bats granted for the destruction of a resting place of soprano pipistrelle and common pipistrelle in 2013.

[10] There are three species of pipistrelle bat, the common pipistrelle *Pipistrellus pipistrellus*, the soprano pipistrelle *Pipistrellus pygmaeu*s and the Nathusius' pipistrelle *Pipistrellus nathusii*. The species can be separated by their echolocations, examination of physical characteristics and Phylogenetic Analysis Identification of bat droppings. Unless confirmation of identification has been made by visual identification the three species shall be referred to in this report as pipistrelle bat. All three species will roost in similar locations within buildings. The soprano pipistrelle has a tendency to form larger roosts numbering 100's of bats and is associated with wetland habitat. Nathusius' pipistrelle bats frequently share maternity roosts with soprano pipistrelle bats.

[11] 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.

[12] 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.

Field Survey Results

Tree Assessment

A large number of trees are present within the site and therefore, it was not possible to assess each individual tree's suitability to support roosting bats. However, a number of trees with suitably to support roosting bats were encountered as part of the field survey with **Table 4** identifying these trees with reference made to Target Notes (TN) on **Map 2**.

Table 5: Trees within the site with suitability to support roosting bats

Target Note Reference on Map 2	Tree Description	Suitability to Support Roosting Bats
TN3	A mature hedgerow with a number of trees with suitability to support roosting bats	High
TN9	Mature oak with broken limbs and dense covering of ivy	Moderate
TN10	Two mature oaks with split limbs	Moderate
TN11	Mature oak with torn limbs and a dense covering of ivy	Moderate
TN12	Dead ash with a number of potential roosting features	Moderate
TN13	Four mature oaks, one of which was dead, with splits and cracks	Moderate

A number of other mature trees are present within the site beyond those listed above which may well support other potential roosting features. Therefore, the site as a whole is assessed as having high suitability to support tree roosting bats.

Foraging and Commuting Habitat

The site contains a variety of habitats suitable for supporting foraging and commuting bats in the form of areas of woodland and boundary hedgerows with mature trees. The site is connected to other suitable habitat in the surrounds in the form of areas of woodland and hedgerow network in the vicinity. The site is assessed as having moderate suitability to support foraging and commuting bats.

Bat Transect Survey Results

A total of four bat transect surveys were undertaken between July and October 2018.

During the survey a minimum of five species of bat were recorded across the site with a total of 306 registrations made across the four-month survey period. The most frequently recorded species was common pipistrelle (73% of total registrations) with a smaller numbers of soprano pipistrelle registrations (23%). Only occasional registrations of noctule (3%), serotine (1%) and *Myotis* bat species (>1%) were

recorded in the July and August transect surveys. The areas of highest activity taken across all surveys was the boundary vegetation to the north and south of Oakcroft Lane, south-western corner of the northern field and eastern boundary tree line of the southern field. The locations of key areas bat activity recorded across the survey period are provided on **Map 3.** A summary of the findings of each survey provided in **Table 6** with the locations of registrations provided on **Map 3a** to **Map 3d**.

Table 6: Bat activity recorded during transect surveys

Survey Date	General Bat Activity at the Site
30th July 2018	The vast majority of the registrations made during the survey were attributed to common pipistrelle with lower numbers of registrations of soprano pipistrelle and two registrations of noctule. The area of greatest activity recorded during the survey was associated with the boundary vegetation to the north of Oakcroft Lane.
29th August 2018	The majority of the registrations were attributed to common pipistrelle with concentrations of soprano pipistrelle recorded along the western site boundary. Other species recorded include four registrations of serotine, six registrations of noctule and a single *Myotis* bat species. Common pipistrelle and soprano pipistrelle were recorded foraging across the open field to the north of Oakcroft Lane during this survey. The area of highest activity was recorded associated with the boundary vegetation to the north of Oakcroft Lane and the south-western boundary.
25th September 2018	The activity recorded during this survey was more evenly distributed between common pipistrelle and soprano pipistrelle with commuting activity recorded along vegetation to the north of Oakcroft Lane. No other species were recorded during this survey. Less obvious concentrations of activity were recorded on this survey with the most activity recorded along margins to the north of Oakcroft Lane and the eastern most tree line.
18th October 2018	The activity during the October transect survey was generally lower than the previous months with registrations restricted to small numbers of common pipistrelle and soprano pipistrelle. The two areas of relatively higher activity during this survey were the south-eastern corner of the site and the south-western corner of the northern field.

Whilst different methods were used between the 2015 and 2018 as a result of new equipment being available. the general results and species diversity were comparable with the only exception being the absence of long-eared bat species being recorded in the 2018 transect surveys.

The automated bat detector survey results recorded a total of 5,811 bat registrations of at least eight species: common pipistrelle, soprano pipistrelle, noctule, serotine, barbastelle *Barbastellus barbastellus*, *Myotis* bat species, Nathusius' pipistrelle *Pipistrellus nathusii* and long-eared bat[7] *Plecotus* species.

Activity by Species

Table 7 shows the number of registrations and proportion of recorded bat activity by species. The vast majority of the registrations were attributable to common pipistrelle (89% of total registrations) with a relatively small number of soprano pipistrelle registrations (9.5%) with 98.5% of all registrations being made attributable to common pipistrelle or soprano pipistrelle. The remainder of the species recorded were in relatively low numbers with barbastelle and Nathusius pipistrelle being the most notable of the remaining species.

Table 7: Number of registrations and proportion of bat activity from each species

Species	No. Registrations	% Registrations
Common Pipistrelle	5,169	89.0%
Soprano Pipistrelle	552	9.5%
Noctule	26	0.4%
Serotine	24	0.4%
Barbastelle	13	0.2%
Myotis bat species	11	0.2%
Nathusius' Pipistrelle	11	0.2%
Long-eared bat species	5	0.1%
Total	**5811**	**100.00%**

Species Activity by Month

Table 8 provides the number of registrations of each species recorded within each month. The month with the greatest species diversity was July with eight species recorded within this month. The month of relatively highest activity was October with an average of 633 registrations per night compared to the average of 232.4 registrations per night across the entire survey period.

Table 8: Number of registrations of each month split by species

Period	Species	No. Registrations	Activity Index
July 18	Common Pipistrelle	1,945	194.5
	Soprano Pipistrelle	188	18.8
	Serotine	22	2.2
	Noctule	20	2
	Myotis bat species	7	0.7
	Long-eared bat species	5	0.5
	Barbastelle	1	0.1
	Nathusius' Pipistrelle	1	0.1
Jul-18 Total		**2,189**	**218.9**

Period	Species	No. Registrations	Activity Index
September 18	Common Pipistrelle	341	34.1
	Soprano Pipistrelle	90	9
	Barbastelle	12	1.2
	Noctule	5	0.5
	Myotis bat species	4	0.4
	Nathusius' Pipistrelle	3	0.3
	Serotine	2	0.2
Sep-18 Total		**457**	**45.7**
October 18	Common Pipistrelle	2,883	576.6
	Soprano Pipistrelle	274	54.8
	Nathusius' Pipistrelle	7	1.4
	Noctule	1	0.2
Oct-18 Total		**3,165**	**633.0**
Grand Total		**5,811**	**232.4**

Activity Levels at Locations

Table 9 shows the number of registrations recorded at each individual location throughout the survey period. Given that there is month on month variation between each location it is not possible to directly compare each location. However, based on the information that has been gathered the location with the highest activity is Location 22, on the western boundary of the site, and Location 16, situated along Oakcroft Lane. This is largely consistent with the results of the transect survey work.

Table 9: Activity Recorded at Each Location

Location	Period	Species	Count of Species	Activity Index
Location 1	Jul-18	Common Pipistrelle	131	26.2
		Soprano Pipistrelle	29	5.8
		Serotine	9	1.8
		Long-eared bat species	5	1.0
		Myotis species	3	0.6
		Noctule	2	0.4
		Barbastelle	1	0.2
Location 1 Total			**180**	**36.0**
Location 14	Sep-18	Common Pipistrelle	189	37.8
		Soprano Pipistrelle	31	6.2
		Barbastelle	12	2.4
		Noctule	4	0.8
		Nathusius' Pipistrelle	2	0.4
		Myotis species	1	0.2

Location	Period	Species	Count of Species	Activity Index
Location 14 Total			**239**	**47.8**
Location 16	Jul-18	Common Pipistrelle	1,814	362.8
		Soprano Pipistrelle	159	31.8
		Noctule	18	3.6
		Serotine	13	2.6
		Myotis species	4	0.8
		Nathusius' Pipistrelle	1	0.2
Location 16 Total			**2,009**	**401.8**
Location 20	Sep-18	Common Pipistrelle	152	30.4
		Soprano Pipistrelle	59	11.8
		Myotis species	3	0.6
		Serotine	2	0.4
		Nathusius' Pipistrelle	1	0.2
		Noctule	1	0.2
Location 20 Total			**218**	**43.6**
Location 22	Oct-18	Common Pipistrelle	2,883	576.6
		Soprano Pipistrelle	274	54.8
		Nathusius' Pipistrelle	7	1.4
		Noctule	1	0.2
Location 22 Total			**3,165**	**633.0**
Grand Total			**5,811**	**232.4**

4.4.2 Evaluation

Roosting Bats

The status of roosting bats is currently unknown at the site as no further survey has been undertaken, given that the trees within the site are to be retained as part of the proposals.

Foraging and Commuting Bats

The bat activity surveys undertaken at the site in 2018 were seasonally constrained due to the time of year which they were commissioned and therefore, did not cover a full survey season from April to October as recommended by current best practice guidelines. However, a full suite of transect surveys were also undertaken in 2015 which did not identify a significant difference between results from 2015 and the work undertaken in 2018. Therefore, it is considered that the below evaluation based on 2018 survey data is a robust assessment.

Bat surveys recorded at least eight species of bat foraging and commuting at the site. The most notable species recorded was barbastelle, which is a relatively rare species throughout the UK and Europe. Whilst no records of this species were returned within

two kilometres of the site by HBIC only a small number of registrations were recorded during the survey work neither of which were within optimal habitat for the species. Therefore, whilst this is relatively more notable it is not considered that this would be of county value and is assessed as being of local value.

It is also not possible to establish whether the records of long-eared bat are of the common and widespread brown long-eared bat or rarer grey long-eared bat. It is considered highly unlikely to be the rarer grey long-eared bat based on the lack of records in the wider area and the restricted range of the species. However, given that only five registrations were recorded it is not considered that the value of the site for these species would be more than local regardless of the species using the site.

Table 10 shows the geographic level of value of foraging and commuting habitat at the site.

Table 10: Value of the site to bat species/species complexes

Species	Foraging and Commuting Value
Common Pipistrelle	Local
Soprano Pipistrelle	Local
Noctule	Local
Serotine	Local
Barbastelle	Local
Myotis bat species	Local
Nathusius' Pipistrelle	Local
Long-eared bat species	Local

4.5 Otter

4.5.1 Baseline Ecological Conditions

Desktop Study Results

Consultation with HBIC produced no records of otter *Lutra lutra* within the desktop study area, however, this does not confirm the absence of the species in the local area.

Field Survey Results

A detailed survey in respect of otter was not undertaken as part of the survey. However, the watercourse within the site are shallow and poorly connected to any other more significant watercourses up stream. In additional, no records of otter were returned as

part of the desktop study. Therefore, it is considered unlikely that otter would be present within the site and no further consideration is given to the species within this report.

4.6 Badger

4.6.1 Baseline Ecological Conditions

Desktop Study Results

Consultation with HBIC produced a single record of badger *Meles meles* within the desktop study area recorded in 2017. The location of the recorded was marked as sensitive.

Field Survey Results

The site provides some foraging resources for badger in the form of scrub, hedgerows and woodland. However, the majority of the site provides relatively poor foraging habitat in the form of arable fields. The site contains a number of areas of suitable sett building such as the blocks of woodland and scrub.

Badger Survey Results

During the targeted badger survey undertaken in October 2018 evidence of badger was recorded within and adjacent to the site. The results of the badger survey are provided in a confidential appendix (**Appendix 10**) which should not be made publicly available.

4.6.2 Evaluation

Given the findings of the badger survey undertaken the site is considered to be of no more than local value for badger which are common and widespread throughout Hampshire.

4.7 Hazel Dormouse

4.7.1 Baseline Ecological Conditions

Desktop Study Results

Consultation with HBIC produced no records of hazel dormouse *Muscardinus avellanarius* within the desktop study area, however, this does not confirm the absence of the species in the local area.

A single EPSM licence in respect of hazel dormouse was returned identified on the MAGIC database situated approximately 1.8 kilometres to the north-west of the site. The licence was granted for the destruction of a breeding and resting place in 2016.

Surveys were undertaken of the surrounds as part of the Stubbington Bypass proposals to the north during which time no hazel dormouse were recorded (WSP, 2015).

Field Survey Results

The boundary vegetation within the site is generally sub-optimal for supporting hazel dormouse. The habitats are in part isolated from the surrounds and in addition no hazel dormouse were recorded as part of the Stubbington Bypass survey of the wider area during extensive survey work undertaken in 2015. More suitable habitat is present within the wider area which has only limited connectivity to the site. Given the likely absence of hazel dormouse from the site no further consideration is given to this species within the report.

4.8 Water Vole

4.8.1 Baseline Ecological Conditions

Desktop Study Results

A number of records of water vole *Arvicola amphibius* were returned by HBIC within the desktop study area, the nearest of which was recoded approximately one kilometre to the west of the site in 2016. The records identified were all associated with the River Meon.

As part of the works undertaken by WSP for Hampshire Country Council in relation to the Stubbington Bypass water vole were confirmed as present along the Crofton Ditch, which is present approximately 25 metres to the west of the site (WSP, 2015).

Field Survey Results

The watercourse network surrounding the site provides suitable habitat for water vole with the highest quality habitat being Crofton Ditch to the west. Given the findings of the previous survey work undertaken in respect of the Stubbington Bypass it is considered that water vole are present along Crofton Ditch. However, this ditch is buffered from the site by at least 25 metres at its nearest point. A recently constructed mitigation pond is also present approximately 25 metres to the west of the site which it is understood to have been constructed as part of the preparatory works for the Stubbington Bypass project.

A ditch is present to the north of Oakcroft Lane. This was recorded as being dry during the September 2017 survey and again as part of a walkover survey undertaken in May 2019. However, the ditch was recorded as being wet in the initial extended Phase 1 habitat survey in 2014 and during the updating walkover survey undertaken in March 2020 (the latter having been undertaken after an exceptionally wet winter of 2019/2020). Therefore, it is reasonable to assume that the ditch does not hold permanent flow but only during periods of increased rainfall. Given this it is not considered to provide permanent connectivity between Crofton Ditch and the wider ditch network marked on OS mapping to the east of the site as water vole do not favour

habitat with inconsistent water levels. Whilst water vole are known to disperse away from optimal habitats this is primarily to reach other high quality habitats. Given the most suitable habitat is Crofton Ditch it is considered unlikely they would disperse away from Crofton Ditch to the improved poorer quality habitat within the site itself.

The southern watercourse within in the woodland is poor quality for supporting water vole being shallow with little to no bankside vegetation.

4.8.2 Evaluation

The ditch to the north of Oakcroft Lane may provide some limited suitability for water vole, however, any local population is unlikely to be reliant on this ditch in isolation. Therefore, the site is assessed as being no more than site value for water vole.

4.9 Birds

4.9.1 Baseline Ecological Conditions

Desktop Study Results

A large number of bird records were returned by HBIC as part of the desktop study with spotted flycatcher *Muscicapa striata* recorded immediately to the west of the site in 2010, water rail *Rallus aquaticus*, tree pipit *Anthus trivialis*, firecrest *Regulus ignicapilla* and kingfisher *Alcedo atthis* recorded to the immediate south-west between 2006 and 2014. The majority of the records returned were waders associated with the Solent and Southampton Water SPA.

Other species returned within the vicinity which may utilise habitats within the site include skylark *Alauda arvensis*, common linnet *Linaria cannabina*, common cuckoo *Cuculus canorus*, yellowhammer *Emberiza citrinella*, reed bunting *Emberiza schoeniclus*, common bullfinch *Pyrrhula pyrrhula*, common starling *Sturnus vulgaris*, song thrush *Sturnus vulgaris*, grey wagtail *Motacilla cinerea*, redwing *Turdus iliacus* and fieldfare *Turdus pilaris*.

The site itself supports Solent Wader and Brent Goose site F17D which is classified as a low use site whilst the site also includes part of F17C which has been classified as a Secondary Support Area. Secondary Support Areas are defined as:

"The Secondary Support Areas offer a supporting function to the Core and Primary Support ecological network, but are generally used less frequently by significant numbers of SPA geese and waders. These sites become important when wader or brent goose populations are higher or when the habitat is in suitable management. In-combination, these sites are essential to secure a long term, permanent network as this ensures a geographical spread of sites across the wider ecological network, thereby meeting the needs of each discrete subpopulation. The Secondary Support

Areas network also provide suitable and favoured sites in years when the population includes high numbers of juveniles, as well as ensuring future resilience."

Whilst Low Use Sites are defined as:

"All Low Use sites have the potential to be used by waders or brent geese. These sites have the potential to support the existing network and provide alternative options and resilience for the future network. The in-combination loss of these sites would impact on the continued ecological function of the wader and brent goose network. In all cases proportionate mitigation, off-setting and/or enhancement measures will be required."

A total of three seasons of wintering bird surveys were undertaken at the site between 2014 and 2016 (ECOSA, 2015) (ECOSA, 2016). During which time the site was assessed as being of local value for overwintering birds. However, this assessment did include a wider survey boundary. A range of wintering bird surveys were also undertaken by WSP between 2013 and 2015 as part of a wider survey of the Stubbington Bypass proposals. The ECOSA survey work did not identify the presence of any waders within either Strategy Site F17C or F17D. However, subsequent survey visits undertaken as part of the Solent Wader and Brent Goose strategy have recorded the presence of golden plover *Pluvialis apricaria*, lapwing *Vanellus vanellus* and snipe *Gallinago gallinago* in F17C and lapwing in F17D. **Table 11** provides a summary of the known records at the site made between 2013 and 2019.

Table 11: Summary of Waders Recorded

Year	Recorder	F17C		F17D	
		Visits	**Records**	**Visits**	**Records**
Pre-2014	Strategy Records	7	-	6	-
2013/2014	ECOSA	3	-	3	-
	WSP	12	Golden Plover 80 Lapwing 1	12	
2014/2015	ECOSA	12	-	12	-
	WSP	12	Lapwing 40 Snipe 1	12	
2015/2016	ECOSA	12	-	12	-
2017/2018	Strategy Records	4	Golden Plover 39 Lapwing 30 Snipe 1	0	-
2018/2019	Strategy Records	2	Lapwing 162 Golden Plover 109	1	Lapwing 16
Total Visits		64		58	

Field Survey Results

The site contains a number of habitats with suitability to support breeding birds in the form of woodland, trees, hedgerows and, to a lesser extent, areas of scrub throughout the site. In addition, the arable farmland provides suitability to support ground nesting birds such as skylark, which was returned as part of the desktop study. Species recorded at the site include great tit *Parus major*, woodpigeon *Columba palumbus*, blue tit *Cyanistes caeruleus*, wren *Troglodytes troglodytes*, blackbird *Turdus merula*, magpie *Pica pica*, starling, greenfinch *Carduelis chloris*, pheasant *Phasianus colchicus*, robin *Erithacus rubecula* and green woodpecker *Picus viridis*.

A range of bird species were recorded within the site and the surrounds as part of the wintering bird surveys undertaken between 2014 and 2016, a number of which may also breed within the site.

Notable species recorded as part of the survey included black-headed gull *Chroicocephalus ridibundus*, bullfinch, common gull, dunnock *Prunella modularis*, fieldfare, herring gull *Larus argentatus*, house sparrow, kestrel *Falco tinnunculus*, kingfisher *Alcedo atthis*, lesser redpoll *Carduelis cabaret*, linnet, mallard *Anas platyrhynchos*, meadow pipit *Anthus pratensis*, Mediterranean gull *Larus melanocephalus*, mistle thrush *Turdus viscivorus*, redwing, reed bunting, skylark, song thrush, starling, stock dove *Columba oenas* and teal *Anas crecca*.

4.9.2 Evaluation

Breeding Birds

Whilst detailed breeding bird surveys have not been undertaken at the site the habitat present provide a wide range of suitable nesting habitats for the species with the key area being the tree lines and woodland. Therefore, the site is assessed as having local value for breeding birds.

Wintering Birds

During the wintering bird surveys undertaken between 2014 and 2016 only low numbers of wintering birds were recorded across the site typical of an agricultural site. However, given the inclusion of the site in the Solent Wader and Brent Goose strategy consideration needs to be given to the wider function which the land offers in the wider area given the presence of the SPA network in the area and the function of the surrounding land. However, the site in isolation is assessed as having local level value for overwintering birds.

4.10 Reptiles

4.10.1 Baseline Ecological Conditions

Desktop Study Results

A record of slow-worm *Anguis fragilis* was recorded approximately 680 metres to the south of the site in 2014 with a maximum count of four individuals recorded. No other records of reptiles were returned by HBIC as part of the desktop study undertaken.

A targeted reptile survey in accordance with current guidance for establishing the presence/absence of reptiles was undertaken by ECOSA in 2015 (ECOSA, 2015) during which time reptiles were identified as likely absent from the site.

Field Survey Results

The vast majority of the site comprises heavily managed arable farmland which is unsuitable for supporting reptiles. However, suitable areas of habitat are present within the site associated with the western margins. The surrounds are generally sub-optimal for supporting reptiles being dominated by agricultural farmland and existing residential development.

Reptile Survey Results

A summary of the reptile surveys at the site is provided in **Table 12** and on **Map 5** A single juvenile common lizard was recorded on the western boundary of the site on a single occasion.

Table 12: Summary of reptile survey results

Survey Date	Number of Individuals Recorded	
	Common Lizard	
	Adult	Juvenile
21st August 2018	0	0
3rd September 2018	0	0
7th September 2018	0	1
11th September 2018	0	0
17th September 2018	0	0
21st September 2018	0	0
27th September 2018	0	0
Peak Count	**0**	**1**

4.10.2 Evaluation

Population Class Size Assessment

Table 13 shows the current guidance (Froglife, 1999) for assessing the population size of reptiles based on a refugia density of 10 per hectare. However, a high density of 10 per hectare was used during this survey work.

Table 13: Criteria for population size assessment based upon a refugia density of 10 per hectare

Species	Low Population	Good Population	Exceptional Population
Common lizard	<5	5-20	>20

Given the peak count of only a single juvenile common lizard, the margins of the site can be assessed as supporting low population of common lizard.

Evaluation

Given that only a single juvenile common lizard was recorded on a single occasion the population is assessed as being of no more than local value.

4.11 Great Crested Newt

4.11.1 Baseline Ecological Conditions

Desktop Study Results

Consultation with HBIC produced no records of great crested newt *Triturus cristatus* within the desktop study area, however, this does not confirm the absence of the species in the local area.

No EPSM licences in respect of great crested newt were identified within two kilometres of the site as part of the MAGIC search undertaken.

A review of online aerial photography and 1:25,000 OS mapping revealed the presence of three ponds within a 500 metre radius of the site. The pond situated to the immediate south is described in more detail, below (Pond 1). The pond to the west of the site was recorded as having been filled in during the 2015 survey and a third pond, also situated approximately 10 meters south of the site (Pond 2) was recorded as being unsuitable being ornamental in nature and potentially fish stocked.

Previous survey work undertaken as part of the Stubbington Bypass application in 2015 recorded great crested newt as likely absent from the study area, which extended over a significant area around Stubbington (WSP, 2015).

Field Survey Results

A single pond (Pond 1) is present approximately 10 metres south of the site (**TN14** and **Figure 7**). This pond is approximately three metres in width by three metres in length with hard rush *Juncus inflexus* and floating sweet grass *Glyceria fluitans* recorded. Whilst the pond held water during the survey undertaken in October 2017 it was recorded as dry in April 2015 and June 2018.

Figure 7: Pond situated to the south of the site (October 2017)

Whilst the pond contains some aquatic vegetation suitable for great crested newt egg laying and is surrounded by suitable terrestrial habitat in the form of woodland, ruderal vegetation and grassland. The pond was recorded as being dry during the ecological assessment undertaken in 2015.

The majority of the site provides limited terrestrial habitat for great crested newt in the form of arable fields. However, a number of suitable areas of terrestrial habitat are present associated with grassland, hedgerows, ruderal vegetation and woodland. In the event that the on-site pond supports great crested newt then there is the likelihood that the species will utilise the surrounding terrestrial habitat.

Given the presence of the pond on site and in the surrounds an eDNA survey was subsequently proposed in order to establish the presence/likely absence of great crested newt. The pond within the site was subsequently recorded as being dry on 29th June 2018. Given that the pond was recorded as dry during the breeding season in both 2015 and 2018 it is considered highly unlikely that great crested newt utilise the pond. In addition, great crested newt were assessed as being likely absent from a wider area in 2015 as part of the Stubbington bypass works. However, following consultation with the Hampshire County Council Ecology Team in 2019 a further eDNA survey was undertaken (see below).

Great Crested Newt eDNA Survey *Results*

Pond 1 (TN14) was re-visited on 13th May 2019 in order to compliment the site visits undertaken in April 2015 and June 2018. The pond was recorded as being dry in all three visits undertaken in 2015, 2018 and 2019. Given that the pond has now been recorded as dry on three separate occasions, in three different years, in the peak of the great crested newt breeding season it is concluded that the pond is not suitable for supporting breeding great crested newt.

As part of the site visit undertaken in 2019 an eDNA sample was also taken of Pond 2, which is situated to the south and which was previously assessed as being unsuitable for the species due to the its ornamental nature and fish stocking. The eDNA analysis (**Appendix 11**) confirmed the species as being absent from this pond. Given this, it is considered that great crested newt are likely absent from the site and no further consideration is given to this species within the report.

4.12 Invertebrates

4.12.1 Baseline Ecological Conditions

Desktop Study Results

A large number of notable invertebrate records were returned by HBIC within the desktop study area including records of Species of Principal Importance knot grass *Acronicta rumicis* and cinnabar moth *Tyria jacobaeae* recorded in 2003.

Field Survey Results

The vast majority of the site provides poor habitat for terrestrial invertebrates comprising arable fields. However, the site does offer suitable habitat for a range of terrestrial invertebrates in the form of woodland, scrub, mature trees and ruderal vegetation with ragwort present within the site which provides a food resource for cinnabar moth A number of areas of standing deadwood were also recorded as present within the site offering opportunities for saprophytic species.

4.12.2 Evaluation

Whilst a detailed invertebrate survey was not undertaken as part of the assessment, given the habitats present, and the relatively limited extent of these, it is considered that the habitats present would be of no more than local value for invertebrates.

4.13 Other Relevant Species

4.13.1 Baseline Ecological Conditions

Desktop Study Results

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

Field Survey Results

No evidence of any other rare or notable species were identified as part of the field survey. The site has suitability for supporting the Species of Principal Importance hedgehog *Erinaceus europaeus*.

4.13.2 Evaluation

Given the habitats present it is considered likely that the site would be of local value for hedgehog.

4.14 Summary of Baseline Ecological Conditions

Table 14 provides a summary of the ecological features of value at the site. Ecological features considered during the appraisal but concluded to have no ecological value have been omitted from this summary.

Table 14: Summary of Baseline Ecological Conditions at the Site

Ecological Feature			Level of Importance
Designated Sites		Solent and Southampton Water SPA and Ramsar site (off site)	International/European
		Titchfield Haven SSSI/NNR (off site)	National
		Titchfield Haven LNR (off site)	Local
Habitats			Site to Local
Bats	Roosting		Unknown
	Foraging and Commuting		Local
Badger			Local
Water Vole			Site
Birds	Breeding		Local
	Wintering		Local
Reptiles			Local
Invertebrates			Local

Ecological Feature	Level of Importance
Hedgehog	Local

5.0 ASSESSMENT OF ECOLOGICAL EFFECTS AND MITIGATION/COMPENSATION/ ENHANCEMENT MEASURES

5.1 Introduction

This section assesses the ecological effects of the proposed development scheme on the identified ecological features as identified in Section 4.0. Methods for addressing potential impacts on ecological features have been approached in accordance with the mitigation hierarchy[13] with avoidance of impacts prioritised where possible. Where significant adverse effects cannot be avoided other forms of mitigation are prioritised over compensation. Enhancement measures have been detailed, where relevant, in order to not only minimise the impacts on biodiversity but also to provide enhancement in accordance with Paragraph 170 of the NPPF (Paragraph 2.2). It is anticipated that mitigation, compensation and enhancement measures will be secured through the planning process.

5.2 Scheme Design

The proposed development entails erection of 209 dwellings with new access from Peak Lane and stopping up part of Oakcroft Lane together with car parking, landscaping, Public Open Space and associated works. The boundary vegetation is due to be retained as part of the proposals with small scale losses to facilitate access. The land to the north of Oakcroft Lane is proposed to be removed from agricultural use as part of the proposals and delivered as a new Ecological Enhancement Area. Access to the site is to be taken off Peak Lane to the east. Detailed landscaping plans are provided by ACD Environmental with reference to their plans PERSC22805 11 Sheets 1 to 11 Rev. C and PERSC22805 20 Sheet 1 Rev. A with proposed management provided in the accompanying Ecological Management Plan (ECOSA, 2020). Lighting is anticipated to be installed as part of the scheme, however, detailed lighting plans were also unavailable at the time of preparation of this report.

The potential ecological impacts and effects of these proposals, in the absence of mitigation, are described for each ecological feature below. For each ecological feature, measures to mitigate and/or compensate for significant effects are described.

5.3 Designated Sites

5.3.1 Potential Impacts and Effects

The proposals have the potential to result in an increase in recreational pressure on Solent and Southampton Water SPA/Ramsar site, Solent Maritime SAC and

[13] In accordance with CIEEM Ecological Impact Assessment guidance (CIEEM, 2018) 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'.

Portsmouth Harbour SPA/Ramsar site, either alone or in-combination with other plans or projects.

In addition the development of the site will result in the loss of the Solent Wader and Brent Goose site F17D associated with the Solent and Southampton Water SPA/Ramsar site.

5.3.2 Mitigation Measures

For further information on mitigation measures please refer to the Shadow Habitats Regulations Assessment prepared to support the application. However, this will include contributions to the Solent's Bird Aware strategy in respect of the increase in recreational pressure and the creation of an Ecological Enhancement Area to the north of Oakcroft Lane in order to compensation for the loss of the of the Low Use site F17D.

5.3.3 Significance of Residual Effects

For further information please refer to the Shadow Habitats Regulations Assessment prepared to support the application.

5.3.4 Compensation

For further information on compensation measures please refer to the Shadow Habitats Regulations Assessment prepared to support the application.

5.3.5 Enhancement

The delivery of the Ecological Enhancement area to the north of Oakcroft Lane will deliver an overall enhancement to the Solent Wader and Brent Goose Strategy network which is likely to be secured in the long-term through transfer to Fareham Borough Council.

5.4 Habitats

5.4.1 Potential Impacts and Effects

The proposals will result in the loss of approximately 7.8 hectares of arable land to the south of Oakcroft Lane. In addition, a section of tree line to the south of Oakcroft Lane will also be removed totalling approximately 15 metres in order to facilitate access. The remaining habitats are to be either retained or enhanced as part of the proposals.

During the construction phase there is the potential to for the degradation of the retained habitats through root compaction, accidental damage and pollution. There is also the potential for pollution events to have an impact on the surrounding ditch network and watercourse.

5.4.2 Mitigation Measures

The features of greater ecological interest in terms of the site and those of local value are to be largely retained as part of the proposals including tree lines, hedgerows and the woodland to the south-west of the site.

All retained trees and hedgerows will have root protection zones (RPZs) established in accordance with BS 5837:2012 Trees in relation to design, demolition and construction in order to avoid any potential damage as a result of construction activities. A buffer of approximately 15 metres from built form is to be created from the eastern boundary hedgerow, a minimum of five metre from the northern boundary, and a minimum of ten metres along the western site boundary. A buffer of approximately 35 metres is to be created from the southern boundary woodland.

In addition, in order to minimise degradation to retained habitat and the risk of potential pollution events a Construction Environmental Management Plan (CEMP) will be prepared and implemented as part of the scheme. This will detail pollution prevention measures and suitable construction methods in order to protect retained habitats and any potential impacts on the surrounding ditch network.

5.4.3 Significance of Residual Effects

The loss of the areas of hedgerow and tree line is assessed as having a residual effect at the site level. The loss of the arable habitat within the site is considered to be of negligible significance.

5.4.4 Compensation

In order to compensate for the loss of the areas of tree line and hedgerow new native species hedgerow planting will be undertaken across the site. A range of native species are to be used in this new planting including field maple, hazel, hawthorn, crab apple *Malus sylvestris*, blackthorn, dog rose and bird cherry *Prunus padus*. Existing hedgerow within the site will be bolster planted and gapped up in order to enhance the areas of retained habitat.

5.4.5 Enhancement

The landscaping scheme includes a range of enhancement measure which in summary include:

- In excess of 2.4 kilometres of new native species hedgerow planting throughout the development;
- The inclusion of new areas of wildflower meadow including a variety of seed mixes including Emorsgate EM2, Emosrage EM10 and Emorsgate EFL1 (or similar approved);

- New hedgerow ground flora mix to be sown along boundary hedgerows such as Emorsgate EH1 or similar;
- The creation of a new attenuation basin in the south of the site which will include a permanently wet area. A range of marginal and aquatic planting is proposed within the permanently wet area with a wetland seed mixture such as Emorsgate EM8 also to be sown;
- New native species buffer mix to be planted around the margins of the site to include species such as dogwood, spindle *Euonymus europaeus*, holly, privet, gorse *Ulex europaeus*, wayfaring tree *Viburnum lantana* and guelder rose *Viburnum opulus*;
- The inclusion of a variety of new native tree species across the site in areas of open space.

The land to the north of Oakcroft Lane is to be delivered as an Ecological Enhancement Area totalling approximately 10.6 hectares. This includes the following measures:

- Creation of new scrapes to increase suitability for wading birds;
- Creation of new grassland habitat;
- Buffer planting and strengthening of hedgerows; and
- New areas of scrub planting around the margins of the area.

This land is proposed be secured in the long-term through the transfer of the land to Fareham Borough Council. No public access will be allowed to this area in order to ensure its suitability of overwintering birds. Full details of the Ecological Enhancement Area are detailed in the Ecological Management Plan (ECOSA, 2020).

A Biodiversity Impact Calculator (ECOSA, 2020) has been prepared as part of the application which is based on the measures outlined above, the associated landscaping plans and proposed Ecological Management Plan. This has demonstrated that the proposals will deliver 84.42 habitat biodiversity units 9.18 hedgerow biodiversity units which is a 91.46% and 64.40% gain respectively. Whilst there is currently no guidelines for the level of gain which should be delivered by a proposal this is over nine times the 10% net gain figures which is currently being considered as part of emerging policy. It is therefore, reasonable to conclude that these proposals will deliver a significant net gain in biodiversity at the site.

5.5 Bats

5.5.1 Potential Impacts and Effects

The introduction of new lighting at the site has the potential to result in an increase disturbance to foraging and commuting bats at the site and has the potential to result in disturbance to any roosting bats within boundary woodland trees.

The key foraging and commuting habitat is to be retained and protected as part of the scheme. The mature trees within and bounding the site are to be retained and protected as part of the proposals. Small scale loss of foraging and commuting habitat will occur associated with the loss of tree line along Oakcroft Lane.

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 3** for details.

5.5.2 Mitigation Measures

A sensitive lighting strategy will be devised as part of the scheme. This will entail maintaining dark corridors along key boundary vegetation at the edges of the site (less than 1 lux). Where lighting it to be introduced this will be a mixture of low level and direction lighting in order to minimise any spill on to both retained and newly created habitat.

The mitigation measures proposed as a result of the 2015 survey work were not materially different to the proposed mitigation measures included in the current planning application nor were the results of the two pieces of survey work notably different. Therefore it is considered that the survey work and the proposed mitigation measures are proportionate for the identified impacts.

5.5.3 Significance of Residual Effects

Given the mitigation measures set out above no significant residual effect on bats is anticipated as a result of the proposals.

5.5.4 Compensation

Given the absence of significant residual effects on bats no compensation measures are necessary.

5.5.5 Enhancement

The creation of new areas of planting and creation of new areas of open space as set out in Paragraph 5.4.5 will provide a significant enhancement for foraging and commuting bats at the site.

In order to provide new habitats for roosting bats a range of new bat boxes will be erected on retained trees. The mix to be used will be five Schwegler 1FF and five Schwegler 2F (or similar) with proposed locations provided on **Map 6**.

5.6 Badger

5.6.1 Potential Impacts and Effects

Given that the proposals are to be restricted to areas of existing arable land no significant loss in badger foraging habitat is anticipated as a result of the scheme.

There is the potential for direct impacts on badger during the construction phase both as a result of disturbance to badgers within immediately adjacent off-site setts. Disturbance to off-site setts has the potential to result in the abandonment of the setts.

Badger are protected from killing and injury, and their setts protected from damage and interference, under the Protection of Badgers Act 1992. Refer to **Appendix 3** for details.

5.6.2 Mitigation Measures

Given that the status of badger can change over time an updating badger survey will be undertaken no more than six months prior to the commencement of the development. Preferably this would be undertaken over the winter months when vegetation cover is lowest. Given that the construction phase of the development is likely to last a number of years the badger survey will be updated on a six monthly basis throughout the construction phase.

The setts are to be buffered from heavy construction activities by a minimum of 20 metres (see **Appendix 10**) for the majority of the construction phase. The construction of both a road and a footpath are proposed within the buffer zone, however no foundation piling will be necessary within this area. Where works are necessary within the 20 metre buffer zone these would be overseen by a suitably qualified ecologist and undertaken outside of the badger breeding season (December to June, inclusive). No direct impacts on sett entrances are considered necessary as these are set back behind the existing hedgerow leading into an offsite area of habitat. Where it is deemed that these works would be licensable a licence would be sought from Natural England, as necessary. This may involve temporary closure of any sett entrances directly impacted or sensitive working methods in order to minimise the disturbance.

Any open excavations should be covered overnight in order to minimise the risk of badgers becoming trapped in excavations. Failing that a ramp will be inserted in order to allow any badgers to escape.

Should any new setts be recorded as a result of the updating badger survey(s) then an appropriate mitigation strategy would be devised. In the event that any new setts could

not be retained within the proposals these would be closed under a Natural England licence.

In order to maintain existing commuting routes around the site buffers have been provided around the margins of the site with a minimum standoff of five metres from existing boundary features which will provide adequate space to allow badger to disperse around the site and to newly created and enhanced habitats.

5.6.3 Significance of Residual Effects

Given the mitigation measures outlined above no significant residual effects in respect of badger are anticipated.

5.6.4 Compensation

Given the absence of any significant residual effect no compensation measure in respect of badger are necessary.

5.6.5 Enhancement

The delivery of new landscaping within the site, and specifically, new areas of native species planting and meadow planting, has the potential to deliver a substantial increase in quality of foraging habitat for badger (see Paragraph 5.4.5).

5.7 Water Vole

5.7.1 Potential Impacts and Effects

The southern ditch has been assessed as being unsuitable for support water vole whilst the northern ditch may occasionally be used by water vole. However, it is considered highly unlikely to form a dispersal route for the species. The northern ditch is to be retained in the Ecological Enhancement Area. However, there is risk to disturbance during any works undertaken to the Ecological Enhancement Area.

In England, water vole and their habitat are fully protected under the Wildlife and Countryside Act 1981 through inclusion in Schedule 5. Refer to **Appendix 3** for details.

5.7.2 Mitigation Measures

The ditch to the north of Oakcroft Lane will be protected and a minimum five metre buffer maintained during any works to the Ecological Enhancement Area to the north of Oakcroft Lane in order to mitigate any potential disturbance impact.

5.7.3 Significance of Residual Effects

Given the impacts identified and the proposed mitigation measures no significant impacts on water vole are anticipated as a result of the proposals.

5.7.4 Compensation

Given the absence of any residual effects no compensation measures are considered necessary as a result of the proposals.

5.7.5 Enhancement

In order to provide an enhancement for water vole the existing ditch will be subject to long-term ecological management as part of the Ecological Enhancement Area.

5.8 Birds

5.8.1 Potential Impacts and Effects

The vast majority of the suitable nesting habitat is to be retained as part of the proposals with short sections being removed in order to facilitate access from Peak Lane and potential direct impacts on ground nesting birds, such as skylark, during ground clearance and potential loss of nesting territories.

The proposals will result in the loss of suitable wintering bird habitat to the south of Oakcroft Lane including the loss of Solent Wader and Brent Goose Strategy Site F17D.

Any increase in lighting at the site has the potential to result in increased disturbance to breeding birds in the boundary vegetation.

All birds, their nests, eggs and young are legally protected, with certain exceptions, under the Wildlife and Countryside Act 1981 (as amended). Refer to **Appendix 3** for details.

5.8.2 Mitigation Measures

Any vegetation clearance, including the removal of arable farmland, will be undertaken outside of the nesting bird season (March to August inclusive) wherever possible. Should this not be possible then a nesting bird check will need to be undertaken by a suitably qualified ecologist prior to vegetation removal.

A sensitive lighting strategy will need to be implemented as part of the scheme as detailed in Paragraph 5.5.2.

5.8.3 Significance of Residual Effects

The loss of the areas of habitat to the south of Oakcroft Lane would result in a significant effect at the site level on wintering birds. The loss of the ground nesting habitat to the south of the site is generally poor quality being heavily managed cropland without any areas of grassland margin or set aside. Therefore, the density of any territories is likely to be low. Given, this it is considered that the residual effect would be significant at the site level.

5.8.4 Compensation

The creation of the Ecological Enhancement Area to the north of Oakcroft Lane will compensate for the loss of wintering bird habitat in the south of the site (see Paragraph 5.4.5). Any nesting habitat to be lost will be more than offset through new wooded planting throughout the site whilst the creation of new grassland to the north of the site will offset the loss of ground nesting habitat to the south of the site

5.8.5 Enhancement

Whilst the creation of new landscaping will provide new nesting habitat for breeding birds the installation of new bird boxes would create new nesting habitat in the short term and provide a long-term enhancement. It is proposed that five Schwegler 1B and five Schwegler 2H (or similar) be installed on suitable retained mature trees with proposed locations provided on **Map 6**.

5.9 Reptiles

5.9.1 Potential Impacts and Effects

No works are proposed adjacent to the area where the low population of common lizard was recorded as part of the survey work undertaken.

Widespread reptile species (slow-worm *Anguis fragilis*, common lizard, grass snake *Natrix natrix* and adder *Vipera berus*) are protected under the Wildlife and Countryside Act 1981 against harm. Refer to **Appendix 3** for details.

5.9.2 Mitigation Measures

The retained habitat will be marked out using Heras fencing (or similar) in order to ensure no accidental incursions into areas of suitable reptile habitat during the creation of the Ecological Enhancement Area.

5.9.3 Significance of Residual Effects

Given that no habitat loss with suitability for reptiles is anticipated and that mitigation measures have been proposed in relation to the potential direct impact, no significant residual effects are anticipated.

5.9.4 Compensation

Given the absence of any significant residual effects no compensation in respect of reptiles is necessary.

5.9.5 Enhancement

No specific enhancement measures in respect of reptiles are proposed. However the delivery of the Ecological Enhancement Area will provide a net gain in suitable reptile habitat at the site.

5.10 Invertebrates

5.10.1 Potential Impacts and Effects

Given that the proposals are largely restricted to areas of arable land no significant effects on invertebrates are considered likely as a result of the proposal.

5.10.2 Mitigation Measures

Given the absence of any significant effects on invertebrates no mitigation in respect of invertebrates is necessary.

5.10.3 Significance of Residual Effects

Given the absence of effects no significant residual effects are anticipated.

5.10.4 Compensation

Given the absence of any significant residual effects no compensation in respect of invertebrates is necessary.

5.10.5 Enhancement

The delivery of a new public open space and the Ecological Enhancement Area (see Paragraph 5.4.5) has the potential to deliver a significant enhancement for invertebrates over the baseline situation. In addition, the positive management of the retained woodland in the south will maintain and enhance the existing habitat for the species.

The inclusion of five logs piles within the public open space will provide additional habitat for invertebrates with proposed locations provided on **Map 6**.

5.11 Other Relevant Species

5.11.1 Potential Impacts and Effects

The proposals have the potential to result in direct impacts on European hedgehog as a result of site clearance and long-term loss and fragmentation of the habitats present.

5.11.2 Mitigation Measures

During site clearance work contractors should maintain a watching brief for the presence of hedgehog. Should any be encountered as part of the site clearance works then these should be safely relocated in a thick gloved hand to retained habitats offsite.

Any new boundary fences should be installed with suitable gaps to allow hedgehog movement across the site. These should be approximately 13 centimetres x 13 centimetres.

5.11.3 Significance of Residual Effects

Given the proposed mitigation measures no significant residual effect in respect of hedgehog or other relevant species are anticipated.

5.11.4 Compensation

Given the absence of any significant residual effect no compensation is necessary in respect of hedgehog or other relevant species.

5.11.5 Enhancement

The delivery of a new public open space (see Paragraph 5.4.5) has the potential to deliver a significant enhancement for a range of other species over the baseline situation.

5.12 Cumulative Effects

Assuming that the mitigation and compensation measures outlined in the paragraphs above are implemented, no significant residual effects are anticipated. As such it is considered unlikely that the proposals will contribute to cumulative adverse effects in association with other proposals in the local area.

6.0 CONCLUSIONS

6.1 Conclusion

The site has been assessed as being of no more than local value in terms of habitats present with the features of relatively higher value being retained within the proposals. The site also supports a diversity of foraging and commuting bats, badger, breeding and wintering birds and a population of common lizard is present adjacent to the site.

A range of mitigation measures have been proposed in order to protect the ecological features identified. The proposals include the retention and positive management of retained features and the creation of new habitats which would deliver an enhancement at the site and an overall net gain in biodiversity. A separate Biodiversity Impact Calculation for the site has confirmed that the proposals will result in a net gain of approximately 91.46% and 64.40% in relation to habitats and hedgerow units respectively over the existing situation. This is a significant net gain at the site and over nine times the 10% net gain currently being recommended in emerging national policy.

As such it is considered that the proposals will accord with all relevant national and local planning policy in relation to ecology including Policy DSP13 and the NPPF (see Section 2.0).

6.2 Updating Site Survey

If the planning application boundary changes or the proposals for the site alter, a re-assessment of the scheme in relation to ecology may be required. Given the mobility of animals and the potential for colonisation of the site over time, updating survey work may be required, particularly if development does not commence within 18 months of the date of the most recent relevant survey.

7.0 REFERENCES

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Map 1 Site Location Plan

OAKCROFT LANE, STUBBINGTON, HAMPSHIRE

ECOLOGICAL IMPACT ASSESSMENT

Map 1 - Site Location Plan

Client:	Persimmon Homes South Coast
Date:	April 2020
Status:	Final

KEY

Site Boundary

Scale at A4: 1:10,000

0 100 200 400 Metres

N

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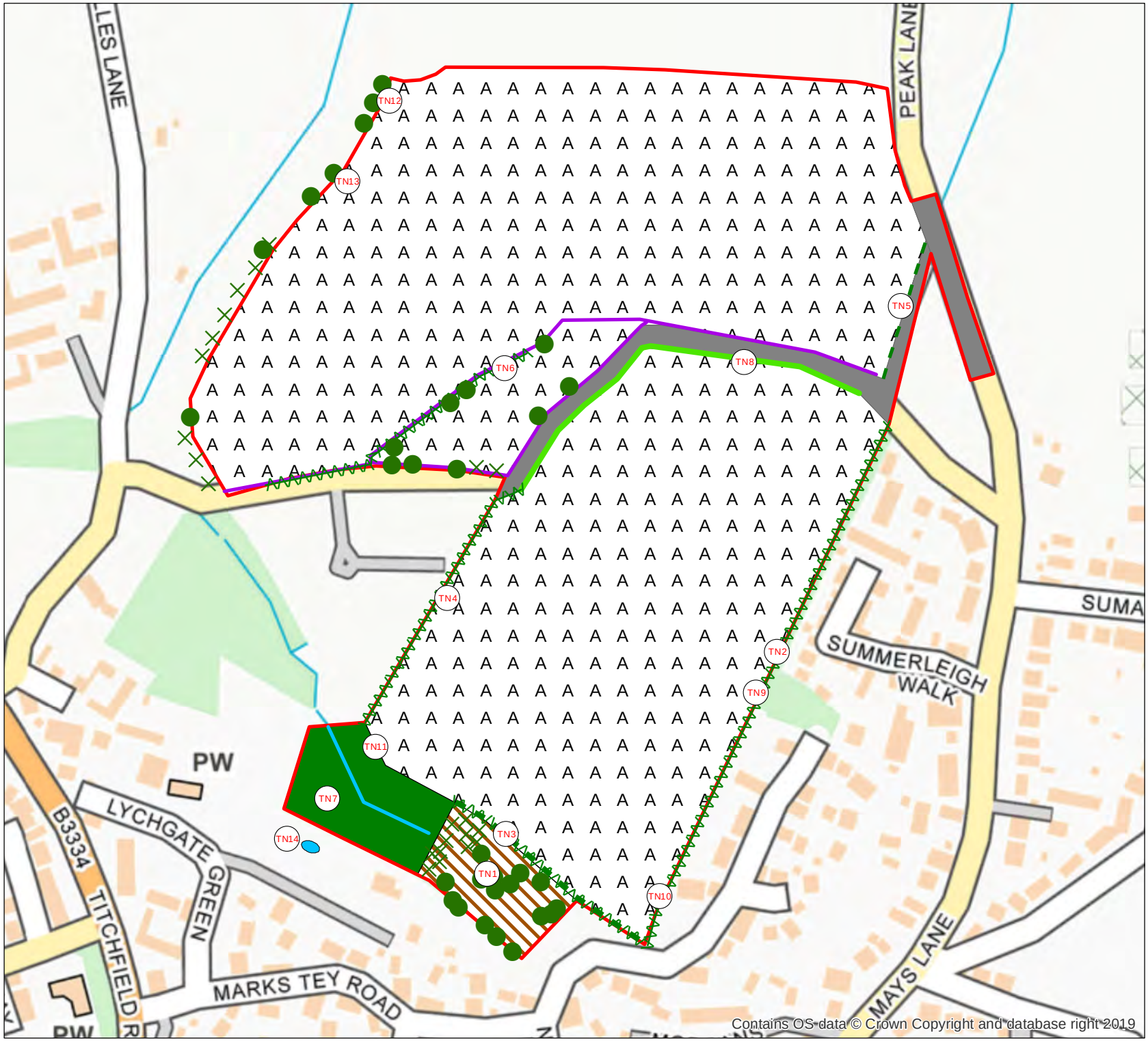
Map 2 Phase 1 Habitat Map



OAKCROFT LANE, STUBBINGTON, HAMPSHIRE

ECOLOGICAL IMPACT ASSESSMENT

Map 2 - Phase 1 Habitat Map

Client:	Persimmon Homes South Coast
Date:	April 2020
Status:	Final

KEY

- Site Boundary
- Scattered Trees
- Scattered Scrub
- Broadleaved Woodland
- Tall Ruderal
- Pond
- Arable
- Hardstanding
- Watercourse
- Wet Ditch
- Species-rich Intact Hedgerow
- Species-rich Defunct Hedgerow
- Species-poor Defunct Hedgerow
- Treeline
- TN1 Target Note

Scale at A4: 1:3,500

0 50 100 Metres

N

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Map 3 Bat Transect Results: Key Areas of Activity

OAKCROFT LANE, STUBBINGTON, HAMPSHIRE

ECOLOGICAL IMPACT ASSESSMENT

Map 3 - Bat Transect Results: Key Areas of Activity

Client:	Persimmon Homes South Coast
Date:	April 2020
Status:	Final

KEY

- Site Boundary
- On-site Bat Transect Route
- Wider Site Bat Transect Route

N.B. This heat map represents the bat transect survey data collected throughout July, August, September and October 2018. Red areas represent higher levels of activity whereas purple areas represent the lowest levels of activity recorded.

At the time this map was produced the red line site boundary had since been altered to cover a smaller extent; the bat transect surveys were carried out over a larger survey area as indicated by the transect route shown.

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Map 3a Bat Transect Results: July

OAKCROFT LANE, STUBBINGTON, HAMPSHIRE

ECOLOGICAL IMPACT ASSESSMENT

Map 3a - Bat Transect Results: July

Client:	Persimmon Homes South Coast
Date:	April 2020
Status:	Final

KEY

- Site Boundary
- Common pipistrelle
- Soprano pipistrelle
- Noctule

N.B. This map shows the location of where bat activity was recorded and does not specifically relate to the number of registrations.

Scale at A4: 1:3,500

0 50 100 Metres

N

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Map 3b Bat Transect Results: August

OAKCROFT LANE, STUBBINGTON, HAMPSHIRE

ECOLOGICAL IMPACT ASSESSMENT

Map 3b - Bat Transect Results: August

Client:	Persimmon Homes South Coast
Date:	April 2020
Status:	Final

KEY

- Site Boundary
- Common pipistrelle
- Soprano pipistrelle
- Noctule
- Serotine
- Myotis species

N.B. This map shows the location of where bat activity was recorded and does not specifically relate to the number of registrations.

Scale at A4: 1:3,500

0 50 100 Metres

N

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Map 3c Bat Transect Results: September

OAKCROFT LANE, STUBBINGTON, HAMPSHIRE

ECOLOGICAL IMPACT ASSESSMENT

Map 3c - Bat Transect Results: September

Client:	Persimmon Homes South Coast
Date:	April 2020
Status:	Final

KEY

- Site Boundary
- Common pipistrelle
- Soprano pipistrelle

N.B. This map shows the location of where bat activity was recorded and does not specifically relate to the number of registrations.

Scale at A4: 1:3,500

0 50 100 Metres

N

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Map 3d Bat Transect Results: October

OAKCROFT LANE, STUBBINGTON, HAMPSHIRE

ECOLOGICAL IMPACT ASSESSMENT

Map 3d - Bat Transect Results: October

Client:	Persimmon Homes South Coast
Date:	April 2020
Status:	Final

KEY

- Site Boundary
- Common pipistrelle
- Soprano pipistrelle

N.B. This map shows the location of where bat activity was recorded and does not specifically relate to the number of registrations.

Scale at A4: 1:3,500

0 50 100 Metres

N

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Map 4 Bat Automated Detector Survey

OAKCROFT LANE, STUBBINGTON, HAMPSHIRE

ECOLOGICAL IMPACT ASSESSMENT

Map 4 - Bat Automated Detector Survey

Client:	Persimmon Homes South Coast
Date:	April 2020
Status:	Final

KEY

Site Boundary

Automated Detector Locations 2018

Month

- July
- September
- October

N.B. Automated bat detectors were deployed at the site for a five consecutive night period during July, September and October 2018.

Scale at A4: 1:3,500

0 50 100 Metres

N

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Map 5 Reptile Survey

OAKCROFT LANE, STUBBINGTON, HAMPSHIRE

ECOLOGICAL IMPACT ASSESSMENT

Map 5 - Reptile Survey

Client:	Persimmon Homes South Coast
Date:	April 2020
Status:	Final

KEY

Site Boundary

Location of Reptile Refugia

Reptile Survey Results 2018

Species, Count

Common Lizard, One juvenile

N.B. A single juvenile common lizard was recorded during the reptile survey undertaken between July and September 2018. No other species were encountered during the survey.

Scale at A4: 1:3,500

0 50 100 Metres

N

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Map 6 Enhancement Measures

OAKCROFT LANE, STUBBINGTON, HAMPSHIRE

ECOLOGICAL IMPACT ASSESSMENT

Map 6 - Enhancement Measures

Client:	Persimmon Homes South Coast
Date:	April 2020
Status:	Final

KEY

- Site Boundary
- Schwegler 1FF Bat Box
- Schwegler 2F Bat Box
- Schwegler 2H Bird Box
- Schwegler 1B Bird Box
- Log Piles

N.B. Location of enhancement features are not to scale and are indicative of location only.

Basemap reproduced from Persimmon Site Layout Drawing Reference No. A-02-015-SL Revision D, dated March 2019.

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Appendix 1 Proposed Site Layout

Rev	Date	Revision Details	Dr	Ch
F	16.09.20	Planning Officer comments incorporated	br	db
E	22.04.20	Bypass junction amended	br	db
D	25.02.20	see planning cover note	br	db
C	05.11.19	see planning cover note	br	db
B	20.09.19	see planning cover note	br	db
A	22.07.19	see planning cover note dated 23 July	br	db

PERSIMMON
Together, we make a home

Job Title
Oakcroft Lane, Stubbington

Drawing Title
Site Layout

Job No	Drawing No	Rev
220	A-02-015-SL	F

Drawn	Checked	Date
BR	DB	March '19

Scale
1:1000 @ A1 / 1:2000 @ A3
metres 20 40 60 80 100

Status
PLANNING

File Location: x:\south coast\technical\current sites\stubbington - oakcroft\drawings\architect\planning\drawings

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 intentionally 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 (LWS), Sites of Importance for Nature Conservation (SINC) or Sites of Nature Conservation Importance (SNCI), amongst others. The exact level of protection afforded to these sites varies and is normally defined through local planning policy.

Appendix 3 Relevant 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 (as amended). 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.

Badger

The Protection of Badgers Act 1992 consolidates previous legislation (including the Badgers Acts 1973 and 1991 Badgers (Further Protection) Act 1991). It makes it an offence to:

- Kill, injure or take a badger;
- Attempt to kill, injure or take a badger; or
- To damage or interfere with a sett.

The 1992 Act defines a badger sett as 'any structure or place which displays signs indicating current use by a badger'.

Water vole

The water vole is listed in Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and is afforded limited protection under Section 9 of this Act. This makes it an offence to:

- Intentionally kill, injure, or take (handle) a water vole;
- Intentionally or recklessly damage or destroy or obstruct access to any structure or place which water voles use for shelter or protection; or
- Intentionally or recklessly disturb water voles while they are using such a place.

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 and Habitats 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 and 41 habitats of principal importance included on the England Biodiversity List.

Appendix 4 Phase 2 Ecological Assessment (2015)

ECOSA
Ecological Survey & Assessment Limited

OAKCROFT LANE,
STUBBINGTON, HAMPSHIRE

PHASE 2 ECOLOGICAL ASSESSMENT

Final Document

December 2015

Preliminary Ecological Appraisals • Phase 1 and 2 Surveys • NVC • EcIA • Management Plans • Protected Species Licensing
Habitats • Badger • Bats • 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 Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Report Writing 2015[1]. The Phase 2 Ecological Assessment was undertaken in accordance with the following guidelines:

- Hundt L. (2012) Bat Surveys: Good Practice Guidelines, (2nd Ed.), Bat Conservation Trust

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

Description:	Phase 2 Ecological Assessment
Produced For:	Persimmon Homes South Coast
Issue:	Final
Date of Issue:	9th December 2015
Author:	**Richard Chilcott MSc MCIEEM** Ecologist
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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

OAKCROFT LANE,

STUBBINGTON, HAMPSHIRE

PHASE 2 ECOLOGICAL ASSESSMENT

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EXECUTIVE SUMMARY

- A Phase 2 ecological assessment was undertaken at Oakcroft Lane, Stubbington, Hampshire between April and September 2015. The full details of the proposals and associated timescales were unknown at the time of writing. However, it is understood that the proposals will entail the redevelopment of a proportion of the site south of Oakcroft Lane for residential development with associated access and landscaping. The remainder of the site is likely to be used to provide areas of open space.

- The Oakcroft Lane site is situated on the northern outskirts of the village of Stubbington, approximately 2 kilometres (km) to the south-west of Fareham town centre, in an area characterised by residential development interspersed with open countryside. The site itself largely comprises a number of arable fields with small copses and boundary vegetation. The site is bounded to the south by the existing residential development, to the east by Peak Lane, and to the north and west by agricultural fields.

- As a result of the Phase 1 ecological assessment undertaken by ECOSA in February 2014 recommendations were made for further survey in respect of bats, reptiles and great crested newt.

- During the surveys six species of bat were recorded foraging and commuting across the site. Activity was dominated by common pipistrelle and is unlikely to represent an important resource for bat species in the local area.

- Recommendations have been made of the retention of the suitable foraging and commuting habitat as part of the proposals, incorporation of new native species landscaping and the incorporation of a sensitive lighting scheme as part of the proposals.

- No reptiles were recorded as part of the reptile survey undertaken.

- Great crested newt are considered absent from the site. Only one of the ponds surveyed contained water at the time of survey and this was assessed as having poor suitability for the species.

- If works have not commenced by September 2017, it is recommended that the ecological assessment is updated. This is because the species considered during the current survey are mobile and the ecology of the site is likely to change over this period. Once the proposals are finalised a re-assessment of the impact of the proposals on bats may also be necessary.

1.0 INTRODUCTION

1.1 Background

Ecological Survey & Assessment (ECOSA) Limited have been contracted by Persimmon Homes South Coast to undertake a Phase 2 ecological assessment at Oakcroft Lane, Stubbington, Hampshire. The site is centred on National Grid Reference (NGR) SU 5536 0454.

The requirement to carry out further Phase 2 survey works was identified during the initial extended Phase 1 habitat survey carried out by ECOSA on 24th February 2014[2]. During the Phase 1 survey habitats within the site were assessed as having potential to support foraging and commuting bats, reptiles and great crested newt.

It was therefore recommended that Phase 2 bat transect surveys, reptile surveys and great crested newt surveys were carried out to assess the status of these species groups and inform the likely impacts of the proposed works.

The Phase 2 surveys were aimed at determining the status of foraging and commuting bats, reptiles and great crested newt at the site, and if present, to record the number, species and location of individuals.

This report presents the findings of the Phase 2 ecological surveys carried out by ECOSA during the 2015. The report also provides an assessment of potential ecological impacts of the proposed development on bats, reptiles, and great crested newt and provides recommendations based on the findings of the surveys and the identified impacts. This report should be read in conjunction with the extended Phase 1 ecological assessment report[2].

1.2 Aims and Scope of Report

The Phase 2 ecological survey works were aimed at providing a robust assessment of the status of roosting, foraging and commuting bats, protected reptile species and great crested newt at the site in order to inform any measures necessary to mitigate impacts to protected species at the site.

1.3 Site Setting and Description

The Oakcroft Lane site is situated in the South Coast Plain Natural Character Area, described by Natural England as follows[3]:

[2] ECOSA (2015) Oakcroft Lane, Stubbington - Extended Phase 1 Ecological Assessment FINAL 091215

[3]National Character Areas (NCA) are defined by Natural England as 'areas defined at the national level, which describe the geographical, ecological and historical variations in landscape character that make one area different from another. Their boundaries follow natural lines in the landscape rather than administrative boundaries, making them a good decision-making framework for the natural environment.' (https://www.gov.uk/government/publications/national-character-area-profiles-data-for-local-decision-making - Natural England, first published 30th September 2014)

"The South Coast Plain National Character Area (NCA) is a flat, coastal landscape with an intricately indented shoreline lying between the dip slope of the South Downs and South Hampshire Lowlands and the waters of the English Channel, Solent and part of Southampton Water. The coastline includes several major inlets which have particularly distinctive local landscapes and intertidal habitats of international environmental importance for wildfowl and waders. Chichester Harbour Area of Outstanding Natural Beauty lies within the NCA and the foothills of the South Downs, along the northern boundary, fall within the South Downs National Park. Some three per cent of the area is designated as a Site of Special Scientific Interest, and there are four Special Protection Areas, two Special Areas of Conservation and four Ramsar sites: Chichester and Langstone Harbour, Pagham Harbour, The Solent and Southampton Water and Portsmouth Harbour."

The site is situated on the northern outskirts of the village of Stubbington, approximately two kilometres (km) to the south-west of Fareham town centre, in an area characterised by residential development interspersed with open countryside.

The wider landscape comprises the village of Stubbington to the south and the town of Fareham to the north and east. To the west lies open countryside with occasional areas of woodland and the River Meon. The Solent lies towards the south and west separated from the site by open countryside and existing residential development.

The site itself comprises a number of arable fields, small copses and boundary vegetation. The site is bounded to the south by the existing residential development, to the east by Peak Lane, and to the north and west by agricultural fields with Oakcroft Lane separating the northern and southern parcels of land.

1.4 Site Proposals

The full details of the proposals and associated timescales were unknown at the time of writing. However, it is understood that the proposals will entail the redevelopment of a portion of the site south of Oakcroft Lane for residential development with associated access and landscaping. The remainder of the site is likely to be used to provide areas of open space.

2.0 METHODS

2.1 Introduction

This section details the methods used during the Phase 2 ecological assessment undertaken at Oakcroft Lane, Stubbington between April and September 2015.

2.2 Phase 2 Bat Survey

2.2.1 Phase 2 Bat Survey Methods

Phase 2 bat transect surveys were carried out between April and September 2015 to allow an assessment of the status of bats at the site to be made. Two surveyors walked a predetermined transect route across the site on a monthly basis. Six bat transect surveys were completed in total. The transect route ensured that surveyors visited key areas of the site such as hedgerows and woodland edge to east of the site and hedgerow along the northern boundary. The dusk transect surveys commenced up to 15 minutes before sunset and lasted for approximately 1.5 to 2 hours, depending on the level of bat activity recorded.

During the transect surveys, one surveyor was equipped with a Pettersson D240X time-expansion bat detector linked to an Edirol RO-9 recording device for the full duration of each survey. The second surveyor navigated and recorded bats heard or seen by the first surveyor on a field survey sheet and a map.

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 such as woodland edges and hedgerows.

2.2.2 Phase 2 Bat Survey Details

The Phase 2 bat surveys were undertaken between April and September 2015 and comprised of six dusk transect surveys undertaken by two experienced ECOSA surveyors. **Table 1** provides details of each visit.

Table 1: Bat transect survey details at Oakcroft Lane, Stubbington

Survey Date	Duration	Weather Conditions	Sunset/ Sunrise Time
29th April 2015	20:23 – 21:59	11°C, 50% cloud cover, some rain prior to survey, light breeze	20:23
27th May 2015	21:00 – 22:45	13°C, 70% cloud cover, dry, light breeze	21:03
17th June 2015	21:29 – 22:59	17°C, 50% cloud cover, dry, light breeze	21:21

Survey Date	Duration	Weather Conditions	Sunset/ Sunrise Time
15th July 2015	21:00 – 22:40	19°C, 70% cloud cover, fair, still	21:12
10th August 2015	20:35 – 22:32	18°C, 80% cloud cover, mild and overcast, still	20:35
30th September 2015	18:42 – 20:49	14°C, 0% cloud cover, dry and mild, light wind	18:45

2.2.3 Phase 2 Bat Survey Personnel

Phase 2 bat transect surveys were co-ordinated by Ecologist Richard Chilcott of ECOSA (Natural England Licence Registration No. 2015-16561-CLS-CLS) with the assistance of suitably qualified and experienced ECOSA surveyors.

2.2.4 Phase 2 Bat Survey Equipment

During the Phase 2 survey surveyors were equipped with a Pettersson D240x time expansion bat detector. The Pettersson detectors were connected to Edirol R-90 recorders for the full duration of the surveys. Recordings made with the Pettersson detectors were later analysed using Sonobat® (v2.9.7) to confirm the identity of any species encountered.

2.2.5 Phase 2 Bat Survey Limitations

Some bat species, e.g. long-eared *Plecotus* bat species[4], 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 Phase 2 bat surveys, leading to under-recording.

2.3 Phase 2 Reptile Survey

2.3.1 Phase 2 Reptile Survey Methods

The Phase 2 reptile survey was undertaken in accordance with the Herpetofauna Workers Manual[5]. The reptile survey consisted of the laying of 60 bitumen roofing felt mats in areas of suitable habitat on the site. Typically, this included areas of unmanaged grassland and tall ruderal vegetation with good exposure. The mats were distributed in all areas considered to offer potential reptile habitat.

[4] 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.

[5] Joint Nature Conservation Committee (2012) Herpetofauna Workers Manual. Peterborough, UK

The refugia warm more rapidly than the surrounding environment and reptiles, being 'cold blooded', use them to thermoregulate. Inspection of refugia is most effectively carried out 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. Inspections are generally ineffective in cold, wet conditions or in very hot sunny weather. The use of such refugia is an effective way of surveying for all species of reptile and current survey guidance[6] states that seven inspections are sufficient to confirm presence/probable absence.

2.3.2 Phase 2 Reptile Survey Details

The refugia were distributed across the site on 29th April 2015. Refugia were left to 'bed in' and then subsequently inspected for reptiles on six occasions in May and July 2015. During each survey visit the species, sex (if possible) and age of all reptiles encountered was recorded. The details of weather conditions for the Phase 2 reptile survey are provided in **Table 2**.

Table 2: Reptile survey details at Oakcroft Lane, Stubbington

Survey Date	Temp (°C)	Weather Conditions
28th May 2015	17	70% cloud cover, sunny with cloud, windy
15th June 2015	19	80% cloud cover, overcast, still
25th June 2015	24	10% cloud cover, clear and warm, still
1st July 2015	21	5% cloud cover, clear and warm, still
8th July 2015	19	90% cloud cover, overcast, light breeze
15th July 2015	18	95% cloud cover, overcast, still
23rd July 2015	15	100% cloud cover, overcast, still

2.3.3 Phase 2 Reptile Survey Personnel

The Phase 2 reptile surveys were carried out by suitably qualified and experienced ECOSA surveyors.

2.3.4 Phase 2 Reptile Survey Equipment

The Phase 2 reptile survey used 60 refugia, comprising approximately 500 millimetre (mm) x 500mm sheets of bitumen roofing felt.

2.3.5 Phase 2 Reptile Survey Limitations

No significant limitations with the Phase 2 reptile survey were associated with the survey undertaken.

[6]Froglife (1999) Froglife Advice Sheet 10 Reptile Survey: An introduction to planning, conducting and interpreting, surveys for snake and lizard and conservation Available from: http://www.froglife.org/

2.4 Phase 2 Great Crested Newt Survey

2.4.1 Phase 2 Great Crested Newt Survey Methods

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 (m) radius of the site. The 500m is a standardised search radius to assist in the assessment of the potential of a site and its surrounding habitat to support this species, based on current Natural England guidance[7].

Those ponds and waterbodies located within a 500m radius of the site, where access permitted, were subject to a Habitat Suitability Index (HSI) assessment[8]. The HSI assessment was completed using the following key habitat criteria to establish the suitability of waterbodies for supporting great crested newts:

- SI_1 = geographical location
- SI_2 = pond area
- SI_3 = pond permanence
- SI_4 = water quality
- SI_5 = pond shading
- SI_6 = number of waterfowl
- SI_7 = occurrence of fish
- SI_8 = pond density
- SI_9 = suitability of surrounding terrestrial habitat
- SI_{10} = macrophyte (aquatic plant) content

The assessment provides a final numerical score for a surveyed pond which in turn results in a qualitative suitability score ranging from 'poor' to 'excellent'. This qualitative score can then be used, within reason, to indicate whether further detailed investigations are necessary or whether a particular waterbody can be 'scoped out' as unsuitable for great crested newts.

Given the findings of the initial visit for great crested newt, no further survey work was undertaken.

2.4.2 Phase 2 Great Crested Newt Survey Details

The initial great crested newt survey visit was undertaken on 29th April 2015. The weather conditions during the survey comprised rain immediately before, 11°C with approximately 50% cloud cover and a light breeze.

[7] English Nature (2001) Great Crested Newt Mitigation Guidelines. Peterborough
[8] Oldham, RS *et al* (2000). Evaluating the suitability of habitat for the great crested newt *Triturus cristatus*. Herpetological Journal 10 (4). 143-155.

2.4.3 Phase 2 Great Crested Newt Survey Personnel

The Phase 2 great crested newt survey visit was undertaken by Simon Mason of ECOSA (Natural England Licence Registration Number 2015-16987-CLS-CLS).

2.4.4 Phase 2 Great Crested New Survey Limitations

No significant limitations with the Phase 2 great crested newt survey were associated with the survey undertaken.

3.0 RESULTS

3.1 Introduction

This section details the results of the Phase 2 ecological assessment undertaken at Oakcroft Lane, Stubbington between April and September 2015.

3.2 Phase 2 Bat Survey Results

The bat transect surveys recorded six species of bat at the site: common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, serotine *Eptesicus serotinus* noctule *Nyctalus noctula*, long-eared bat[9] *Plecotus* species and *Myotis* bat species[10]. The level of species diversity recorded is considered to be largely low with small numbers of registrations of common species made during the survey.

Common pipistrelle was the most frequently recorded species within the site. Only small numbers of passes of soprano pipistrelle and serotine were recorded throughout the surveys. Very occasional registrations of long-eared bat, *Myotis* bat species and noctule were also recorded.

The activity levels recorded were generally low throughout the survey undertaken and dominated by common and widespread species. The activity was largely recorded along the western boundary of the site, the southern parcel and along Oakcroft Lane. Further details of each transect is provided in **Table 3** below with areas of highest bat activity are plotted on **Map 2**.

Table 3: Bat activity recorded during transect surveys at Oakcroft Lane, Stubbington

Survey Date	General Bat Activity at the Site
29th April 2015	Very low levels of bat activity were recorded during the survey, totalling four registrations of common pipistrelle. Two of the registrations were recorded along the western boundary of the site with two registrations also recorded associated with vegetation along Oakcroft Lane.

[9] 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.

[10] 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.

Survey Date	General Bat Activity at the Site
27th May 2015	The vast majority of the activity recorded was attributable to common pipistrelle with single registrations of noctule, long-eared bat species and *Myotis* bat species also made during the survey. The activity recorded was spread throughout the site and associated with the western boundary of the site and southern parcel of the site. Relatively more activity was recorded within this month than other survey months, however, the generally level of activity was low to moderate overall.
17th June 2015	The vast majority of the activity recorded during this survey was attributable to common pipistrelle with a single recording of noctule also made during the survey. The activity was spread throughout the site with the highest area of activity recorded associated with the hedgerows in the southern parcel of land and vegetation associated with Oakcroft Lane.
15th July 2015	The vast majority of the activity recorded during this survey was attributable to common pipistrelle with three registrations of serotine also recorded during the survey. The activity was largely recorded along the vegetation along Oakcroft Lane as well as the southern field. The three serotine registrations made were associated with the small woodland around to the south of the site.
10th August 2015	The vast majority of the activity was attributable to common pipistrelle with three registration of serotine as well as a single registration of long-eared bat species and *Myotis* bat species. The activity was recorded throughout the site with registrations recorded along the western site boundary, Oakcroft Lane and within the southern parcel of land.
30th September 2015	Only very low levels of activity were recorded during this survey with a total of three registrations made comprising two registrations of soprano pipistrelle and a single registration of common pipistrelle. Two of the registrations were made along the western site boundary with a single registration made along vegetation to the north of Oakcroft Lane.

3.1.1 Status of Bat Species Recorded

This section describes the national status of the bat species recorded during transect surveys in 2015 at the site, based upon the Bat Conservation Trust Bat Atlas[11].

Common and Soprano Pipistrelle

Common and soprano pipistrelle are common and widespread across much of Europe and the most common species of bat in the UK[12] [13]. The distribution of both species extends to all corners of England, Scotland and Wales and much of Northern Ireland. In the UK in 2005, population estimates were at just under 2.5 million common pipistrelle and 1.3 million soprano pipistrelle, although these estimates are

[11] Phil Richardson (2000) Distribution atlas of bats in Britain and Ireland 1980 – 1999, Bat Conservation Trust.
[12] Bat Conservation Trust, BCT (2010) Common Pipistrelle, accessed 24th July 2012 http://www.bats.org.uk/publications_detail.php/217/species_information_sheet_common_Pipistrelle
[13] Bat Conservation Trust, BCT (2010) Soprano Pipistrelle accessed 10th October 2015. http://www.bats.org.uk/publications_detail.php/217/species_information_sheet_soprano_Pipistrelle,

based on limited population data and exclude Northern Ireland[14]. Populations of pipistrelle species declined by 70% in the UK between 1978 and 1993.

Common pipistrelle was most frequently recorded during the transect surveys with only two individual registrations of soprano pipistrelle recorded during the September survey. Activity was predominantly recorded associated with areas of hedgerow, trees and woodland. Given the distribution of these species across the site, and following analysis of registration timings, it is estimated that low numbers of common pipistrelle and were foraging and commuting at the site in any one survey night, with small numbers of soprano pipistrelle present. This number will inevitably vary temporally.

Long-eared bat

Occasional registrations of long-eared bat were recorded as part of the transect surveys. Whilst it is not possible to confirm the species of long-eared bat utilising the site, it is considered highly likely to be the more common and widespread brown long-eared bat as opposed to the rare and restricted grey long-eared bat.

Notwithstanding this, the small number of registrations would indicate that the site is unlikely to be an important foraging resource for the species.

Myotis Bat Species

Seven *Myotis* species bats are found in the UK, and these range from very rare species (e.g. Bechstein's bat *Myotis bechsteinii*) to commoner species (e.g. Daubenton's bat *Myotis daubentonii*). Generally *Myotis* bats are well-distributed across Europe.

Only a two passes of unidentified bats of this genus was recorded during the surveys undertaken.

It is considered that the site is being used by low numbers of bats of this genus and no meaningful estimate of numbers can be made. However, given the low numbers recorded it is considered unlikely that the site forms an important foraging resource for *Myotis* bat species.

Noctule

Noctule is a migrant species in mainland Europe, but this behaviour is not known in the UK other than a few found in Orkney, Shetland and on North Sea oil rigs. It is common throughout much of Europe, but not in southern France or Iberia[15].

[14] Battersby. J. (Ed) & Tracking Mammals Partnership. (2005) UK Mammals Species Status and Population Trends. First Report by the Tracking Mammals Partnership. JNCC/Tracking Mammals Partnership, Peterborough.
[15] Bat Conservation Trust, BCT (2010) Noctule Bat.
http://www.bats.org.uk/publications_detail.php/217/species_information_sheet_Noctule, accessed 10th October 2015.

The UK population, which is thought to exist mainly in England, is estimated at 50,000[14]. This species is relatively common in the UK but has become scarce in areas of intensive agriculture. Noctule are absent from Ireland. Population numbers have declined in the UK as a result of modern agricultural practices leading to loss of permanent pasture, woodland edges and hedgerows that are rich in invertebrate fauna. Heavy management of suitable mature trees may also be a factor in the decline[15].

Only two registrations of noctule was recorded during the transect surveys. Therefore, it is considered unlikely that the site provides an important resource for the species.

Serotine

Serotine bat is one of the less common species in the UK. Its distribution is restricted mainly to the south of a line between The Wash and South Wales. It is found across much of Europe, where it is declining in abundance in some areas but may be increasing its range northwards[16].

Small numbers of serotine were recorded across the site on a number of occasions with a peak count of three registrations on any one survey. Given the small numbers of registrations made it is considered that the species is unlikely to be reliant on the site as a foraging resource.

3.1.2 Assessment of Value to Foraging and Commuting Bats

Phase 2 bat surveys at the site recorded at six seven species of bat foraging and commuting through on-site habitats in low numbers.

Current guidance on valuing bats in Ecological Impact Assessment[17] was consulted to assess the value of the on-site foraging and commuting habitat to bats. **Table 4** shows the geographic level of value of foraging and commuting habitat at the site. Considering the results of the activity surveys, site is considered to be of **local importance** to foraging and commuting bats.

Table 4: Value of the site to bat species/species complexes

Species	Foraging and Commuting Value
Common pipistrelle	Local
Soprano pipistrelle	Local
Long-eared bat	Local
Noctule	Local
Myotis bat species	Local
Serotine	Local

[16] Bat Conservation Trust, BCT (2010) Serotine Bat. http://www.bats.org.uk/publications_detail.php/217/species_information_sheet_Serotine, accessed 10th October 2015

[17] 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)

It is considered that the areas of relatively greater importance in terms of the site are the mature trees, hedgerows and small woodland copse areas.

3.2 Phase 2 Reptile Survey Results

No reptiles were recorded as part of the Phase 2 reptile survey undertaken at the site. Given that the survey work was undertaken in line with current best practice guidance it is considered that reptiles are **likely absent** from the site.

3.3 Phase 2 Great Crested Newt Survey Results

The three ponds identified as part of the Phase 1 survey were visited on 29th April 2015 in order to assess their suitability for supporting great crested newt and to undertake a Phase 2 great crested newt survey. Two of the ponds visited were dry or no longer present, whilst a third pond was assessed as being unsuitable for supporting great crested newt. A summary of these findings is provided in **Table 5**.

Table 5: Waterbodies located within a 500m radius of the site

Pond Number (see Map 3)	Approximate Distance and Direction from Site Boundary	Waterbody Description	Suitability for Supporting Great Crested Newt
Pond 1	On-site	The pond was dry at the time of survey.	Given that the pond was dry during the great crested newt breeding season the pond is unsuitable for supporting the species.
Pond 2	10m south	Access was not possible during the survey. However, from the view available from accessible areas the pond was recorded as being a managed amenity pond with a small fountain and paved margins.	The pond is considered to be unsuitable lacking natural vegetation for egg laying, having a flow of water from the water feature present and potentially stocked with fish which would predate on eggs and larvae. The HSI assessment for this pond identified the pond as having poor suitability for supporting great crested newt.
Pond 3	40m west	This pond no longer exists and appears to have been converted to an area of hardstanding.	

The single pond holding water at the time of survey was an ornamental pond with containing a water feature which was considered unsuitable for supporting great crested newt. Therefore, it is considered that great crested newt is **likely absent** from the site.

4.0 EVALUATION, IMPACTS AND RECOMMENDATIONS

4.1 Introduction

This section presents the conclusions of the Phase 2 Ecological Assessment undertaken at Oakcroft Lane, Stubbington, Hampshire. It provides an assessment of the likely ecological constraints to the proposed development in relation to bats, reptiles and great crested newt and details recommendations for any mitigation measures considered necessary.

4.2 Bats

4.2.1 Summary Evaluation

The Phase 2 bat suveys confirmed that the site provides habitat for generally low numbers of bats. A total of six bat species were recorded using the boundary hedgerows, mature trees and woodland for foraging and commuting. The species diversity is low and the site is unlikely to represent an important foraging resource for bats in the local area. No particularly rare species of bat were recorded and activity was dominated by common pipistrelle.

4.2.2 Impacts of Proposed Development

Vegetation removal has the potential for an overall loss in suitable foraging and commuting habitat at the site whilst increased lighting at the site could cause disturbance to low numbers of foraging and commuting bat species.

4.2.3 Recommendations

It is recommended that the new landscaping at the site largely comprises native species wherever possible to provide new habitat for foraging and commuting bats. Recommendations have already been made within the Phase 1 ecological assessment for retention of existing wooded vegetation, where possible, and the incorporation of new hedgerow planting.

It is recommended that the lighting to be installed comprises hooded luminaires directed away from vegetation. The bulbs will be LED and at the warmer end of the spectrum (i.e. avoiding blue or white light). LED lights emit much lower levels of UV and therefore have a lower impact on wildlife[18]. The new lighting will 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)[19] will be followed.

[18] *Wildlife and Artificial Lighting Seminar*, 21st – 22nd March 2014, Arup London, Bat Conservation Trust.
[19] CIBSE (1992) *Lighting Guide 6: The Outdoor Environment*; CIBSE (2002) *Code for Lighting*, Butterworth-Heinemann, UK.

As an enhancement measure, it is recommended that new bat boxes of varying designs, be erected on retained trees or new buildings. These would provide new roosting opportunities for roosting bats. Five Schwegler 1FF and five Schwegler 2F (or similar) would provide a suitable enhancement.

4.3 Reptiles

4.3.1 Summary Evaluation

No reptiles were recorded within the site during the Phase 2 reptile survey work undertaken. Therefore, it is considered that reptiles are likely absent from the site.

4.3.2 Impacts of Proposed Development

Given the likely absence of the species group form the site no impacts in relation to reptiles are anticipated as a result of the development.

4.3.3 Recommendations

Given the findings of the survey work no recommendations in relation to reptiles are considered necessary.

4.4 Great Crested Newt

4.4.1 Summary Evaluation

Two of the identified ponds were dry or no longer present at the time of survey in April 2015 undertaken whilst the single off-site pond recorded as still supporting water was considered unsuitable for supporting the species. Therefore, it is considered that great crested newt are likely to be absent from the site.

4.4.2 Impacts of Proposed Development

Given the likely absence of great crested newt from the site no impacts on this species are anticipated as a result of the proposals.

4.4.3 Recommendations

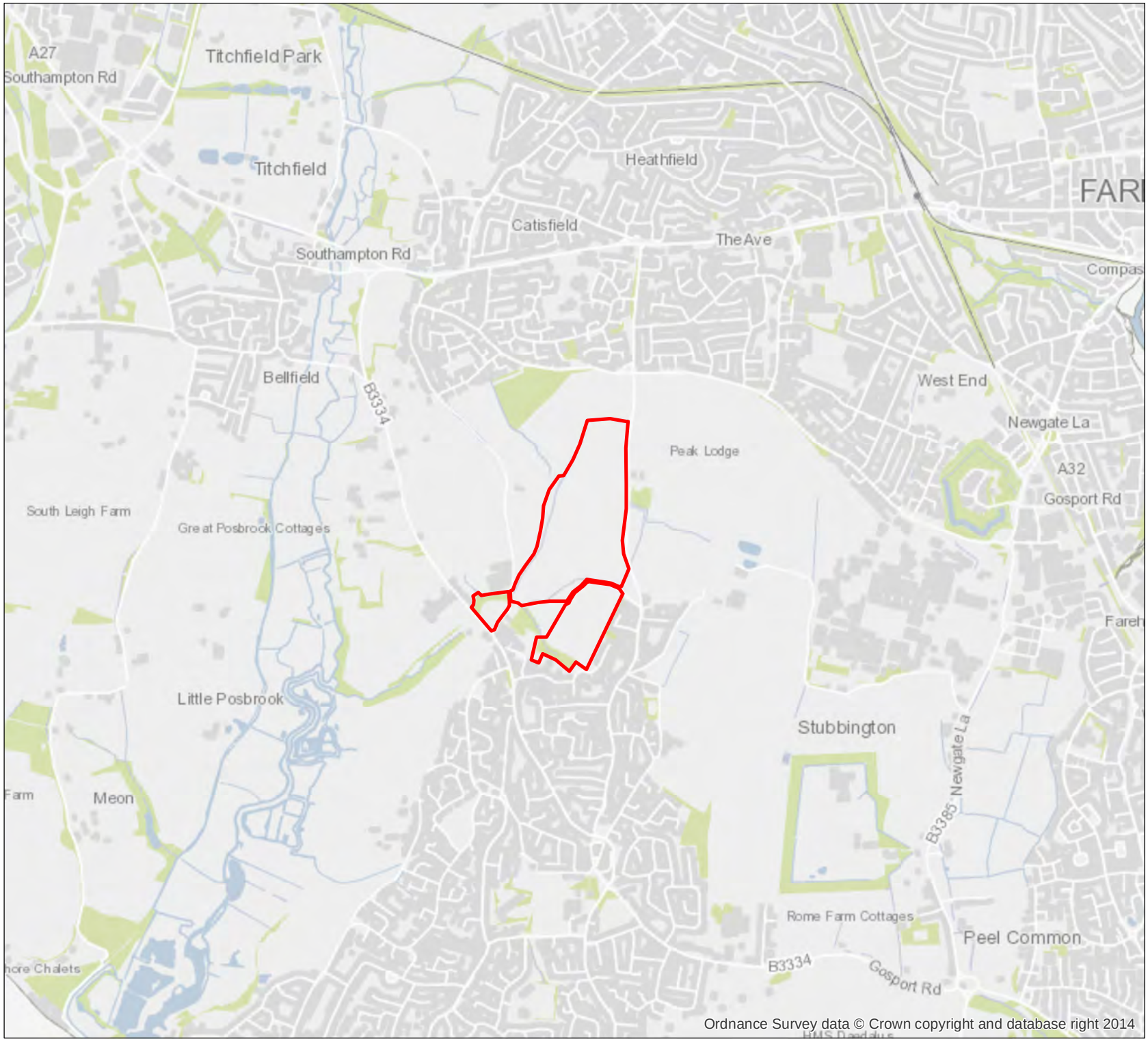
Given the findings of the survey work no further recommendations in relation to great crested newt are considered necessary.

4.5 Updating Survey

If works have not commenced by September 2017, it is recommended that the ecological assessment is updated. This is because the species considered during the current survey are mobile and the ecology of the site is likely to change over this

period. Once the proposals are finalised a reassessment of the impact of the proposals on bats may also be necessary.

Map 1 Site Location Plan



OAKCROFT LANE, STUBBINGTON, FAREHAM, HAMPSHIRE

PHASE 2 ECOLOGICAL ASSESSMENT

Map 1 - Site Location

Client:	Persimmon Homes
Date:	December 2015
Status:	Final

KEY

Site Boundary

Scale at A4: 1:24,000

0 100 200 400 600 800 Metres

N

ECOSA
Ecological Survey & Assessment Limited
ECOSA Ltd., Ten Hogs House, Manor Farm Offices,
Flexford Road, North Baddesley, Hampshire SO52 9DF
Telephone: 02380 261065
Email: info@ecosa.co.uk Web: www.ecosa.co.uk

Map 2 Phase 2 Bat Transect Results

OAKCROFT LANE, STUBBINGTON, FAREHAM, HAMPSHIRE

PHASE 2 ECOLOGICAL ASSESSMENT

Map 2 - Phase 2 Bat Transect Results

Client: Persimmon Homes

Date: December 2015 | Status: Final

KEY

- Site Boundary
- Woodland
- Scattered Scrub
- Scattered Trees
- I — Improved Grassland
- SI — Semi-improved Grassland
- Tall Ruderal Vegetation
- Pond
- Watercourse
- A — Arable Land
- Hedgerow

Bat Transect

- Transect Route
- 1-10 Passes of Common Pipistrelle
- 10-20 Passes of Common Pipistrelle
- 1 Pass of Soprano Pipistrelle
- 1-3 Passes of Serotine
- 1 Pass of *Myotis* species
- 1 Pass of Long-eared bat species
- 1 Pass of Noctule

N.B. All bat activity plotted on the map represents survey data recorded from April to September 2015 inclusive.

N

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Map 3 Pond Locations

OAKCROFT LANE, STUBBINGTON, FAREHAM, HAMPSHIRE

PHASE 2 ECOLOGICAL ASSESSMENT

Map 3 - Pond Locations

Client:	Persimmon Homes
Date:	December 2015
Status:	Final

KEY

- Site Boundary
- Great Crested Newt Buffer - 500m Radius
- Pond Locations
- (1) Pond No's (As Referenced in Report)

Scale at A4: 1:12,000

0 50 100 200 300 400 Metres

N

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Appendix 1 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 2010. They are afforded full protection under Section 9(4) of the Act and Regulation 41 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.

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 2010. They are afforded full protection under Section 9(4) of the Act and Regulation 41 of the Regulations (in England and Wales only) and the Wildlife and Countryside Act 1981 (as amended). However, the distribution of these species are restricted to only a very few sites.

Appendix 5 Protected and Notable Species Appraisal Methods

Bats

The survey conformed to current Bat Conservation Trust guidelines (Collins, 2016). An assessment was made of the suitability of trees on the site and immediately on the site boundary to support roosting bats based on the presence of features such as holes, cracks, splits, loose bark and ivy cladding.

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 potential for the site to support roosting, foraging and commuting bat is based on a four-point scale as detailed in **Appendix 6**.

Otter

The otter appraisal was based on an assessment of the suitability of the habitat present within the site to support otter by reference to habitat type (such as rivers, streams, ditches, wetlands, reed beds, lakes, ponds and reservoirs), proximity of the site to freshwater and potential important feeding resources (such as fisheries), presence of habitat features which could provide opportunities for resting places and/or holts (such as tunnels, hollows at the base of trees and presence of dense, undisturbed habitat). During the survey attention was paid to the presence of evidence such as spraints, feeding remains, footprints and slides.

Badger

The survey involved a detailed investigation of the site to identify evidence of badger residence, foraging or territorial activity. Particular emphasis was placed on locating badger setts, paths, and signs of territorial activity such as latrine sites both on-site and within immediately adjacent areas where access was possible. The status of setts (where appropriate) has been based on standard terminology as detailed in **Appendix 8**.

Hazel Dormouse

The appraisal for the potential of the site to support 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 potential presence of hazel dormouse.

Water Vole

The water vole appraisal was based on an assessment of the suitability of the habitat present within the site to support water vole by reference to habitat type (such as rivers, streams, ditches, wetlands, reed beds, lakes, ponds and reservoirs), bank structure and the bank side vegetation. Water voles generally require sloping banks in which to burrow and well-developed

bank side vegetation to provide shelter and food. During the survey attention was paid to the presence of burrows, latrines, feeding remains, trails and footprints.

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 potential 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. The suitability of on-site ponds and terrestrial habitat is considered in relation to the presence of ponds within the wider area, as identified within the desktop study (Paragraph 3.4.3), and their suitability to be used as a network.

Invertebrates

An assessment was made of the site for its potential value 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) species[14], 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.

[14] 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.

Appendix 6 Appraisal Criteria 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 15**[15].

Table 15: 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 of 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.

[15] Table adapted from (Collins, 2016)

Appendix 7 Automated Detector Settings

Automated Detector Settings

Automated 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 16** details the standard settings used by ECOSA during automated detector surveys undertaken.

Table 16: Standard automated detector 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 automated detector are subsequently converted to zero crossing (.zc) files which and 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 17**.

Table 17: 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 8 Badger Sett Status and Level of Use

Sett Status

Main Setts

These are in continuous use, they are large, well-established, often extensive and may have large spoil heaps outside the entrances. There are likely to be well-worn paths leading to the sett. It is where the cubs are most likely to be born. There is generally only one main sett per social group of badgers. Main setts are usually built in very specific positions, where there is the right combination of soil (to facilitate drainage and ease of digging), aspect, slope and cover. Since suitable sett sites are at a premium, main setts are usually long-established, and may have been in use for decades or even centuries. The average number of holes is15.

Annexe Setts

These occur in close association with the main sett (usually within 150 metres), and are linked to the main sett by clear well-used paths. Annexe setts consist of six holes on average, but they are not necessarily in use all the time, even if the main sett is very active. If a second litter of cubs are born, this may be where they are reared.

Subsidiary Setts

These comprise five holes on average, but are not in continuous use and are usually some distance from the main sett (50 metres or more). There is no obvious path connecting them to the main sett and their ownership can often only be determined by bait marking.

Outlying Setts

These consist of only one or two holes. They can be found anywhere within the territory and usually have small spoil heaps, indicating that they are not very extensive underground. There are no obvious paths connecting them to other setts, they are only used sporadically and often used by foxes or rabbits when not occupied by badgers.

Sett Use and Levels of Activity

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

Well-used Holes

These are clear of any debris or vegetation, are obviously in regular use, and may or may not have been excavated recently.

Partially-used holes

These are not in regular use and have debris such as leaves and twigs in the entrance, or have moss and/or other plants growing in or around the entrance. They could be in regular use after a minimal amount of clearance.

Disused holes

These have not been in use for some time, are partially or completely blocked, and could not be used without a considerable amount of clearance. If the hole has been disused for some time, all that may be visible is a depression in the ground where the hole used to be, and the remains of the spoil heap, which may be covered in moss or plants.

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

Appendix 9 Statutory Designated Sites within the Desktop Study Area

Details of statutory designated sites within the desktop study area, as listed in Paragraph 4.2.1, are provided in **Table 18**.

Table 18: Statutory Designated Sites Located Within the Desktop Study Area

Site Name	Solent and Southampton Water
Site Designation	Rasmar site
Approximate Relative Location	320 metres west
Reasons for Designation:	

The site is designated under Ramsar Criterion 1, 2, 5 and 6.

Criterion 1 – The site is one of the few major sheltered channels between a substantial island and mainland in European waters, exhibiting an unusual strong double tidal flow and has long periods of slack water at high and low tide. It includes many wetland habitats characteristic of the biogeographic region: saline lagoons, saltmarshes, estuaries, intertidal flats, shallow coastal waters, grazing marshes, reedbeds, coastal woodland and rocky boulder reefs.

Criterion 2 – The site supports an important assemblage of rare plants and invertebrates. At least 33 British Red Data Book invertebrates and at least eight British Red Data Book plants are represented on site.

Criterion 5 – species with international importance:

- 51343 waterfowl, count in winter (1998/99 – 2002/2003).

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

Qualifying species/populations (as identified at designation)

Species with peak counts in spring/autumn:

- Ringed plover

Species with peak counts in winter:

- Dark-bellied brent goose;
- Eurasian teal; and

Black-tailed godwit.

Site Name	Solent and Southampton Water
Site Designation	SPA
Approximate Relative Location	320 metres south-west
Reasons for Designation:	

The site qualifies for supporting the following Annex I species:

Breeding

- Common *Tern Sterna hirundo*, 267 pairs representing at least 2.2% of the breeding population in Great Britain;
- Little Tern *Sterna albifrons*, 49 pairs representing at least 2.0% of the breeding population in Great Britain;
- Mediterranean *Gull Larus melanocephalus*, 2 pairs representing at least 20.0% of the breeding population in Great Britain;
- Roseate Tern *Sterna dougallii*, 2 pairs representing at least 3.3% of the breeding population in Great Britain; and

- Sandwich Tern *Sterna sandvicensis*, 231 pairs representing at least 1.7% of the breeding population in Great Britain.

This site also qualifies by supporting populations of European importance of the following migratory species:

Over winter

- Black-tailed Godwit *Limosa limosa islandica*, 1,125 individuals representing at least 1.6% of the wintering Iceland - breeding population;
- Dark-bellied Brent Goose *Branta bernicla bernicla*, 7,506 individuals representing at least 2.5% of the wintering Western Siberia/Western Europe population;
- Ringed Plover *Charadrius hiaticula*, 552 individuals representing at least 1.1% of the wintering Europe/Northern Africa - wintering population; and
- Teal *Anas crecca*, 4,400 individuals representing at least 1.1% of the wintering North-western Europe population.

The site also qualifies under Article 4.2 for regularly supporting at least 20,000 waterfowl.

Site Name	Titchfield Haven
Site Designation	SSSI
Approximate Relative Location	320 metres south-west
Reasons for Designation:	
Designated for its wetland habitats including fens, fen meadow, brackish marsh and salt marsh. Only an important area for surface-feeding duck including large number of wigeon *Anas penelope* and teal. A rich wetland breeding bird community is also present including large populations bearded reedling *Panurus biarmicus*, reed warbler *Acrocephalus scirpaceus* and sedge warbler *Acrocephalus schoenobaenus*.	

Site Name	Titchfield Haven
Site Designation	NNR
Approximate Relative Location	820 metres south-west
Reasons for Designation:	
The boundaries for this site overlap with the boundaries of the Tichfield Haven SSSI. The site is designated for its open water habitat and is under the ownership of Hampshire County Council.	

Site Name	Titchfield Haven
Site Designation	LNR
Approximate Relative Location	980 metres south-west
Reasons for Designation:	
As with other Local Nature Reserves this site is designated primarily for its amenity value and provides an important refuge for ducks, geese and wading birds as well as providing breeding ground for avocet. The boundaries overlap with the Titchfield Haven SSSI.	

Appendix 10 Confidential Badger Appendix

Appendix 11 Great Crested Newt eDNA Results

SureScreen Scientifics

Folio No: E5081
Report No: 1
Order No: 4730
Client: ECOSA
Contact: Zoe
Contact Details: zoe@ecosa.co.uk
Date: 16/05/2019

TECHNICAL REPORT

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

Date sample received at Laboratory: 14/05/2019
Date Reported: 16/05/2019
Matters Affecting Results: None

RESULTS

Lab Sample No.	Site Name	O/S Reference	SIC	DC	IC	Result	Positive Replicates
2207	4730 Ockcroft Lane	-	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 security.

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: Chris Troth **Approved by:** Sarah Evans

End Of Report