

**SOUTHLEIGH PARK HOUSE, EASTLEIGH ROAD,
HAVANT, HAMPSHIRE**

ECOLOGICAL ASSESSMENT

Final Document (Revision 2)

April 2018

Preliminary Ecological Appraisals • Phase 1 and 2 Surveys • NVC • EclA • Management Plans • Protected Species Licensing
Habitats • Badger • Bats • Dormouse • Birds • Reptiles • Amphibians • Invertebrates • Riparian and Aquatic Species

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

Registered Office: 3-4 Eastwood Court, SO51 8JJ Registered in England No: 6129868



ECOSA Quality Assurance Record

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

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Author:	 Georgina Timmis BSc (Hons) GradCIEEM Ecologist
Checked and Reviewed by:	 Simon Boswell MSc MCIEEM Senior Ecologist and GIS Specialist

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

² www.cieem.net

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EXECUTIVE SUMMARY

- A suite of ecological surveys has been undertaken between July 2015 - October 2016 at Southleigh Park House, Eastleigh Road, Havant, Hampshire PO9 2PE. The proposals comprise the construction of 90 residential units (up to 70 new residential units and 20 units within the retained and converted Grade II listed buildings).
- The surveys were undertaken to ascertain the potential for protected habitats and species to be present within the site, to establish the presence / likely absence of these species and to be able to fully assess the impact of the proposals.
- The Southleigh Park House site is situated approximately 2.8 kilometres (km) east of Havant, Hampshire. It is surrounded by parkland, agricultural land and woodland, beyond which lies mixed use development. The site itself comprises a number of Grade II listed buildings of flint construction, a more modern flat roofed office complex and associated car parking, bordered by mixed scattered trees. There is a lawn of improved grassland in the south of the site and a large pond in the south-western corner. The site is bounded by roads to the north (Bartons Road), east (Horndean Road/B2148) and west (Eastleigh Road) and parkland to the south.
- The site is dominated by habitats that comprise non-native and common and widespread native species. The site is therefore considered to be of low ecological value overall, however, mature trees within the site margins are considered to be of greatest ecological value at the site level, both intrinsically and as foraging and commuting habitat for bats (including the tree roosting Annex II species Bechstein's bat) and breeding birds. There is low potential for on-site deadwood to be used by notable saprophytic invertebrates. On-site buildings also have potential to support roosting bats, although no roosts have been identified.
- The mitigation strategy includes approaches to avoid impacts on protected species through sensitive design, construction methods and timings of works. In addition, mitigation infrastructure such as bat and bird boxes and invertebrate log piles have been included.
- If works have not commenced by October 2018, it is recommended that the ecological appraisal is updated. This is because many of the species considered during the current survey are highly mobile and the ecology of the site is likely to change over this period. If the planning application boundary changes or the proposals for the site alter, a re-assessment of the impacts may be required.

1.0 INTRODUCTION

1.1 Background

Ecological Survey & Assessment Limited (ECOSA) have been contracted by Snell & Wilcox Ltd Pension Plan to undertake an Ecological Assessment for Southleigh Park House, Eastleigh Road, Havant, Hampshire, PO9 2PE. The site is centred on National Grid Reference (NGR) SU 7372 0795 (**Map 1**).

This report presents the findings of the suite of ecological surveys carried out by ECOSA between July 2015 and October 2016.

1.2 Aims and Scope of Report

This report is based on an extended Phase 1 habitat survey and desktop study aimed at assessing the suitability of the site to support notable habitats and protected and notable species. This information allows an initial assessment of the biodiversity value of the site to be made, potential constraints to the proposed development to be identified and mitigation, compensation and enhancement measures to be developed.

Following the findings of the extended Phase 1 habitat survey further Phase 2 surveys in relation to bats and great crested newt have also been undertaken to establish the presence / likely absence of these species on site and to be able to fully assess the impact of the proposals.

The report assesses the compliance of the scheme with relevant local and national planning policy and addresses any potential impacts on protected species and habitats.

1.3 Site Setting and Description

The Southleigh Park House site is situated in the South Coast Plain National Character Area, described by Natural England as follows³:

“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

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).

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 approximately 2.8 kilometres (km) east of Havant, and approximately 1.1km north of Emsworth, on the south coast of Hampshire. It is surrounded by parkland, agricultural land and woodland, beyond which lies mixed use development associated with Havant and Emsworth.

The site itself is approximately three hectares and comprises a number of Grade II listed buildings of flint construction, a more modern flat roofed office complex and associated car parking, bordered by mixed scattered trees. There is a lawn of improved grassland in the south of the site and a large pond in the south-western corner. The site is bounded by roads to the north (Bartons Road), east (Horndean Road/B2148) and west (Eastleigh Road) and parkland to the south.

1.4 Site Proposals

This report will form part of a hybrid planning application for the construction of 90 residential units comprising full planning permission and listed building consent for the listed buildings and outline consent to construct new residential units. The full planning application covers change of use, alterations to and extension of existing buildings to 20 residential units, 13 dwellings in Building 3 (**Map 8**) and seven in other listed buildings, with associated landscaping, parking and amenity space. The outline application (all matters reserved except means of access) includes the demolition of Building 4 (**Map 8**) and associated brick and glass corridor link and development of up to 70 residential units with associated landscaping, parking and infrastructure works. Access will be gained from Eastleigh Road via the existing gateways (although two of these are currently disused). The exact timing of the works are not known at this stage but it is assumed they will commence before the end of 2018. Details of the proposals are provided in **Map 13**⁴.

⁴ Terence O'Rourke (2017) *Indicative Site Layout*. Drawing No. 245001/P006. 1:500 @ A1

2.0 METHODS

2.1 Introduction

This section details the methods, and any associated limitations, used during the Ecological Assessment undertaken for Southleigh Park House, Eastleigh Road, Havant, Hampshire.

2.2 Zone of Influence

The Zone of Influence⁵ is the area encompassing all predicated negative ecological effects from the proposed scheme and is informed by the habitats present within the site and the nature of the proposals. Due to the scale and nature of the proposals, it is considered that a zone of 1km from the centre of the site is appropriate for the gathering of information for the desk study. For the extended Phase 1 habitat survey the area within the red line boundary was considered appropriate. However, in consideration of the proposals and likely impacts it is considered that the following exceptions apply:

- Increase in recreation pressure on designated sites including Southampton and Solent Water SPA / Ramsar site, Solent Maritime SAC as a result in the increase in residents in the vicinity of these designated sites;
- Severance foraging and commuting habitat for bats likely to be present roosting in the wider area.

2.3 Desk-Based Assessment Methods

2.3.1 Biological Records Centre

Hampshire Biodiversity Information Centre (HBIC) was consulted on 22nd July 2016 for information on non-statutory designated sites and protected and notable species in the vicinity of the site. The search radius was established based on the size nature and location of the site and nature of the proposals. **Table 1** details the search distances used.

Table 1: Biological records centre search distances

Receptor	Search Distance
Non-Statutory Site	1km
Protected Species	1km

⁵ The Zone of Influence (ZOI) is defined by IEEM (now CIEEM) as being the “areas / resources that may be affected by the biophysical changes caused by activities”.

Receptor	Search Distance
Bats	2km

2.3.2 Multi-Agency Geographic Information for the Countryside (MAGIC)

The Multi-Agency Geographic Information for the Countryside (MAGIC)⁶ database was accessed on 11th November 2016 in order to establish the presence 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), Ramsar sites, Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) and Local Nature Reserves (LNRs) within 2km of the site. In addition, a search was completed for granted European Protected Species Mitigation (EPSM) licences within 2km of the site. Where appropriate, the desk study search area has been extended to take account of any appropriate statutory designated sites which need consideration in terms of potential in-direct impacts and which support particularly mobile species.

2.3.3 Other Sources of Information

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

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 great crested newt *Triturus cristatus*, based on current Natural England guidance⁷.

Extensive bat surveys have been undertaken at Havant Thicket, a site 1.9km north-west of the Southleigh Park House site⁸. These surveys included a series of bat activity surveys, emergence surveys and mist netting and radio tracking surveys carried out in 2008 and 2009. The site was subject to significant survey effort due to the presence of the nationally rare (Annex II species, see **Appendix 7**) Bechstein's bat *Myotis bechsteinii* and in the context of the destruction of a large area of habitat for this species. Data in relation to this survey has been provided with permission of Portsmouth Water.

⁶ <http://defra.magic.gov.uk>

⁷ English Nature (2001) Great Crested Newt Mitigation Guidelines. Peterborough

⁸ ECOSA (2013) *Havant Thicket Winter Storage Reservoir - Ecology Report*. Winchester, Hampshire.

2.4 Extended Phase 1 Habitat Survey Methods

The extended Phase 1 habitat survey was carried out on 17th July 2015. The survey involved a walkover of the site to identify the habitat types present and to record evidence of the more commonly encountered protected species. The scope of the protected species was based on the habitats present with particular reference to bats, badger *Meles meles*, dormouse *Muscardinus avellanarius*, birds, reptiles, great crested newt and invertebrates. The potential for the site to support other protected and notable species was also considered as part of the extended Phase 1 habitat survey. Details of the species-specific appraisal methods are given below.

2.4.1 Vegetation

An assessment was made of all areas of vegetation within the site based on the standardised Phase 1 survey methodology⁹. This involved a walkover survey to identify 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 also compiled and any invasive species¹⁰ encountered as an incidental result of the survey are noted.

2.4.2 Bats

An assessment was made of the suitability of buildings and trees on the site and immediately on the site boundary to support roosting bats based on the presence of features such as loose or missing roof tiles or lifted lead flashing for buildings and holes, cracks, splits, loose bark and ivy *Hedera helix* cladding for trees. An assessment was made of the suitability of the site and the surrounding landscape to support foraging and/or commuting bat species. The survey conformed to current Bat Conservation Trust guidelines¹¹.

2.4.3 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.

2.4.4 Dormouse

The assessment for the potential of the site to support dormouse was based on an assessment of habitat features that may indicate that dormice are present on the study area. This includes the presence of food sources such as common hazel *Corylus avellana* and honeysuckle *Lonicera periclymenum*. Additionally, the species requires a

⁹ JNCC (2010) Handbook for Phase 1 habitat survey: A technique for environmental audit – Field manual

¹⁰ Plant species included on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended)

¹¹ Collins, J. (Ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Third Edition). The Bat Conservation Trust, London

continuum of food supply so that habitat structure, diversity and connectivity to adjacent areas of woodland/scrub are important features for determining the potential presence of dormice.

2.4.5 Birds

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

2.4.6 Reptiles

The reptile survey was based on an assessment of the suitability of habitat present within the site to support a population of reptiles. Reptiles particularly favour scrub and 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.

2.4.7 Great Crested Newt

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

In addition, online mapping resources at a minimum scale of 1:25,000 were used to identify the presence of ponds or other waterbodies within a 500 metre (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 guidance¹².

Those ponds and waterbodies located within a 500m radius of the site, where access permitted, were subject to a Habitat Suitability Index (HSI) assessment¹³. The HSI assessment was completed using the following key habitat criteria to establish the suitability of waterbodies for supporting great crested newts:

- SI₁ = geographical location
- SI₂ = pond area
- SI₃ = pond permanence
- SI₄ = water quality
- SI₅ = pond shading

¹² English Nature (2001) Great Crested Newt Mitigation Guidelines. Peterborough

¹³ Oldham, RS *et al* (2000). Evaluating the suitability of habitat for the great crested newt *Triturus cristatus*. Herpetological Journal 10 (4). 143-155.

- SI₆ = number of waterfowl
- SI₇ = occurrence of fish
- SI₈ = pond density
- SI₉ = suitability of surrounding terrestrial habitat
- SI₁₀ = 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.

2.4.8 Invertebrates

An assessment was made of the site for its potential value to support diverse communities of invertebrates. The assessment was made 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, the presence of varied woodland structure and sunny woodland edges with a diverse flora, presence of ponds and water courses and the presence of free draining soil exposures. During the Phase 1 survey there was no attempt made to identify species present and where a site supports features that may be of importance to invertebrates then further Phase 2 surveys may be required to assess the importance of the site.

2.5 Extended Phase 1 Habitat Survey Details

The extended Phase 1 habitat survey was carried out by Georgina Timmis of ECOSA on 17th July 2015. The weather conditions were cloudy becoming sunny with approximately 60% - 10% cloud cover, an ambient temperature of 21°C and a light to gentle breeze.

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

2.6 Extended Phase 1 Habitat 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 not present or that it will not be present in the future.

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

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

2.7 Initial Protected Species Assessment

As part of the extended Phase 1 habitat survey, the assessment criteria is based on the potential for the site to support the species considered, this is usually based on habitat features, their suitability for the species and the results of any desk study data obtained as part of the appraisal. However, in many cases, Phase 2 surveys will be required to assess the status of species and hence the importance of a population at the site. Therefore, the assessment should be considered a provisional assessment. **Table 2** defines the criteria used to assess the potential of the site to support protected species.

2.8 Criteria used to Assess Ecological Value

The ecological values provided within this report are based around both professional judgement and current published relevant guidance, including information sources such as *A Nature Conservation Review*¹⁴ and *Guidelines for Ecological Impact Assessment in the United Kingdom*¹⁵.

¹⁴ Ratcliffe, D. (1977) *A Nature Conservation Review*. Cambridge University Press

¹⁵ IEEM (2006) *Guidelines for Ecological Impact Assessment in the UK*

Table 2: Criteria used to assess ecological potential

	Bats¹⁶		Other Protected Species¹⁷
	Description of Roosting Habitats	Commuting and Foraging Habitats	
Species Present	Evidence of bat presence confirmed during survey, which may include presence of live or dead bats, droppings, feeding remains or urine stains etc. Where possible, a provisional assessment of roost status is made.	In some instances, bat presence can be confirmed from trees e.g. where staining or droppings are visible; where roosting bats have been observed entering/emerging from a tree; or where roosting bats can be heard.	The presence of a protected species can sometimes be confirmed by evidence recorded, for example guard hairs or latrines for badger or hazel nuts gnawed in the characteristic style for dormice.
	If species are likely to be affected by the proposals, further Phase 2 surveys will be required to establish the status of the species present.		
High Potential	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.	On-site habitat is of high quality for a species or species group. The site is within or near a geographic stronghold. Good quality surrounding habitat and good connectivity.
	If species are likely to be affected by the proposals, further Phase 2 surveys will be required to establish the presence/likely absence of the species.		
Medium Potential	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.	On-site habitat is of moderate quality, providing most of the species/species group requirements. Limiting factors may include small habitat area or disturbance.
	If species are likely to be affected by the proposals, further Phase 2 surveys will be required to establish the presence/likely absence of the species.		

¹⁶ The criteria are an attempt to qualify the potential for a given building or tree to support roosting bats and are to a degree subjective. Bats may make use of a single feature on an otherwise unsuitable building or tree and therefore an assessment of bat potential cannot solely be based on the quantity of potential roost features present. Taken from Collins, J. (Ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Third Edition). The Bat Conservation Trust, London

¹⁷ Badger, dormouse, birds, reptiles, great crested newt, invertebrates, other notable species

	Bats ¹⁶		Other Protected Species ¹⁷
	Description of Roosting Habitats	Commuting and Foraging Habitats	
Low Potential	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.	On-site habitat is of poor to moderate quality for the species or group. Presence cannot be discounted on the basis of distribution, isolation, surrounding habitats, etc.
	If species are likely to be affected by the proposals, further Phase 2 surveys will be required to establish the presence/likely absence of the species.		
Negligible Potential	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.	Site includes very limited or poor quality habitat for the species /group; surrounding habitat is unlikely to support wider populations.
	Further Phase 2 surveys are unlikely to be required as species is unlikely to be present.		

2.9 Ground Level Tree Assessment

2.9.1 Ground Level Tree Assessment Methods

The previously undertaken Phase 1 bat survey in respect of trees was updated to include all on-site trees within the scope of the arboricultural surveys undertaken by Bernie Harverson¹⁸. An assessment was made from ground level, where accessible to the surveyor, of the suitability of these trees to support roosting bats based on the presence of features such as holes, cracks, splits, loose bark and ivy cladding, and each tree was classified where appropriate with a tree category as outlined in the Bat Conservation Trust guidelines¹¹ (**Table 3**).

¹⁸ Bernie Harverson (2015) Arboricultural Assessment - Southleigh Park House, Havant. South Harting, West Sussex.

Table 3: Tree Assessment Criteria

Tree Category	Description
Confirmed Roost	Evidence of bat presence confirmed during survey, which may include presence of live or dead bats, droppings, feeding remains or urine stains etc. Where possible, a provisional assessment of roost status is made.
High Suitability	A 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 ¹⁹ and surrounding habitat.
Moderate Suitability	A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions ¹⁹ and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only and irrespective of species conservation status, which is established after presence is confirmed).
Low Suitability	A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential ²⁰ .
Negligible Suitability	Negligible habitat features on site likely to be used by roosting bats.

2.9.2 Ground Level Tree Assessment Details

The ground level tree assessment was carried out by Georgina Timmis of ECOSA (Natural England Bat Licence No. 2015-15803-CLS-CLS) on 28th August 2015. The weather conditions were dry with approximately 30% cloud cover, an ambient temperature of 12°C and a light to gentle breeze.

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

2.9.3 Ground Level Tree Assessment Limitations

The ground level tree inspection was undertaken during the summer months, when trees have full foliage and therefore visibility of some potential roosting features may be obscured.

A number of trees within the proposal boundary contained dense thick stemmed ivy, which has a potential to support roosting bats. Due to the extent of ivy, it is not possible to fully inspect all potential features behind areas of matted ivy. If it becomes necessary to fell or prune any trees covered with dense, thick stemmed ivy, further emergence surveys will be needed prior to any works affecting these trees being undertaken.

¹⁹ For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

²⁰ This system of categorisation aligns with BS 8596:2015 Surveying for bats in trees and woodland (BSI, 2015).

2.10 Tree Climb and Inspect Survey

2.10.1 Tree Climb and Inspect Survey Methods

The trees identified during the Phase 1 ground level tree assessment as suitable for climb and inspect surveys were assessed and inspected for evidence of roosting bats. Each tree was climbed, where safe to do so, and any potential bat roost features were inspected using a video endoscope, torch and binoculars (equipment differed depending on the location and type of roost feature requiring inspection). Where evidence of roosting bats was identified, photographs were taken and a sample of droppings (if present) were also taken for analysis of the species.

In accordance with Health and Safety Executive guidance²¹ (AFAG401) the tree inspection was carried out by a team of two ECOSA surveyors, experienced and trained in tree climbing. One surveyor climbed the tree and the other surveyor remained on the ground to perform a competent aerial rescue in case of an emergency. The tree climbing was carried out using an appropriate work-positioning system and suitable Personal Protective Equipment (PPE).

2.10.2 Tree Climb and Inspect Survey Details

The tree climb and inspect surveys were carried out by Ed Venables (Natural England Bat Licence No. 2015-16701-CLS-CLS) and Brian Hicks (Natural England Bat Licence No. 2015-14880-CLS-CLS) of ECOSA. During the survey, the surveyors were equipped with a video endoscope, torch and 10x40 binoculars.

Survey dates, weather conditions and trees targeted for climb and inspect surveys are detailed in **Table 4**.

Table 4: Trees subject to climb and inspect surveys at Southleigh Park House

Survey Date	Weather Conditions	Tree/Group Number ²²	Species
11-12 th May 2016	Dry and warm, 21°C, 60% cloud cover, a light air	Group 15	Pedunculate Oak x 6
		Group 17	Beech x 4 Yew x 2 Oak x 1 dead stump
		Group 18	Yews x 2 Sycamore x 5
		T23	Norway Spruce
		T41	English Yew
		T42	Silver Birch

²¹ Health and Safety Executive (2013) AFAG201 (Rev.2), Tree Climbing Operations. Available from www.hse.gov.uk/pubns/afag401.htm

²² Tree numbers in accordance with Bernie Harverson (2015) Southleigh Park House, East Leigh Road, Havant, -Tree Survey and Constraints Plan. Drawing No: BJH 01/02. 1:400 @ A3

		T44	Sycamore
		T45	English Yew
		T48	Pedunculate Oak
		T61	Monkey Puzzle
		T62	Pedunculate Oak
		T67	Pedunculate Oak
13 th June 2016	Dry, 15°C, 50 - 100% cloud cover, a light breeze	G16	Pedunculate Oak
		T40	English Yew
		T49	Pedunculate Oak
		T50	Californian Redwood
		T52	Wellingtonia
		T59	Common Lime

2.10.3 Tree Climb and Inspect Survey Limitations

It was not possible to inspect the T34 or G11 as it was not safe to climb due to the proximity of the road, however a ground level assessment identified these trees as having limited potential to support tree roosting bats.

2.11 Phase 2 Bat Emergence/Re-entry Survey

2.11.1 Phase 2 Bat Emergence/Re-entry Survey Methods

The Phase 2 bat survey involved one or two dusk emergence surveys and one dawn re-entry survey, in accordance with current guidelines²³ for trees assessed as having medium or high potential to support roosting bats. The dusk surveys commenced 15 minutes before sunset until two hours after sunset. The dawn re-entry survey commenced two hours prior to sunrise until 15 minutes post sunrise.

The survey was carried out by up to six ECOSA surveyors positioned at previously identified vantage points around the trees subject to survey (**Map 2**). These vantage point locations allowed a sufficient level of coverage of the identified roosting features.

During the surveys surveyors recorded the time, species, location and direction of flight for each bat encountered, with particular attention paid to establishing bat access/egress locations.

2.11.2 Phase 2 Bat Emergence/Re-entry Survey Details

Table 1 provides details of the Phase 2 bat survey visit.

²³ Collins, J. (Ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Third Edition). The Bat Conservation Trust, London

Table 5: Phase 2 bat survey details

Survey Date	Survey Type	Trees Surveyed ²²	Duration	Weather Conditions	Sunset/ Sunrise Time
14 th July 2016	Dusk	G15, G17, T49, T50, T52	20:57 - 23:12	17-15°C, dry and clear, 30 - 5% cloud cover, still becoming a light breeze	21:12
28 th July 2016	Dusk	G15, G17, T49, T50, T52	20:39 - 22:54	18-14°C, dry and overcast, 100% cloud cover and a light breeze becoming still	20:54
6 th September 2016	Dawn	G15, G17, T49	04:26 - 06:41	20-19°C, cloudy, 60-30% cloud cover and a light breeze	06:26

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

The Phase 2 survey was coordinated by Georgina Timmis of ECOSA and undertaken by suitably qualified and experienced ECOSA surveyors Georgina Timmis, Jo Richmond, Jack Medley, Natalie Boote, Ralph Dunbar, Joe Turner, Jodie Case, Agatha Thompson, Ben Davis, Claire Ford, Laura Cowley and Rowan Tolfts.

2.11.3 Phase 2 Bat Emergence/Re-entry Survey Limitations

Some bat species, e.g. long-eared bats *Plecotus* species²⁴, 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.

2.12 Phase 2 Bat Transect Survey

2.12.1 Phase 2 Bat Transect Survey Methods

Phase 2 bat transect surveys were undertaken between June 2016 and October 2016 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. The transect route ensured that surveyors visited key areas of the site such as the boundary vegetation (**Map 3**). The

²⁴ 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.

transect survey commenced around sunset and lasted until two hours after sunset. The direction of travel on each transect was varied on each occasion in order to ensure that all parts of the site were visited at various points after sunset.

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 along the boundary vegetation.

2.12.2 Phase 2 Bat Survey Details

The Phase 2 bat survey was undertaken between June 2016 and October 2016. **Table 6** provides details of the bat transect survey visit.

Table 6: Bat transect survey details

Survey Date	Duration	Weather Conditions	Sunset Time
14 th June 2016	21:19 - 23:19	15°C, clear, 65% cloud cover, a light breeze	21:19
30 th June 2016	21:19 – 23:21	17-15°C, overcast, occasional rain, 70% cloud cover, gentle breeze	21:21
19 th July 2016	21:09 – 23:19	26-28°C, clear and humid, 5-10% cloud cover, still becoming a light breeze	21:09
2 nd August 2016	20:47 – 22:51	16°C, overcast, 100% cloud cover, gentle breeze	20:47
3 rd August 2016	03:45 - 05:45	20-19°C, light rain at start, 100% cloud cover, still becoming a light breeze	05:35
16 th August 2016	20:24 – 22:29	24-18°C, clear, 5% cloud cover, still	20:24
30 th August 2016	19:40 – 21:55	24-19°C, warm, thin cloud cover, 90-0% cloud cover, still becoming a light breeze	19:52
13 th September 2016	19:22 - 21:22	25-23°C, mild, 10-5% cloud cover, still becoming a gentle breeze	19:22
4 th October 2016	18:34 - 20:40	15-12°C, clear and dry, 0% cloud cover, gentle breeze.	18:34

The Phase 2 bat survey was coordinated by Georgina Timmis of ECOSA (Natural England Bat Licence No. 2015-15803-CLS-CLS), and completed by two suitably experienced ECOSA surveyors.

2.12.3 Phase 2 Bat Survey Limitations

Some bat species, e.g. long-eared *Plecotus* bat species²⁴, 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.

Current survey guidance states that surveys should be carried out between April and October inclusive. The 2016 surveys at Southleigh Park House did not cover the early part of the bat survey season (April and May). However eight transect surveys (including one consecutive dusk/dawn) were carried out between June and October, covering the peak of the active bat season, as a result the lack of data from spring 2016 is not considered to be a significant limitation.

2.13 Phase 2 Bat Automated Detector Survey

2.13.1 Phase 2 Bat Automated Survey Methods

In addition to the manual transect surveys automated detector surveys were undertaken in line with current Bat Conservation Trust Guidelines²⁵ between June and September 2016 inclusive.

Three Wildlife Acoustics Song Meter 2 (SM2+) detectors were deployed at the site for five consecutive nights each month between June and September 2016.

The SM2 detectors were secured in a tree at a height of 2-4m using bungee cords. The microphone was positioned to face towards the nearest open space. The devices were programmed to record between 30 minutes before sunset, until 30 minutes after sunrise the following morning on each night they were deployed. The settings utilised on the SM2 detectors are provided in **Appendix 2**.

The location of at which each detector was deployed was varied throughout the survey period. The suitable habitat within the site was equally divided into a numbered grid. The location at which each detector was located on each month was determined through a random number generator. Where the generator determined that a detector would be deployed within a single grid on more than one month the program was re-run until detectors were at varied location throughout the survey period. The locations at which the SM2's were deployed are provided in **Map 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 4.0.4). This program is designed to analyse large volumes of bat call data

²⁵ Collins, J. (Ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (Third Edition). The Bat Conservation Trust, London

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 2**.

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 species²⁴ and *Myotis*²⁶ bat species, specific identification was not always possible.

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

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

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

2.13.2 Phase 2 Bat Automated Survey Details

The automated detector surveys were undertaken between June and September 2016. **Table 7** provides details of the survey periods and weather conditions.

²⁶ 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.

Table 7: Remote bat detector survey details

Survey Period	Date	Weather Conditions ²⁷				Sunset	Sunrise
		Temperature (°C)		Wind (km/h)	Precipitation (mm)		
		High	Low				
June 2016	14 th	18	13	14	0.0	21:19	04:49
	15 th	17	11	14	0.0	21:19	04:49
	16 th	19	12	5	0.0	21:20	04:49
	17 th	18	13	10	0.0	21:20	04:49
	18 th	17	12	8	0.0	21:20	04:49
July 2016	14 th	19	8	10	0.0	21:12	05:08
	15 th	18	9	8	0.0	21:11	05:09
	16 th	23	15	8	0.0	21:10	05:11
	17 th	25	18	10	0.0	21:09	05:12
	18 th	26	13	5	0.0	21:08	05:13
August 2016	16 th	23	8	6	0.0	20:21	05:55
	17 th	23	9	8	0.0	20:19	05:57
	18 th	25	15	5	0.0	20:17	05:59
	19 th	18	14	11	0.0	20:15	06:00
	20 th	18	14	31	0.0	20:13	06:02
September 2016	13 th	26	12	5	0.0	19:21	06:39
	14 th	23	14	6	0.0	19:19	06:40
	15 th	23	14	8	0.0	19:16	06:42
	16 th	19	12	14	0.0	19:14	06:43
	17 th	16	10	14	0.0	19:12	06:45

The Phase 2 automated SM2 bat detectors were deployed suitably experienced ECOSA surveyors. The detector programming and data analysis was conducted by Ecologist Georgina Timmis of ECOSA.

2.13.3 Phase 2 Bat Automated Survey Limitations

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

Complications associated with the equipment are not usually evident until an attempt is made to retrieve data from the detectors at the end of a survey period. During the

²⁷ Obtained from <https://www.wunderground.com/>

survey period issues with the equipment were encountered during the June and July recorded period with a single location failing on each of these deployments. Therefore, data was not recorded from Locations 3 and 13 as part of the assessment. This has been taken into account during the data analysis with the use of Activity Indexes (registrations per night) to ensure that a comparison can be made between each month.

The use of bat detectors is likely to result in the under-recording of a percentage of bats present, such as those flying at height²⁸, which would be out of the recording range for the detectors.

Current survey guidance states that surveys should be carried out between April and October inclusive. The 2016 surveys at Southleigh Park House did not cover the early part of the bat survey season (April and May). However automated detectors were deployed for five consecutive nights on four occasions between June and October, covering the peak of the active bat season, as a result the lack of data from spring 2016 is not considered to be a significant limitation.

2.14 Phase 2 Bat Trapping Surveys

2.14.1 Phase 2 Bat Trapping Survey Methods

The aim of trapping surveys is to determine the presence of quiet echolocating species, and to determine the species, sex and breeding status of bats using the site by being able to examine bats in the hand. Differentiating *Myotis* species bats to determine the presence of Bechstein's bat was a primary focus.

In accordance with the Bat Survey Guidelines trapping surveys commenced two hours before dusk to enable adequate set up time and continued for at least four hours after sunset, with approximately 1.5-2 hours of dismantling/packing up time.

The four trapping locations were repeated on each survey (**Map 5**). Trap sites were positively selected to increase the chance of capturing bats. Therefore, habitats most likely to support foraging or commuting bats such as woodlands, treelines or single mature trees and otherwise cluttered habitats were chosen for trap deployment.

All bats caught were identified to species level, sexed, aged and breeding status was determined e.g. breeding female, non-breeding female, sexually active male etc

Bats were released immediately following examination.

²⁸ Collins, J., Jones, G. (2009). Differences in Bat Activity in Relation to Bat Detector Height: Implications for Bat Surveys at Proposed Windfarm Sites. *Acta Chiropterologica*, 11(2), 343-350.

2.14.2 Phase 2 Bat Trapping Survey Details

Table 8 provides details of the Phase 2 bat trapping survey visits.

Table 8: Phase 2 bat trapping survey details

Survey Date	Weather Conditions	Sunset/ Sunrise Time
17 th June 2016	18-14°C, dry, scattered clouds becoming partly cloudy and a light to gentle breeze	21:20
5 th July 2016	18-14°C, dry, partly cloudy becoming clear and a light to gentle breeze	21:18
11 th August 2016	20-16°C, dry, partly cloudy becoming clear and a gentle breeze becoming calm	20:31

During the Phase 2 trapping survey, the surveyors were equipped with harp traps in combination with acoustic bat lures (Sussex Autobat).

The Phase 2 trapping survey was undertaken by Dr Ian Davidson-Watts and Dr David Hill.

2.14.3 Phase 2 Bat Trapping Survey Limitations

There were no significant limitations to the bat trapping surveys.

2.15 Great Crested Newt eDNA Survey

2.15.1 Great Crested Newt eDNA Survey Methods

Given the presence of five waterbodies within 500m of the site boundary an environmental DNA (eDNA) analysis was undertaken on accessible ponds to establish the presence / likely absence of great crested newt. Locations of the waterbodies are shown in **Map 6**. The field sampling followed current guidance²⁹ and entailed collection of 20 samples of 30ml 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 15ml are taken each of which is preserved in 35ml of ethanol.

The samples are then refrigerated until analysis at the lab. The samples were sent to Crestwood Environmental eDNA testing service for analysis which were analysed in line with current guidance²⁹. 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

²⁹ Biggs *et al* (2014) Analytical and methodological development for improved surveillance of the great crested newt. Appendix 5. Technical Advice note for field and laboratory sampling of great crested newt environmental DNA. Freshwater Habitats Trust, Oxford.

therefore, the analysis result indicates the presence or likely absence of the species from a given waterbody.

2.15.2 Great Crested Newt eDNA Survey Details

The eDNA sampling was carried out by Georgina Timmis (Class Licence 2016-21864-CLS-CLS) and Jack Medley of ECOSA on 18th April 2016.

2.15.3 Great Crested Newt eDNA Survey Limitations

Access to Pond 2, was not granted by the land owner; therefore a water sample could not be taken from the larger pond. Pond 2 lies approximately 40m from the development site, however, the B2148 lies between them. At the point between the site and Pond 2 the width of the B2148 is considerable, comprising two lanes and three slip roads, with high curbs, drains and a long traffic island in the centre of the carriageway. It is therefore considered that should great crested newt be present within Pond 2, they would not be able to disperse into on-site habitat.

3.0 BASELINE ECOLOGICAL CONDITIONS

3.1 Introduction

This section details the results of the Ecological Assessment undertaken for Southleigh Park House, Eastleigh Road, Havant, Hampshire.

3.2 Desktop Study

3.2.1 Protected Species

A number of protected species have been recorded within a 1km radius of the site and a number of bat species within a 2km radius of the site. These are discussed further within the relevant results section below³⁰.

3.2.2 Statutory and Non-statutory Designated Sites

Consultation with HBIC and the MAGIC website revealed that there are five international statutory designated sites of nature conservation within a 7km radius of the site. There are no national statutory designated sites within a 1km radius of the site, however, there are four non-statutory sites present within this radius. Details of these designations are provided in **Table 9** and **Table 10**. Further information on sites designated for nature conservation is provided in **Appendix 3**. No EPSM licences have been granted within 2km of the site.

There is a significant amount of ancient and replanted woodland in the vicinity of the site. There is approximately 150ha of ancient woodland within 2km of the site boundary, associated with Southleigh Forest, Barton's Copse and Longcopse Hill. Beyond this to the north lie larger areas of ancient woodland associated with Havant Thicket and Stansted Forest.

Table 9: International statutory designated sites located within a 7km radius of the site.

Designation	Name	Approximate Relative Location	Reason for Designation
Ramsar site	Chichester and Langstone Harbours	2.5km south	The site comprises two large, interconnected sheltered estuarine basins providing extensive intertidal mud and sand flats with eelgrass <i>Zostera</i> species beds, large areas of mixed saltmarsh and extensive cord-grass <i>Spartina</i> species swards in an advanced state of degeneration. Fringing habitats include shingle spits, saline, brackish and freshwater lagoons, coastal grazing marsh and deciduous woodland. The site supports important overwintering populations of migratory waterfowl.
SPA	Chichester and Langstone Harbours	2.5km south	Chichester and Langstone Harbours are located on the south coast of England in Hampshire and West Sussex. They are large, sheltered estuarine basins comprising extensive sand- and mud-flats exposed at

³⁰ The full data set is available on request from ECOSA.

Table 9: International statutory designated sites located within a 7km radius of the site.

Designation	Name	Approximate Relative Location	Reason for Designation
			low tide. The two harbours are joined by a stretch of water that separates Hayling Island from the mainland. Tidal channels drain the basin and penetrate far inland. The mud-flats are rich in invertebrates and also support extensive beds of algae, especially <i>Enteromorpha</i> species, and eelgrasses. The basin contains a wide range of coastal habitats supporting important plant and animal communities. The site is of particular significance for waterbirds, especially in migration periods and in winter. It also supports important colonies of breeding terns.
SAC	Solent Maritime	2.5km south	The site is designated for supporting Annex I habitats. Annex I habitats that are a primary reason for selection of this site as follows: ▪ Estuaries ▪ 1Spartina swards (<i>Spartinion maritimae</i>) ▪ Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>) A number of Annex I habitats are present as a qualifying feature, but not a primary reason for selection of this site: ▪ Sandbanks which are slightly covered by sea water all the time ▪ Mudflats and sandflats not covered by seawater at low tide ▪ Coastal lagoons * Priority feature ▪ Annual vegetation of drift lines ▪ Perennial vegetation of stony banks ▪ <i>Salicornia</i> and other annuals colonizing mud and sand ▪ "Shifting dunes along the shoreline with <i>Ammophila arenaria</i> ("white dunes")" The site also supports Annex II species present as a qualifying feature, but not a primary reason for site selection ▪ 1016 Desmoulin's whorl snail <i>Vertigo moulinsiana</i>
SAC	Solent and Isle of Wight Lagoons	3.6km south-west	The Solent encompasses a series of Coastal lagoons, including percolation, isolated and sluiced lagoons. The lagoons show a range of salinities and substrates, ranging from soft mud to muddy sand with a high proportion of shingle, which support a diverse fauna including large populations of three notable species: the nationally rare foxtail stonewort <i>Lamprothamnium papulosum</i>, the nationally scarce lagoon sand shrimp <i>Gammarus insensibilis</i>, and the nationally scarce starlet sea anemone <i>Nematostella vectensis</i>.

Table 9: International statutory designated sites located within a 7km radius of the site.

Designation	Name	Approximate Relative Location	Reason for Designation
SAC	Kingley Vale	7.0km north-east	The site is designated for supporting Annex I habitats. Annex I habitats that are a primary reason for selection of this site as follows: - Yew <i>Taxus baccata</i> woods of the British Isles Kingley Vale is one of the sites representing yew woods on chalk, in the central southern part of its UK range. It has been selected primarily because of its size, as it is the largest area of yew woodland in Britain. It also shows excellent conservation of the full range of habitat structure and function. Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site: - Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>)

Table 10: Non-statutory designated sites located within a 1km radius of the site.

Designation	Name	Approximate Relative Location	Reason for Designation
SINC	Southleigh Forest (south)	30m east	Pasture woodland and wooded commons which is not wholly ancient or semi-natural, does not support a significant element of ancient or semi-natural woodland and does not comprise important commuting types of restricted distribution in the county, but is of considerable biological and historical interest.
SINC	Southleigh Forest (North of Emsworth Common Road)	110m north	Pasture woodland and wooded commons which is not wholly ancient or semi-natural, does not support a significant element of ancient or semi-natural woodland and does not comprise important commuting types of restricted distribution in the county, but is of considerable biological and historical interest.
SINC	Barton's Copse and the Slip	160m north	Ancient semi-natural woodland
SINC	Southleigh Forest	725m east	Pasture woodland and wooded commons which is not wholly ancient or semi-natural, does not support a significant element of ancient or semi-natural woodland and does not comprise important commuting types of restricted distribution in the county, but is of considerable biological and historical interest. This site is also known to support Purple Emperor <i>Apatura iris</i> and Coral Necklace <i>Illecebrum verticillatum</i> .

3.2.3 Review of Havant Thicket Bat Surveys

Extensive bat surveys have been undertaken at the Havant Thicket site, 1.9km north-west of the Southleigh Park House site³¹. These surveys included a series of bat activity surveys, emergence surveys and mist netting and radio tracking surveys carried out in 2008 and 2009. The site was subject to significant survey effort due to the presence of the nationally rare (Annex II species, see **Appendix 7**) Bechstein's bat *Myotis bechsteinii* and in the context of the destruction of a large area of habitat for this species.

Bechstein's Bat

The surveys considered that the local population of Bechstein's bat includes a minimum of 108 bats which utilises suitable fragmented areas of mixed woodland of varying age for roosting and foraging, where it is present.

The 2009 bat radio tracking survey work has confirmed the presence of Bechstein's Bat maternity colonies within four woodland areas, Barton's Copse (one roost), Hollybank Wood (six roosts), Dell Piece (two roosts) and Leyls Wood and the The Groves, part of Stansted Forest (two roosts). A summary of the Bechstein's roosts recorded within 2km of the Southleigh Park House site are shown in **Table 11**.

Table 11: Summary of Bechstein's roosts recorded within 2km of the Southleigh Park House site

Tree Number	Roost Status	Number of bats	Approximate distance from site
1636	Maternity roost	38	0.46 km east
'Untagged Tree 4'	Non-breeding day roost	2-3	0.92km east
'Untagged Tree 1'	Maternity roost	51	0.97km east
1632	Maternity roost	13	1.35km east
1635	Maternity roost	26 +/- 5	1.36km east
1630	Non-breeding night roost ³²	0	1.42km east
1631	Non-breeding day roost	1	1.46km east

The surveys also recorded foraging and commuting behaviour. The closest activity was recorded within Hollybank Wood, near Hollybank House, approximately 850m east of the Southleigh Park House site. The bats were generally recorded foraging around the cluster of identified tree roosts with a range of approximately 1km. This is typical behaviour for Bechstein's bat, which are known to be a sedentary species, rarely foraging more than 1km from their roosts³³.

³¹ ECOSA (2013) *Havant Thicket Winter Storage Reservoir - Ecology Report*. Winchester, Hampshire.

³² A single bat was recorded roosting briefly in the tree during overnight rain.

³³ Dietz, C; Helvesen O; Nill, D (2009) *Bats of Britain, Europe and Northwest Africa*. A & C Black Publishers Ltd, London.

The locations of Bechstein's bat roosts recorded within Southleigh Forest, Hollybank and Barton's Copse during the Havant Thicket bat surveys, and the foraging and commuting range of Bechstein's bat subject to radiotracking, are shown in **Map 7**³⁴.

Other Bat Species

In addition to Bechstein's bat, the Havant Thicket surveys also identified roost sites for a number of other species including common pipistrelle *Pipistrellus pipistrellus* (maternity roost), soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared *Plecotus auritus* (maternity roost), whiskered bat *Myotis mystacinus* and Natterer's bat *Myotis nattereri* (maternity roost). Brown long-eared, Natterer's bat and common pipistrelle roosts were recorded within 2km of the site and roosts for all other species were recorded just outside of this radius, associated with Staunton Country Park.

3.3 Vegetation

The vegetation within the site is described here in general terms using Phase 1 habitat survey terminology and referring to dominant, characteristic and other noteworthy species in each vegetation type within the survey area. The habitat types on site are shown in **Map 8**, and consist of:

- Scattered scrub;
- Scattered Trees
- Improved grassland;
- Standing water;
- Arable;
- Fence;
- Wall;
- Buildings and hardstanding

3.3.1 Scattered Scrub

A small area of scrub is present in the north-west corner of the site (**Figure 1**)(TN1). Species present include herb robert *Geranium robertianum*, bramble *Rubus fruticosus* aggregate, common sorrel *Rumex acetosa*, cleavers *Galium aparine*, nettle *Urtica dioica*, garlic mustard *Alliaria petiolata* and enchanter's nightshade *Circaea lutetiana*.

³⁴ Map provided with permission of Portsmouth Water from: ECOSA (2013) *Havant Thicket Winter Storage Reservoir - Ecology Report*. Winchester, Hampshire



Figure 1: Scattered scrub in north-west of site

3.3.2 Scattered Trees

The northern, eastern and western boundaries of the site are dominated by wide margins of mature and semi-mature deciduous and coniferous trees (**Figure 2**) comprising both native and non-native species. The areas of tree planting can be broken down into a number of discrete areas (**Map 9**), which have been summarised in **Table 12**:

Table 12: Descriptions of areas of scattered trees within the Southleigh Park House site

Area Number ³⁵	Habitat Description
Area 1	Shelterbelt comprising semi-mature sycamore <i>Acer pseudoplatanus</i>
Area 2	Narrow tree belt comprising mature pedunculate oak <i>Quercus robur</i> , holly <i>Ilex aquifolium</i> , beech <i>Fagus sylvatica</i> , English yew <i>Taxus baccata</i>
Area 3	Narrow tree belt comprising mature pedunculate oak and English yew
Area 4	Predominantly English yew, Irish yew <i>Taxus baccata</i> 'Fastigiata', and sycamore with overgrown shrubs including cherry laurel <i>Prunus laurocerasus</i> , bay laurel <i>Laurus nobilis</i> , hazel, holly, Lawsons cypress <i>Chamaecyparis lawsoniana</i> and pittosporum <i>Pittosporum</i> species.
Area 5	Area of more mature trees, predominantly non-native including redwood <i>Sequoia sempervirens</i> , Wellingtonia <i>Sequoiadendron giganteum</i> , Caragana <i>Caragana</i> species and monkey puzzle <i>Araucaria araucana</i> , although mature pedunculate oak, beech, yew and common lime <i>Tilia europaea</i> are also present. The mature trees are surrounded by overgrown shrub including cherry <i>Prunus</i> species, sycamore cherry laurel, silver birch <i>Betula pendula</i> , Portugal laurel <i>Prunus lusitanica</i> , silver lime <i>Tilia tomentosa</i> , holly and ash <i>Fraxinus excelsior</i>
Area 6	Mature pedunculate oak and horse chestnut <i>Aesculus hippocastanum</i> , with Leyland cypress <i>Cupressocyparis leylandii</i> and cherry laurel along the southern boundary of the car park
Area 7	Single mature pedunculate oak and a small a small number of immature silver birch
Area 8	Area of predominantly overgrown shrubs including cherry laurel, Portugal laurel, holly and semi-mature silver birch and beech with scattered mature

³⁵ Area numbers relate to those shown on Map 9

	conifers including Californian Scots pine <i>Pinus sylvestris</i> and Californian redwood.
Area 9	Shelterbelt comprising semi-mature birch, holly, cherry laurel and false acacia <i>Robinia pseudoacacia</i> with scattered trees including pedunculate oak, English yew, hazel, Lebanon cedar <i>Cedrus libani</i> and Norway spruce <i>Picea abies</i> ,
Area 10	Mature trees, predominantly native in this section, including oak, beech, sycamore, holly, ash, Turkey oak <i>Quercus cerris</i> , and silver lime as well as cherry and cherry laurel
Area 11	Trees associated with the pond including mature and semi-mature beech, ash, oak and yew and semi-mature goat willow <i>Salix caprea</i> , grey willow <i>Salix cinerea</i> , silver birch, cherry laurel, Portugal laurel and holly and Rhododendron <i>Rhododendron</i> species

The scattered trees form a dense canopy and therefore a very limited understorey and ground flora, the ground layer is dominated by leaf litter (**Figure 3**).



Figure 2: Scattered trees in west of site



Figure 3: Interior of tree margin

Individual trees are present across the site, mainly within the areas of managed grassland around the on-site buildings (**Figure 4**) and the track in the east of the site (**Figure 5**)(TN2). Species present include native species such as silver birch, wild cherry *Prunus avium*, pedunculate oak and, and non-native ornamentals including Turkey oak, weeping willow *Salix babylonica*, rowan *Sorbus* 'Joseph Rock', grand magnolia *Magnolia grandiflora*, golden Indian bean tree *Catalpa bignonioides* 'Aurea', Persian ironwood tree *Parrotia persica*, Lebanon cedar and silver lime.



Figure 4: Scattered trees in north of site



Figure 5: Scattered tree in south-east of site

3.3.3 Improved Grassland

An area of lawn measuring approximately 0.36ha is present in the south of the site (**Figure 6**) (TN3). In addition, a number of smaller areas of grassland are present between on-site buildings and areas of hardstanding (**Figure 7**). All areas comprise well-managed improved grassland with species dominated by course grasses such as perennial ryegrass *Lolium perenne* and fescue *Festuca* species. Other species recorded within the sward include catsear *Hypochaeris radicata*, ribwort plantain *Plantago lanceolata*, creeping cinquefoil *Potentilla reptans*, red fescue *Festuca rubra*, bird's-foot trefoil *Lotus corniculatus*, creeping buttercup *Ranunculus repens*, daisy *Bellis perennis*, selfheal *Prunella vulgaris*, hop trefoil *Trifolium campestre*, greater plantain *Plantago major*, white clover *Trifolium repens*, red clover *Trifolium pratense*, ragwort *Jacobaea vulgaris*, yarrow *Achillea millefolium*, and creeping thistle *Cirsium arvense*.



Figure 6: Well-managed lawn in the south of the site.



Figure 7: Small area of grassland between building and hardstanding.

3.3.4 Standing Water

An ornamental pond measuring approximately 0.11ha is present in the south-western corner of the site (**Figure 8**) (TN4). The pond is lined by trees to the north and south, the well managed lawn is to the east and a driveway is directly adjacent to the west of the pond. There is limited aquatic vegetation within the pond, however, the banks are well vegetated, including species such as great willowherb *Epilobium hirsutum*, bramble, rose *Rosa* species, flag iris *Iris pseudacorus*, bracken *Pteridium* species, pendulous sedge *Carex pendula*, cocksfoot *Dactylis glomerata* and rough meadow grass *Poa trivialis*.



Figure 8: Pond in south-west of site

3.3.5 *Introduced Shrub*

Small areas of flower bed planted with ornamental species including hydrangea. *Hydrangea* species are present on the eastern edge of Building 3 (TN5). A small section of introduced shrub is present between Building 1 and Building 4 (TN6).

3.3.6 *Fence*

The majority of the site is bounded by chainlink fencing. There is a short stretch of closed board fencing on the western boundary (TN7).

3.3.7 *Wall*

Short stretches of flint wall are present in the north-east of the site, along the western site boundary adjacent to Building 7 (TN8), and along a section of the northern edge of the tree margin that divides the car park from the tarmac track behind (TN9).

3.3.8 *Buildings and Hardstanding*

There are seven buildings on site, four listed buildings of flint construction, two smaller outbuildings of similar construction and a single modern office block of brick and glass construction. Further details of these buildings are provided in **Appendix 3**.

There is a large car park in the north of the site (TN10) and a smaller visitor's car park in the west (TN11), the site is crossed by a number of tarmac access tracks and there are areas of patio associated with the south and west of Building 3 (TN12).

3.3.9 *Invasive Species*

Rhododendron was recorded in the south-eastern corner of the site. Rhododendron is listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). This makes it illegal to plant or otherwise cause the species to grow in the wild.

3.3.10 *Summary*

The site is dominated by buildings, hardstanding, improved grassland and mixed scattered trees. These habitats are common in the local area and comprise non-native

and common and widespread native species. The vegetation on site is therefore considered to be of **low ecological value** overall.

3.4 Bats

3.4.1 Bats - Building Assessment

With the exception of Building 4, a modern flat roofed office block, all of the buildings on site are considered to have potential to support roosting bats. This is mainly due to the buildings' flint construction, which has a rough finish and leaves gaps behind barge boards and soffits. In addition, a number of cracks in the flint finish were recorded as well as lifted roof tiles on some of the buildings.

The results of the Phase 1 survey of the Southleigh Park House buildings are provided in **Appendix 3**.

3.4.2 Bats - Tree Assessment

The site supports a large number of mature trees, many of which have potential to support roosting bats. Trees with bat roosting potential are shown in **Table 13**.

Table 13: Phase 1 tree survey categories

High Potential	Medium Potential	Low Potential	
T2	T50	T19	T38
T10	T52	T20	T41
T49	G5	T24	T45
G15		T25	T46
G17		T26	T68
		T27	G2
		T30	G11
		T31	G14
		T32	Shelterbelt
		T34	1
		T37	

The remaining on-site trees have no suitable roosting features visible at the time of survey (although some features could have been obscured by foliage, see **Paragraph 2.6**) and/or are of an unsuitable age/structure to support roosting bats.

The results of the ground level tree assessment and climb and inspect surveys of the Southleigh Park House trees are provided in **Appendix 4**. Details of tree locations and levels of bat potential are provided in **Map 10**.

3.4.3 Bats - Foraging and Commuting Habitat

The site is bounded to the north, east and west by bands of mature trees that provide linear features for foraging and commuting bats. The mature trees and the pond in the south-west of the site are also likely to be a good source of invertebrate prey. The on-site habitat is connected to extensive suitable foraging and commuting habitat in the wider area, due to the presence of ancient and semi-natural woodland including Southleigh Forest and Barton's Copse to the north and east and parkland to the south. Lighting associated with the roads to the north, east and west of the site may discourage bats in the wider area from dispersing into on-site habitat.

3.4.4 Phase 2 Bat Emergence/Re-entry Survey Results

The survey recorded six species of bats; common pipistrelle, soprano pipistrelle, long-eared bat *Plecotus auritus*, *Myotis* bat, serotine *Eptesicus serotinus* and noctule *Nyctalus noctula*. **Table 14** provides details of the species, numbers and locations of bats recorded foraging/commuting during the Phase 2 bat surveys.

Table 14: Phase 2 bat survey results

Survey Date	Recorded Bat Roosts	General Bat Activity at the Site		
		Species	First Pass	Last Pass
14 th July 2016 (G15, G17, T49, T50, T52)	<u>Summary:</u> No bats were recorded emerging during the survey	Common pipistrelle	21:27	23:11
		Soprano pipistrelle	21:17	23:09
		Long-eared bat	22:13	-
		<i>Myotis</i> bat	22:09	23:05
		Noctule	22:25	22:27
		Serotine	21:37	-
		<u>Summary:</u> A moderate level of common and soprano pipistrelle activity was recorded across the site with greater levels of activity recorded by surveyors positioned to the south. A small number of <i>Myotis</i> bat passes were recorded, with passes recorded by all surveyors for five minutes approximately 1 hour after sunset and a single pass recorded by the southernmost surveyor at 23:05. Two noctule passes were recorded by surveyors in the south of the site. A single serotine pass was recorded by a surveyor in the north of the site and a single long-eared bat pass was recorded by the surveyor in the south of the site.		
28 th July 2016 (G15, G17, T49, T50, T52)	<u>Summary:</u> No bats were recorded emerging during the survey	Species	First Pass	Last Pass
		Common pipistrelle	21:28	22:53
		Soprano pipistrelle	20:54	22:35
		Long-eared bat	22:09	22:10
		<i>Myotis</i> bat	21:49	22:45
		Noctule	22:01	22:16

³⁶ 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.

		<u>Summary:</u> Generally a lower level of activity was recorded in comparison to the first survey. A low level of common and soprano pipistrelle activity was recorded across the site. A single pass of <i>Myotis</i> bat was recorded by surveyors in the south of the site at around one hour after sunset and a small number of passes were recorded across the site approximately two hours after sunset. Single passes of long-eared bat and noctule were recorded by surveyors in the south of the site.		
6 th September 2016 (G15, G17, T49)	<u>Summary:</u> No bats were recorded emerging during the survey	Species	First Pass	Last Pass
		Common pipistrelle	04:44	06:09
		Soprano pipistrelle	05:00	06:03
		<i>Myotis</i> bat	04:49	05:29
		<u>Summary:</u> A much lower level of activity was recorded during the dawn survey. Equally low levels of common and soprano pipistrelle and <i>Myotis</i> bat were recorded by all surveyors, who were positioned in the south of the site only.		

3.4.5 Phase 2 Bat Transect Survey

A total of eight bat transect surveys were undertaken between June and October 2016, including a consecutive dusk/dawn transect, during which time a minimum of seven species of bat were recorded within the site including common pipistrelle, soprano pipistrelle, long-eared bat species, *Myotis* species, serotine, noctule and a single pass of barbastelle *Barbastella barbastellus*.

Low to moderate levels of activity were recorded on site with the majority of registrations associated with the habitat in the south, particularly adjacent to the on-site pond. A much smaller number of registrations were recorded in the north of the site, and most of these were associated with the western boundary, where the adjacent road is subject to significantly less light spill than those on the northern and eastern site boundaries. The locations of the bat activity recorded are provided on **Map 3** with a summary of the findings of each survey provided in **Table 15**.

Table 15: Bat activity recorded during transect surveys

Survey Date	General Bat Activity at the Site
14 th June 2016	Bat activity levels across the site were low during the transect survey with a total of ten registrations of foraging and commuting bat recorded during the survey comprising common and soprano pipistrelle. Almost all activity was associated with the south-western corner of the site, predominantly associated with habitat around the on-site pond.
30 th June 2016	A greater level of activity was recorded during this survey with a total of 28 registrations of foraging and commuting bat recorded during the survey comprising common pipistrelle, soprano pipistrelle, <i>Myotis</i> bat, long-eared bat and serotine. The majority of activity was recorded to the south of the site in treed areas and adjacent to the pond in the south-west, although soprano pipistrelle was recorded in the north of the site.
19 th July 2016	A relatively high level of activity was recorded during this survey with a total of 32 registrations of foraging and commuting bat recorded during the survey comprising common pipistrelle, soprano pipistrelle and <i>Myotis</i> bat. The majority of activity was recorded to the south of the site in treed areas and adjacent to the pond in the south-west, with less activity in and around the carpark to the north and on the road sides, where the surveyor noted there is significantly more lighting.
2 nd August 2016	A moderate level of activity was recorded on site with a total of 18 registrations of foraging and commuting bat recorded during the survey, comprising common and soprano pipistrelle, <i>Myotis</i> bat, noctule and barbastelle. The majority of activity was recorded in the south of the site. The single barbastelle pass was recorded at Point 6 in the south-eastern corner of the site.
3 rd August 2016 (Dawn)	Bat activity at the site was very low during the dawn survey with only two soprano pipistrelle registrations recorded in the south-western corner of the site, associated with the on-site pond.
16 th August 2016	A low level of activity was recorded at the site with a total of 6 registrations of foraging and commuting bat. These were attributed to common pipistrelle with a single pass of soprano pipistrelle. The majority of activity was associated with habitat on the western boundary of the site, including the area around the on-site pond.
30 th August 2016	A moderate level of activity was recorded at the site with a total of 14 registrations of foraging and commuting bat comprising common pipistrelle, soprano pipistrelle, <i>Myotis</i> bat, and noctule. Activity was spread more evenly across the site with registrations in the north-western corner (the single <i>Myotis</i> bat pass recorded) and along the road adjacent to the eastern site boundary.

Survey Date	General Bat Activity at the Site
13 th September 2016	A moderate level of activity was recorded at the site with a total of 14 registrations of foraging and commuting bat comprising common pipistrelle, soprano pipistrelle, noctule, <i>Myotis</i> bat, serotine and long-eared bat. A single <i>Myotis</i> bat pass was recorded on the western site boundary, a single serotine record was associated with habitat adjacent to the on-site pond and a single long-eared bat record was associated with the lawn area in the south of the site.
4 th October 2016	A moderate level of activity was recorded at the site with a total of 17 registrations of foraging and commuting bat comprising common pipistrelle, soprano pipistrelle, <i>Myotis</i> bat, serotine and long-eared bat. Activity was spread more evenly across the site with registrations in the south, along the eastern boundary and in the north-western corner of the site. It was noted by the surveyor that fewer external lights were illuminated during the survey than on previous visits, which may explain the wider distribution of registrations across the site.

3.4.6 Automated Bat Detector Survey Results

The automated bat detector survey results recorded a total of 11,481 bat registrations of at least eight species: common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle *Pipistrellus nathusii*, *Myotis* bat species, noctule, serotine, long-eared bat and barbastelle. Nathusius pipistrelle was the only species not recorded during the transect surveys.

Activity by Species

Table 16 shows the number of registrations and proportion of recorded bat activity at the site by species. Common and soprano pipistrelle are represented in relatively even numbers, a number of social calls were too ambiguous to be identified to species level, however, could be positively attributed to pipistrelle species. Taken together, pipistrelle account for approximately 90% of overall bat activity.

Table 16: Number of registrations and proportion of bat activity from each species

Species	No. Registrations	% Registrations
Common Pipistrelle	4344	37.85%
Soprano Pipistrelle	4338	37.80%
Pipistrelle Species	1663	14.49%
<i>Myotis</i> species	413	3.60%
Noctule	261	2.27%
Serotine	226	1.97%
Long-eared Bat	207	1.80%
Nathusius' Pipistrelle	21	0.18%
Barbastelle	3	0.03%
Grand Total	11476	100.00%

The remainder of the activity recorded was attributed to *Myotis* bat species, noctule and serotine and long-eared bat with only very occasional registrations of *Nathusius pipistrelle* and *barbastelle*.

Species Activity by Month

Almost all species were recorded during every month the surveys were undertaken. Serotine and noctule were not recorded in June. *Barbastelle* was not recorded in August, although the species was recorded in such low numbers during all months that this may be a coincidence. *Nathusius pipistrelle* were recorded solely in September. *Pipistrelle* calls that could not be identified to species level are all in September, this is likely to be due to a significant increase in social calls during this month which are difficult to attribute to species level. **Table 17** provides the number of registration of each species recorded within each month.

Table 17: Number of registrations of each month split by species

Period	Species	No. Registrations	Activity Index (Registrations Per Night)
Jun-16	Common Pipistrelle	29	2.9
	Myotis species	8	0.8
	Soprano Pipistrelle	257	25.7
	Long-eared Bat	6	0.6
Jun-16 Total		300	
Jul-16	Common Pipistrelle	917	91.7
	Myotis species	102	10.2
	Noctule	165	16.5
	Soprano Pipistrelle	1833	183.3
	Long-eared Bat	154	15.4
	Serotine	200	20.0
	Barbastelle	1	0.1
Jul-16 Total		3372	
Aug-16	Common Pipistrelle	2438	162.5
	Myotis species	5	0.3
	Noctule	55	3.7
	Soprano Pipistrelle	297	19.8
	Long-eared Bat	7	0.5
	Serotine	4	0.3
Aug-16 Total		2806	
Sep-16	Common Pipistrelle	960	64.0
	Myotis species	298	19.9
	Noctule	41	2.7
	Soprano Pipistrelle	1951	130.1
	Long-eared Bat	40	2.7

	Serotine	22	1.5
	Nathusius' Pipistrelle	21	1.4
	Barbastelle	2	0.1
	Pipistrelle Species	1663	110.9
Sep-16 Total		4998	
Grand Total		11476	

Activity Levels at Locations

Table 18 shows the number of registrations recorded at each individual location throughout the survey period.

Table 18: Activity Recorded at Each Location

Period	Location	Count of Species	Activity Index (Registrations Per Night)
Jun-16	Location 11	112	22.4
	Location 5	188	37.6
Jul-16	Location 14	2611	522.2
	Location 15	761	152.2
Aug-16	Location 2	430	86.0
	Location 6	2114	422.8
	Location 8	262	52.4
Sep-16	Location 1	807	161.4
	Location 4	2208	441.6
	Location 7	1983	396.6
Grand Total		11,476	

During the survey detectors were deployed at different and random locations throughout the season. This means that it is not possible to analyse which areas of the site supported the greatest number of registrations as activity levels varied across the survey period dependant on the time of year. However, this method allows bat activity to be recorded across the site, reducing bias in survey data.

3.4.7 Phase 2 Bat Trapping Survey

A total of 24 bats of six species were captured over three nights of trapping. Bats of particular note include a male Bechstein's bat captured on the 5th July 2016 and two juvenile Bechstein's bats captured on the 11th August 2016. The other bat species included common and soprano pipistrelle, brown long-eared and Natterer's bat *Myotis nattereri* and whiskered bat *Myotis mystacinus*.

Bats were captured in all trap locations. Traps placed in the south east part of the site captured the most bats, including the juvenile Bechstein's bats. The male Bechstein's

bat was captured on the western side. The least captures were from the northern part of the site.

Table 19 provides full details of the trapping data which should be crossed referenced with **Map 5**:

Table 19: Bat captures at Southleigh Park House 2016

Date	Time	Species	Sex	Breeding status	Trap
17 th June 2016	23:29	Brown long-eared	Male	Not recorded	Trap 1
	01:19	Brown long-eared	Male	Not recorded	Trap 1
	02:20	Brown long-eared	Male	Not recorded	Trap 1
5 th July 2016	22:00	Whiskered	Male	Not recorded	Trap 4
	22:10	Brown long-eared	Male	Not recorded	Trap 3
	22:18	Whiskered	Male	Not recorded	Trap 1
	22:26	Bechstein's	Male	Not recorded	Trap 3
	22:49	Natterer's	Male	Not recorded	Trap 4
	22:53	Brown long-eared	Male	Not recorded	Trap 3
	23:35	Soprano pipistrelle	Male	Not recorded	Trap 1
	23:39	Soprano pipistrelle	Male	Not recorded	Trap 2
	00:09	Brown long-eared	Male	Not recorded	Trap 4
	00:13	Brown long-eared	Male	Not recorded	Trap 1
11 th August 2016	20:55	Common pipistrelle	Female	Post-lac.	Trap 4
	20:55	Soprano pipistrelle	Female	Post-lac.	Trap 4
	20:55	Soprano pipistrelle	Male	Adult	Trap 4
	22:37	Brown long-eared	Male	Adult	Trap 1
	23:16	Soprano pipistrelle	Female	Juvenile	Trap 2
	23:40	Common pipistrelle	Female	Non-lac	Trap 3
	23:40	Brown long-eared	Male	Juvenile	Trap 3
	23:48	Bechstein's	Female	Juvenile	Trap 1
	00:19	Soprano pipistrelle	Female	Juvenile	Trap 4
	00:22	Bechstein's	Female	Juvenile	Trap 1
	01:09	Brown long-eared	Female	Post-lac.	Trap 1

3.4.8 Assessment of Value of Site to Bats

Phase 2 bat surveys at the site recorded at least nine species of bat foraging and commuting within the site. The conservation status of bat species recorded is provided in **Appendix 5**.

Current guidance on valuing bats in Ecological Impact Assessment³⁷ was consulted to assess the value of the on-site foraging and commuting habitat to bats. **Table 20** shows the geographic level of value of foraging and commuting habitat at the site.

³⁷ Wray, S. *et al.* (2010) Valuing Bats in EclA. In Practice No. 70, December 2010, P. 23-25, Chartered Institute of Environmental and Ecological Management (CIEEM)

Table 20: Value of the site to bat species/species complexes

Species	Site Value
Bechstein's bat	Regional
Barbastelle	Regional
Nathusius' pipistrelle	Regional
Common pipistrelle	County
Soprano pipistrelle	County
Serotine	County
Other <i>Myotis</i> bat species	Local
Noctule	Local
Brown long-eared bat	Local

Bechstein's Bat

The historic surveys undertaken for the Havant Thicket project identified a number of maternity roosts within the woodland surrounding Southleigh Park House. Bechstein's bats are known to be a sedentary species³³ foraging near to their roost sites. Radiotracking undertaken in 2009 followed the range of female Bechstein's foraging and commuting behaviour. The bats generally remained within a 1km area with the furthest recorded distance travelled from the roost 830km. The nearest of identified roost to the Southleigh Park House site is 930m east, it is therefore considered likely that the site is out of the range of the maternity colonies (**Map 7**). This is supported by the Southleigh Park House survey findings, which recorded a single male and two juveniles using on-site habitat.

The on-site boundary habitat is dominated by mature and semi-mature deciduous and coniferous trees comprising both native and non-native species, forming a dense canopy, and with a very limited understorey. This habitat is considered sub-optimal for Bechstein's bat which is known to prefer unevenly aged, deciduous woodland with a high proportion of oaks and a good understorey. This explains why only a small number of Bechstein's bat were recorded at the site (only three Bechstein's bats trapped during the surveys and *Myotis* bats accounting for only 3.6% of all bat calls recorded by automated detectors, of which only a proportion of which are likely to be attributed to Bechstein's bat). Juvenile bats are known to range erratically around colony territory and make use of lower quality habitat³⁸. Males have high fidelity to their roosts and forage in close proximity to them (generally within a smaller range than females), however, they usually have multiple roosts at distances of up to 2.5km³³.

Three Bechstein's bats were trapped at the site, one male and two juveniles. This is as expected considering the large numbers of Bechstein's known to be present in the local area and the limited extent and relatively low quality of the on-site habitat. The on-site

³⁸ Greenway, F; Hill, D (2004) Woodland management advice for Bechstein's bat and barbastelle bat. Report 658. English Nature, Peterborough.

habitat is likely to form a very small part of a much wider foraging area associated with the extensive local woodland habitat.

Barbastelle and Nathusius' Pipistrelle

A small number of barbastelle were recorded from the static detector surveys undertaken in 2016 and an assessment of the value of the site indicated that these records mean that the site is of regional importance for these species. However, an average of only one barbastelle registration was recorded per month (3 registrations overall). Barbastelle are regularly encountered through woodlands in southern England and, given the high quality of nearby habitat, it is considered unlikely that on-site trees forms key foraging and commuting habitat for the local barbastelle population.

Nathusius' Pipistrelle

Nathusius' pipistrelle were recorded only in September with 21 registrations. This suggests autumn migration behaviour with a small number of bats commuting through on-site habitat. Given the high quality of nearby habitat, it is considered unlikely that the on-site trees form key commuting habitat for the local Nathusius' pipistrelle population.

3.5 Badger

The surrounding woodland provides suitable habitat for both resident and foraging badger, and there is suitable habitat on site in the form of tree margins and grassland. However, the site is surrounded by security fencing which is likely to discourage badger activity on site. The security fence has been lifted in one place on the southern site boundary (**TN13**) where animals are regularly entering/leaving the site and a number of small mammal excavations were recorded within the rhododendron patch in the south-west of the site (**TN14**). However, these signs are attributed to rabbit, which were recorded during the survey. The site is therefore considered to have **low potential** for resident, foraging and commuting badger.

3.6 Dormouse

Consultation with HBIC revealed no records of dormouse within 1km of the site. The tree margins on site are well connected to similar habitat in the wider area, however, the margins themselves are generally considered unsuitable for this species, due to the lack of understorey vegetation that provides shelter and food resources for dormouse throughout the year. The site is therefore considered to have **low potential** to support dormouse.

3.7 Birds

Consultation with HBIC revealed a large number of notable bird records within 1km of the site. Of these, red listed spotted flycatcher *Muscicapa striata*, house sparrow *Passer domesticus*, marsh tit *Poecile palustris*, starling *Sturnus vulgaris*, redwing

Turdus iliacus and song thrush *Turdus philomelos*, and amber listed firecrest *Regulus ignicapillus*, may occasionally occur on site. A number of common bird species were recorded during the survey, including long-tailed tit *Aegithalos caudatus*, treecreeper *Certhia familiaris*, great tit *Parus major*, blackbird *Turdus merula*, wood pigeon *Columba palumbus* and carrion crow *Corvus corone*.

Overhanging eaves and porches of the on-site buildings and scattered trees have potential to support nesting birds. The site is therefore considered to have **high potential** for breeding birds.

3.8 Reptile

Consultation with HBIC revealed no records of reptiles within 1km of the site. The habitat on-site is considered generally unsuitable for reptiles due to the well-managed nature of areas of grassland, which does not provide sufficient shelter for reptiles, and the shaded nature of the treed areas, which does not provide sufficient opportunities for basking. The site is therefore considered to have **negligible potential** for reptiles.

3.9 Great Crested Newt

3.9.1 Habitat Suitability Results

Consultation with HBIC revealed no records of great crested newt within 1km of the site. There is a waterbody on site and online mapping resources reveal a further four ponds within 500m of the site boundary. The on-site pond has an area of approximately 1100m² and 50% of it is shaded. There was good aquatic vegetation on the banks of the pond, but very limited macrophyte cover. The pond is likely to only dry rarely and while there was no evidence of fish presence during the survey the conditions suggest that they could be present. There was no evidence of the impact of wildfowl with the exception of a nesting moorhen.

Table 21: Waterbodies located within a 500m radius of the site

Pond Number	Approximate Distance and Direction from Site Boundary	Waterbody Description	Access Available During Phase 1 Survey	Suitability for Supporting Great Crested Newt
1	South-western corner of site	Large ornamental pond	Yes	Good ³⁹
2	40m east	Large pond within woodland	No	Unknown
3	285m north-east	Small pond within a cemetery	No	Unknown
4	400m north	Large pond within woodland	No	Unknown
5	430m south-east	Small pond within woodland	No	Unknown

³⁹ HSI score of 0.78

3.9.2 eDNA Results

The analysis of the eDNA sample taken from the four accessible ponds (see **Paragraph 2.15.3**) within 500m of the Southleigh Park House site identified that no great crested newt eDNA was present within the samples taken thus confirming that great crested newt are likely absent from the ponds sampled. Although Pond 2 could not be sampled, great crested newt are known to rely on a network of ponds and as they are known to be absent from all other ponds in the area, it is considered unlikely that Pond 2 would be sufficient to support a metapopulation. The site is therefore considered to have **negligible potential** to support great crested newt.

3.10 Invertebrates

Consultation with HBIC revealed a single record of stag beetle *Lucanus cervus* approximately 1km south-west of the site in 2007. A number of trees on site are dead or support deadwood with suitability to support stag beetle and other saprophytic invertebrates. The site is dominated by buildings, hardstanding, improved grassland and mixed scattered trees. The tree and grassland habitats comprise common and widespread species and form only a small extent of this habitat within the wider area. The site is therefore considered to have **low potential** to support notable assemblages of invertebrates.

4.0 PLANNING POLICY CONTEXT

4.1 Introduction

This section summarises the planning policy in relation to ecology and biodiversity within the East Hampshire District administrative area.

4.2 Planning Policy

4.2.1 National Policy

The National Planning Policy Framework (NPPF) sets out the government's requirements for the planning system in England. A number of sections of the NPPF are relevant when taking into account development proposals and the environment. As set out within Paragraph 14 of the NPPF *“At heart of the National Planning Policy Framework is a presumption in favour of sustainable development, which should be seen as a golden thread running through both plan-making and decision-taking”*. However Paragraph 119 goes on to state that *“The presumption in favour of sustainable development does not apply where development requiring appropriate assessment under the Birds or Habitats Directives is being considered, planned or determined”*.

The general impetus of the NPPF in relation to ecology and biodiversity is for development proposals to not only minimise the impacts on biodiversity but also to provide enhancement. Paragraph 109 states that the planning system should contribute to and enhance the natural environment by *“...minimising impacts on biodiversity and providing net gains in biodiversity where possible...”*

Paragraph 118 states that *“when determining planning applications, local planning authorities should aim to conserve and enhance biodiversity”*. A number of principles are set out in Paragraph 118 including the principle 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. Protection of irreplaceable habitats, such as ancient woodlands and those sites proposed as SPAs, SACs and Ramsar sites or acting as compensation for SPAs, SACs and Ramsar sites, should receive the same protection as European sites.

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

that the presence or otherwise of a protected species, and the extent that they may be affected by the proposed development, is established before planning permission is granted”.

4.2.2 Local Policy

Local planning policy within East Hampshire District is provided by the East Hampshire District Local Plan: Joint Core Strategy with two policies referring specifically to ecology and biodiversity:

- **Policy CP21: Biodiversity.** This policy refers to the need to maintain, enhance and protect district-wide biodiversity. The policy specifically refers to the requirement for new development to:
 - Protect designated sites including those of international, national and local importance;
 - Protect other features which are of local value for wildlife with examples listed including hedgerow, important trees and river corridors;
 - Contribute towards district wide network of local sites;
 - Ensure net gains in biodiversity and ensuring adverse impacts are avoided or mitigated for; and
 - Protect and strengthen populations of legally protected species.
- **Policy CP22: Internationally Designated Sites.** This policy specifically states that any development within 400m of the Wealden Heaths Phase II SPA will be required to undertake a project specific Habitats Regulations Assessment. The policy requires that development complies with the findings of any forthcoming work provided by the Solent Disturbance and Mitigation Project in relation to the Solent SAC, SPA and Ramsar sites.

5.0 EVALUATION, POTENTIAL IMPACTS AND RECOMMENDATIONS

5.1 Introduction

This section presents the conclusions of the Ecological Assessment. It provides an initial assessment of the likely ecological impacts as a result of the proposed development and recommendations for any further survey work, mitigation or enhancement measures considered necessary. An outline of protected species legislation relevant to the findings of this report is provided in **Appendix 7**.

5.2 Site Evaluation

The site is dominated by buildings, hardstanding, improved grassland and mixed scattered trees. These habitats are common in the local area and comprise non-native and common and widespread native species. The vegetation on site is therefore considered to be of low ecological value overall. However, the site has low potential to support foraging badger and high potential to support nesting birds. The site also provides habitat for a range of foraging bat species, and is part of a wider area of habitat known to support a population of Bechstein's bat.

5.3 Summary of Potential Impacts

The proposed development entails the construction the construction of 90 residential units. This will result in the loss of Building 4 and areas of hardstanding, as well as approximately 0.8ha of scattered trees. In the absence of mitigation, the potential ecological impacts of these works are:

- A net increase in residents at the site is likely to increase recreational impacts on nearby statutory and non-statutory designated sites, including the Solent SPAs;
- No bat roosts were recorded in trees with medium or high potential to support roosting bats, which were subject to emergence/re-entry surveys. Trees with low potential were not subject to emergence/re-entry surveys, but have potential to support low status roosts of individual bats. Therefore, there is a risk of directly impacting tree roosting bats through the clearance of trees with bat roosting potential;
- The proposals will result in a net loss of suitable bat foraging and commuting habitat;
- There is potential for indirect disturbance impacts on foraging and commuting bats as a result of new external lighting;
- Demolition of buildings and clearance of trees has potential to impact on nesting birds and result in a net loss of potential nesting habitat on site;
- The removal of dead trees and deadwood on site may result in a loss of suitable habitat for saprophytic invertebrates.

5.4 Summary of Key Mitigation and Enhancement Measures

The following main recommendations have been designed to minimise the potential impacts and enhance the site for wildlife:

- A financial contribution will be made to the Solent Interim Recreational Mitigation Strategy to mitigate for recreational impacts on the Solent SPAs;
- It is recommended that retained trees are protected from damage during construction using Heras-type fencing;
- Proposed landscaping will incorporate native tree and shrub species and species rich grassland;
- Trees with potential to support roosting bats will be subject to sectional felling under the supervision of a licenced bat ecologist;
- A sensitive post-development lighting strategy will avoid impacts associated with increased external lighting at the site and result in a net reduction in light spill;
- New native tree and hedgerow planting along the site boundaries will mitigate for the loss of foraging habitat post-development and will maintain connectivity across the site in the long-term;
- Retained areas of suitable habitat will be enhanced and managed for foraging and commuting bats. The proposed new meadow planting will enhance the prey resource for bats at the site.
- New bat boxes will be erected on retained trees to mitigate for the loss of roosting opportunities on site.
- Demolition of on-site buildings and clearance of trees will be undertaken outside the breeding bird season of March to August, inclusive, or if not possible, an ecologist should be present immediately prior to clearance to check vegetation. Active nests should be left with a suitable buffer until nesting ends. Installation of bird boxes on trees and new buildings will mitigate for the net loss of nesting bird habitat on site;
- If possible, dead trees on-site will be retained. Creation of log 'piles' will mitigate for the loss of dead wood used by saprophytic invertebrates.

5.5 Evaluation Against Relevant Planning Policy

Given the impacts identified and the subsequent recommendations made it is considered that the proposals will accord with all relevant national and local planning policy in relation to ecology (see **Section 4**).

5.6 Designated Sites

5.6.1 Summary

Consultation with HBIC and the MAGIC website revealed that there are five international statutory designated sites of nature conservation within a 7km radius of the site. There are no national statutory designated sites within a 1km radius of the site, however, there are four non-statutory sites present within this radius, all designated for their woodland habitat. This includes the Southleigh Forest (south) Site of Importance for Nature Conservation (SINC), which lies approximately 30m east of the site.

5.6.2 Potential Impacts of Proposed Development

The proposals will result in an increase in human activity/number of residents at the site, there is potential for impacts on both statutory and non-statutory designated sites. The site lies within the 5.6km buffer zone of the Solent SPAs⁴⁰. Therefore a net increase in residents at the site is considered likely to have a negative impact on these sites. No impacts are anticipated in relation to the local SINC as it is understood that these are on private land and only accessible via specified public rights of way.

5.6.3 Mitigation and Enhancement

In line with the Solent Interim Recreational Mitigation Strategy it may be required that a financial contribution is made to the strategic mitigation measures to be implemented by the Solent Recreation Mitigation Partnership. At the time of writing this contribution is currently £172 per dwelling plus any administration charges necessary. These long-term strategic measures will ensure that the conservation objectives of the designated sites are maintained.

5.7 Vegetation

5.7.1 Summary

The site is dominated by buildings, hardstanding, improved grassland and mixed scattered trees. These habitats are common in the local area and comprise non-native and common and widespread native species. The vegetation on site is therefore considered to be of **low ecological value** overall, however, mature trees within the woodland margins are considered to be of greatest ecological value at the site level.

5.7.2 Potential Impacts of Proposed Development

As all on-site habitats are of low ecological value overall, no significant impacts on vegetation communities are anticipated.

5.7.3 Mitigation and Enhancement

It is recommended that retained trees are isolated from the construction area using Heras-type fencing to protect these habitat features from accidental damage during

⁴⁰ Solent Recreation Mitigation Partnership (2014) *An interim framework to mitigate the impact on the Solent Special Protection Areas of increased visitor pressure arising from housebuilding.*

construction. Tree root protection zones should be set up in accordance with BS 5837:2012 *Trees in relation to design, demolition and construction*

Proposed landscaping will incorporate native tree and shrub species, of local provenance⁴¹.

New native hedgerow planting will incorporate:

- Field maple *Acer campestre*;
- Dogwood *Cornus sanguinea*;
- Hazel *Corylus avellana*;
- Hawthorn *Crataegus monogyna*;
- Holly *Ilex aquifolium*;
- Wild privet *Ligustrum vulgare*;
- Crab apple *Malus sylvestris*;
- Blackthorn *Prunus spinosa*;
- Guelder-rose *Viburnum opulus*; and
- Dog rose *Rosa canina*.

New native tree planting will include:

- Field maple;
- Alder *Alnus glutinosa*;
- Hornbeam *Carpinus betulus*;
- Bird cherry *Prunus padus*;
- Pedunculate oak *Quercus robur*; and
- Small leaved lime *Tilia cordata*.

Part of the existing improved grassland in the south of the site will be reseeded with a native wildflower meadow mix (e.g. Emorsgate EM3 Special General Purpose Meadow Mixture) and will be managed appropriately.

New habitat mitigation and enhancement measures are shown in **Map 13**.

⁴¹ Terence O'Rourke (2017) *Planning, Design and Access Statement - Southleigh Park House (Appendix F)*. Terence O'Rourke, Bournemouth.

5.8 Bats

5.8.1 Summary

Roosting Bats

Building 4 and the flat roofed section of Building 1 have negligible potential to support roosting bats. Buildings 2 and 6 have medium potential and Buildings 1, 3, 5 and 7 have high potential for roosting bats.

Bat roosting surveys revealed no evidence of roosting bats within trees with medium or high potential. Trees with low potential were not subject to roosting surveys.

Foraging and Commuting Bats

Bat activity surveys (transect surveys, automated detector surveys and trapping surveys) recorded at least nine species of bat using the site including small numbers of rarer species including barbastelle and Bechstein's bat (both Annex II species, see **Appendix 7**) and Nathusius' pipistrelle. Trapping surveys revealed the presence of one male Bechstein's bat and two juveniles. The core habitat for these species is likely to be associated with the significant area of ancient woodland locally and therefore the low quality on-site habitat probably represents a peripheral foraging area.

While the presence of small numbers of rarer species, including Bechstein's bat, barbastelle and Nathusius' pipistrelle, suggest the site is of regional importance, given the large extent of high quality habitat in the immediate vicinity, it is considered unlikely that on-site trees form a key part of these species foraging and commuting habitat and, in this context, the site is considered not to be of regional importance.

5.8.2 Potential Impacts of Proposed Development

Roosting Bats

Buildings with negligible potential are proposed to be demolished. Buildings with medium or high potential for roosting bats are to be retained with minor alterations. Details of proposals to each building are summarised below:

Building 1 (Stable Block):

- Installation of two new windows in the eastern elevation and installation of new windows in existing openings on this elevation;
- Installation of a new window in the southern elevation and installation of a new window in the existing opening on this elevation;
- Installation of a new window in the northern elevation and installation of a new window in an existing opening on this elevation;
- Blocking up of existing window on northern elevation;
- Replacement of existing doorway with window on western elevation;
- Demolition of flat-roofed single-storey extension of Building 4, that links with the eastern and southern elevations of the Building 1;

- Construction of new single-storey rear extension;
- Removal of existing fire escape staircase on western elevation;
- Installation of new roof lights in eastern elevation; and
- Removal of existing dormer on eastern elevation to be replaced with conservation roof light.

Building 2 (Coach House)

- Demolition of single storey extension on eastern elevation;
- Replacement of windows and doors on the eastern elevation, western elevation, some of which will require some removal of the flint wall to convert windows into doorways; and
- Removal of section of flint wall to create new doorway on the western elevation.

Building 3 (Main House and West Wing)

- Installation of new doors and windows in existing openings on the northern and western elevations;
- Existing doorway opening to be blocked up on eastern elevation; and
- New ground floor doorway and window openings to be created in northern and southern elevations.

Building 4:

- Complete demolition.

Building 5 (Woodstore)

- Installation of double doors in northern elevation.

Building 6 (Dairy)

- No significant alterations proposed.

Building 7 (Lodge)

- New single-storey flat roofed kitchen extension on eastern elevation of existing single-storey elevation; and
- Creation of new double entrance doorway in western elevation of existing single-storey extension.

None of the proposed alterations above are anticipated to result in adverse effects on roosting bats as they will not impact on any of the potential roosting features identified in **Appendix 3**. The only roof works are associated with eastern elevation of Building 2. This will involve the removal of a small number of roof slates and the existing dormer window to accommodate new roof lights. These areas do not support any potential

roosting features so there is no risk of destruction of a bat roost or killing or injury of individual bats. This part of the roof is associated with the converted section of the roof void and is not directly connected to the unconverted roof sections within the property. Therefore, assuming the works are undertaken using hand tools, it is not anticipated that the installation of these features will result in disturbance impacts on bats which could be roosting within other parts of the building.

No direct impacts on bats roosting within on-site buildings, such as killing or injury of individual bats or roost loss, are anticipated.

There is potential for indirect disturbance impacts on roosting bats through increased external lighting shining on bat emergence/re-entry features, or if on-site contractors encroach on parts of the building not directly subject to alteration (e.g. entering roof voids). There will also be a net loss in roosting opportunities post-development.

There is a risk of directly impacting tree roosting bats through the clearance of trees with bat roosting potential, although only low status bat roosts are likely to be present on site.

Foraging and Commuting Bats

The proposals will result in a net loss of suitable bat foraging and commuting habitat of approximately 0.8ha (47% of available on-site habitat). The majority of the habitat lost will be of low quality. There is a large amount of suitable habitat within the surrounding area (approximately 150ha of ancient and replanted woodland and 101ha of other deciduous woodland and 23ha of parkland within 2km), which is of better quality for foraging and commuting bats. On-site habitat therefore represents approximately 0.6% of suitable habitat within the area. The on-site pond and associated trees to the north and south, identified as a key foraging area during the transect surveys, will be retained. For this reason the impact of the proposed habitat loss is considered to be of low significance.

There is potential for indirect disturbance impacts on foraging and commuting bats as a result of new external lighting.

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 2010. Refer to **Appendix 7** for details.

5.8.3 Mitigation and Enhancement

It is recommended that identified trees with potential to support roosting bats be subject to sectional felling under the supervision of a licenced bat ecologist in line with current

guidance for low suitability trees⁴². Should any bats be encountered during the felling then works should cease and a European Protected Species Mitigation (EPSM) licence is required to be sought from Natural England.

A toolbox talk will be delivered by a suitably qualified ecologist prior to commencement of works, to make on-site contractors aware of the potential presence of roosting bats within the retained buildings and areas which should be avoided during the alteration works, to prevent potential disturbance to roosting bats.

The proposed lighting strategy will reduce the intensity level of external lighting at the site overall and will reduce light spill onto retained areas of suitable roosting and foraging habitat. The lighting installed will primarily comprise illuminated bollards with directional road lighting at a height of 5m where necessary for safety reasons. An illuminance plan of the existing lighting on site is shown in **Map 11**, and a proposed post-development illuminance plan is shown in **Map 12**.

New native tree and hedgerow planting along the site boundaries will mitigate for the loss of foraging habitat post-development and will maintain connectivity across the site in the long-term. It will also serve to screen the site from adjacent street lighting, particularly from Horndean Road.

Retained areas of suitable habitat will be enhanced and managed for foraging and commuting bats, with particular consideration for Bechstein's bat. Many colonies in southern England are in derelict hazel coppice where the oak standards have closed canopy over the old hazel⁴³. Inclusion of coppiced and pollarded native species such as hawthorn and hazel will create the developed understorey preferred by this species.

The site will be further enhanced for foraging and commuting bats through the planting of a species rich meadow area in the south of the site. This will provide an enhanced invertebrate prey resource for foraging and commuting bats.

New bat boxes will be erected on retained trees, such as Schwegler 1FF and Schwegler 2F boxes to mitigate for the loss of roosting opportunities on site. See Map 13 for indicative bat box locations.

5.9 Badger

5.9.1 Summary

The surrounding woodland provides suitable habitat for both resident and foraging badger, and there is suitable habitat on site in the form of scattered trees and grassland.

⁴² Collins, J. (Ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Third Edition). The Bat Conservation Trust, London

⁴³ Greenway, F; Hill, D (2004) Woodland management advice for Bechstein's bat and barbastelle bat. Report 658. English Nature, Peterborough.

However, the site is surrounded by security fencing which is likely to discourage badger activity on site. Damage to the exterior fencing was attributed to rabbit. However, these signs are attributed to rabbit, which were recorded during the survey. The site is therefore considered to have **low potential** for resident, foraging and commuting badger.

5.9.2 Potential Impacts of Proposed Development

No impacts on badger are anticipated as a result of any proposed works. It is possible that badger could become trapped in excavations during construction works, although this is considered unlikely.

5.9.3 Mitigation and Enhancement

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

5.10 Dormouse

5.10.1 Summary

Consultation with HBIC revealed no records of dormouse within 1km of the site. The woodland on site is well connected to similar habitat in the wider area, however, the woodland itself is generally considered unsuitable for this species, due to the lack of understorey vegetation that provides shelter and food resources for dormouse throughout the year. The site is therefore considered to have **negligible potential** to support dormouse.

5.10.2 Potential Impacts of Proposed Development

As dormouse are considered unlikely to be present on site, no significant impacts are anticipated.

5.10.3 Mitigation and Enhancement

There are no recommendations to be made in respect of dormouse.

5.11 Birds

5.11.1 Summary

A number of common bird species were recorded during the survey and woodland habitat on site is considered suitable for nesting birds as are Buildings 1, 2, 3 and 7, due to the presence of overhanging eaves and porches. The site is therefore considered to have **high potential** for nesting birds.

5.11.2 Potential Impacts of Proposed Development

Demolition of buildings with nesting bird potential and clearance of areas of woodland has potential to impact on nesting birds and result in a net loss of potential nesting habitat on site.

All birds, their nests, eggs and young are legally protected, see **Appendix 7** for details.

5.11.3 Mitigation and Enhancement

Demolition of on-site buildings and clearance of trees will be undertaken outside the breeding bird season of March to August, inclusive, or if not possible, an ecologist should be present immediately prior to clearance to check vegetation. Active nests should be left with a suitable buffer until nesting ends. It should be noted that clearance outside of the bird nesting season may clash with timing requirements for roosting bats, in these cases, mitigation for both species should be carefully considered.

Installation of bird boxes on trees and new buildings will mitigate for the net loss of nesting bird habitat on site. See Map 13 for indicative bird box locations.

5.12 Reptiles

5.12.1 Summary

Consultation with HBIC revealed no records of reptiles within 1km of the site. The habitat on-site is considered generally unsuitable for reptiles due to the well-managed nature of areas of grassland, which does not provide sufficient shelter for reptiles, and the shaded nature of the woodland areas, which does not provide sufficient opportunities for basking. The site is therefore considered to have **negligible potential** for reptiles.

5.12.2 Potential Impacts of Proposed Development

No impacts on reptiles are anticipated.

5.12.3 Mitigation and Enhancement

There are no recommendations in respect of reptiles. The proposed new wildflower meadow area will enhance the site for this species group.

5.13 Great Crested Newt

5.13.1 Summary

Four of the five ponds within 500m of the site boundary were subject to eDNA sampling and analysis. All of the ponds sampled returned negative results for great crested newt eDNA. Pond 2, which could not be accessed, may be suitable for great crested newt however as this species generally relies on a network of suitable ponds, as they are absent in all ponds within 500m it is unlikely that they would be present in Pond 2. The site is therefore considered to have **negligible potential** for great crested newt.

5.13.2 Potential Impacts of Proposed Development

No impacts on great crested newt are anticipated.

5.13.3 Mitigation and Enhancement

There are no recommendations in respect of great crested newt.

5.14 Invertebrates

5.14.1 Summary

The site supports low value habitats that are limited in extent. However, due to the presence of dead wood on site and records of notable invertebrates associated with dead wood in the wider area (such as stag beetle) revealed through the HBIC consultation, the site is considered to have **low potential** to support notable invertebrate species and assemblages.

5.14.2 Potential Impacts of Proposed Development

The removal of dead trees and deadwood on site may result in a loss of suitable habitat for saprophytic invertebrates. However, given the limited extent of suitable habitat on site compared with that of the surrounding area, the impacts associated with the development are considered to be of low significance.

5.14.3 Mitigation and Enhancement

If possible, dead trees on-site should be retained. If a tree eventually falls then it should be retained in place. If it is necessary to remove, its height should be reduced to the stump, rather than being removed completely, and removed limbs should be retained for use by saprophytic invertebrates.

Creation of log 'piles' (**Figure 9**) or 'pyramids' (**Figure 10**)⁴⁴, using felled trees and removed limbs, will mitigate for the loss of dead wood and enhance the site for saprophytic invertebrates, such as stag beetle. Indicative locations of dead wood features are provided in **Map 13**.

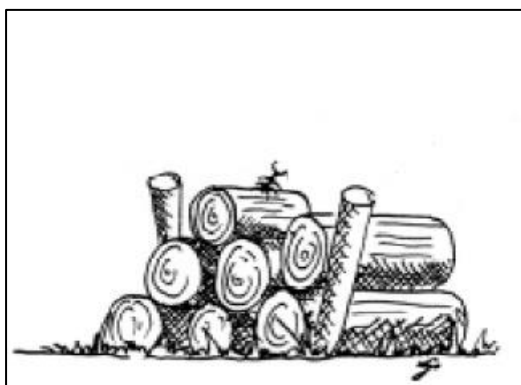


Figure 9: Log 'pile', logs held in place by posts.

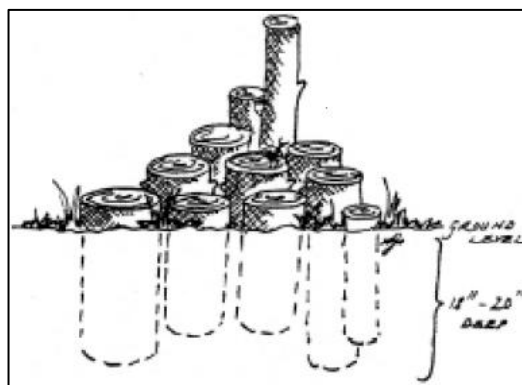


Figure 10: Log 'pyramid', suitable for parks and large gardens.

5.14.4 Ecological Management Plan

Broad details of the mitigation strategy are shown in **Map 13**. A detailed Ecological Management Plan will be prepared for the site to cover construction, operation and post-construction. The post construction section will provide details of deliverance of

⁴⁴ **Figure 9** and **Figure 10** are taken from Peoples Trust for Endangered Species (PTES) guidance (PTES (no date) *Fact Sheet: Stag Beetles*. PTES, London, UK).

enhanced habitat on site. This will include prescription methods for the proposed mitigation measures outlined above.

5.15 Updating Survey

If works have not commenced by October 2018, it is recommended that the ecological appraisal is updated. This is because many of the species considered during the current survey are highly mobile and the ecology of the site is likely to change over this period. If the planning application boundary changes or the proposals for the site alter, a re-assessment of the impacts may be required.

Map 1 Site Location Plan

**SOUTHLEIGH PARK HOUSE,
EASTLEIGH ROAD, HAVANT,
HAMPSHIRE**

ECOLOGICAL ASSESSMENT

Map 1 - Site Location

Client: Jill Manson & Associates

Date: November 2015

Status: Final

KEY

 Site Boundary

Scale at A4: 1:10,000

0 40 80 160 240 320
Metres



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Telephone: 02380 261065

Email: info@ecosa.co.uk Web: www.ecosa.co.uk

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Map 2 Bat Roost Survey Surveyor Locations



SOUTHLEIGH PARK HOUSE, PORTSMOUTH

ECOLOGICAL IMPACT ASSESSMENT

Map 2 - Bat Roost Survey Surveyor Locations

Client: Jill Manson & Associates

Date: November 2016 Status: Draft

KEY

 Surveyor Location and Number of Surveys

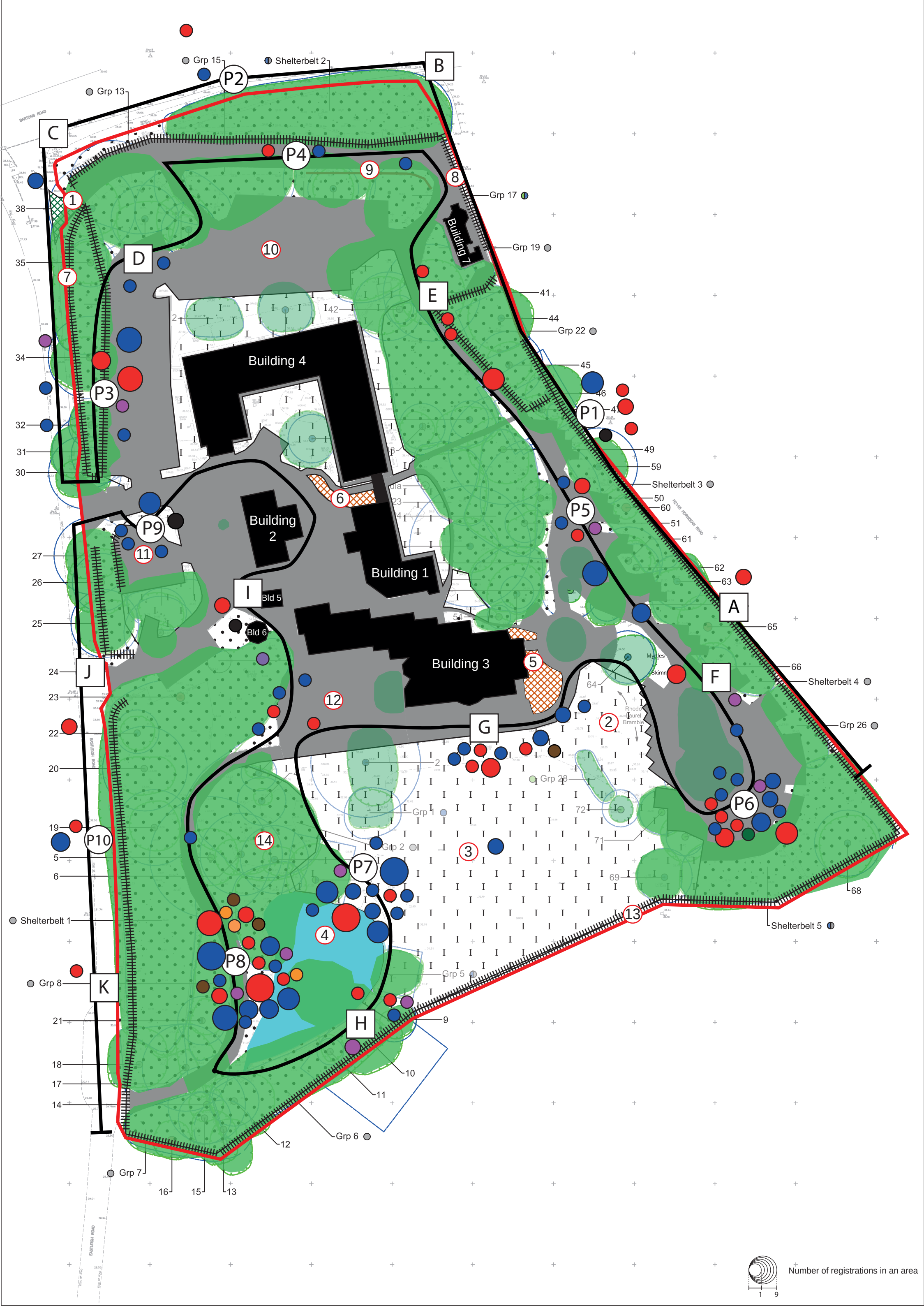
Basemap: Bernie Harverson (2015) *Southleigh Park House, East Leigh Road, Havant, -Tree Survey and Constraints Plan*. Drawing No: BJH 01/02. 1:400 @ A3



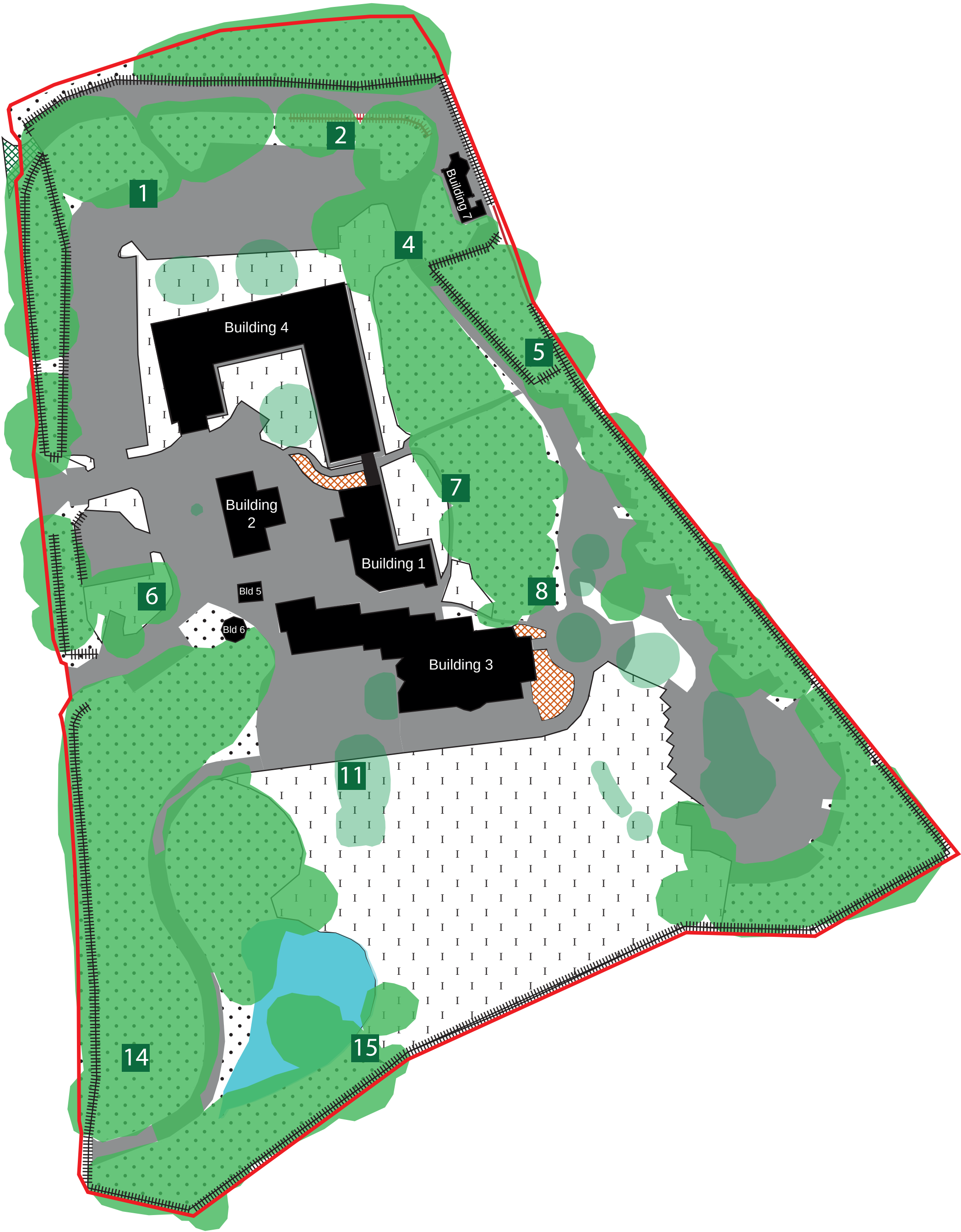
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Map 3 Bat Transect Survey Results



Map 4 Automated Detector Survey Results



SOUTHLEIGH PARK HOUSE, PORTSMOUTH

ECOLOGICAL IMPACT ASSESSMENT

Map 4 - Automated Detector Survey Results

Client: Jill Manson & Associates

Date: November 2016

Status: Draft

KEY

1 Automated Detector Location

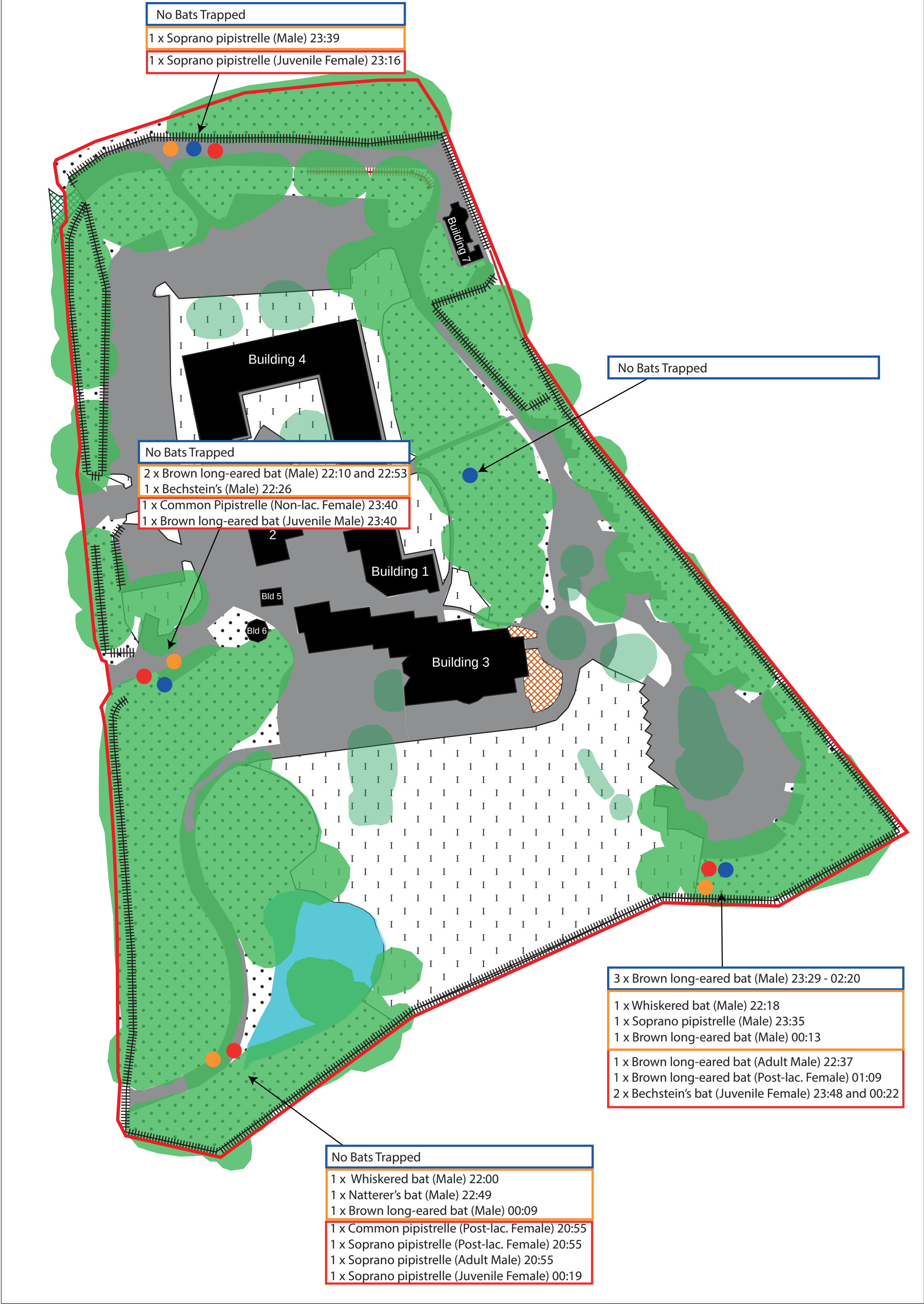


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Map 5 Bat Trapping Survey Results



Map 6 Great Crested Newt eDNA Survey Results



SOUTHLEIGH PARK HOUSE, EASTLEIGH ROAD, HAVANT, HAMPSHIRE

ECOLOGICAL ASSESSMENT

Map 6 - Great Crested Newt eDNA
Survey Results

Client:	Snell & Wilcox Ltd Pension Plan
Date:	November 2016
Status:	Final

KEY

 Site Boundary

 GCN 500m Buffer

Ponds Surveyed

 1, Pond Surveyed, GCN Absent

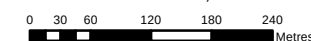
 2, Pond Not Surveyed: Access Denied

 3, Pond Surveyed, GCN Absent

 4, Pond Surveyed, GCN Absent

 5, Pond Surveyed, GCN Absent

Scale at A4: 1:7,500



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Map 7 Summary of Historic Survey Data in Relation to Havant Thicket 2009

ECOLOGICAL ASSESSMENT

Client: Jill Manson & Associates

Date: December 2016

Status: Draft

- Site Boundary
- 2km Radius from Site Boundary
- Foraging Range of Radiotracked Bechstein's bats
- 1km Radius around Foraging Range
- Location of Bechstein's Roost
- Tree Tag Number
- Peak Number of Bats Recorded During Emergence Surveys

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Email: info@ecosa.co.uk Web: www.ecosa.co.uk

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Map 8 Phase 1 Habitat Map



SOUTHLEIGH PARK HOUSE, PORTSMOUTH
ECOLOGICAL IMPACT ASSESSMENT
Map 8 - Phase 1 Habitat Map

Client: Jill Manson & Associates

Date: November 2016 Status: Draft

KEY

- | | | | | | |
|--|--------------------|--|------------------|--|--|
| | Site Boundary | | Standing Water | | Wall |
| | Scattered Trees | | Introduced Shrub | | Fence |
| | Scattered Scrub | | Hardstanding | | Target Note Features of Interest,
As Referenced in Report |
| | Improved Grassland | | Buildings | | |

Basemap: Bernie Harverson (2015) *Southleigh Park House, East Leigh Road, Havant, -Tree Survey and Constraints Plan*. Drawing No: BJH 01/02. 1:400 @ A3

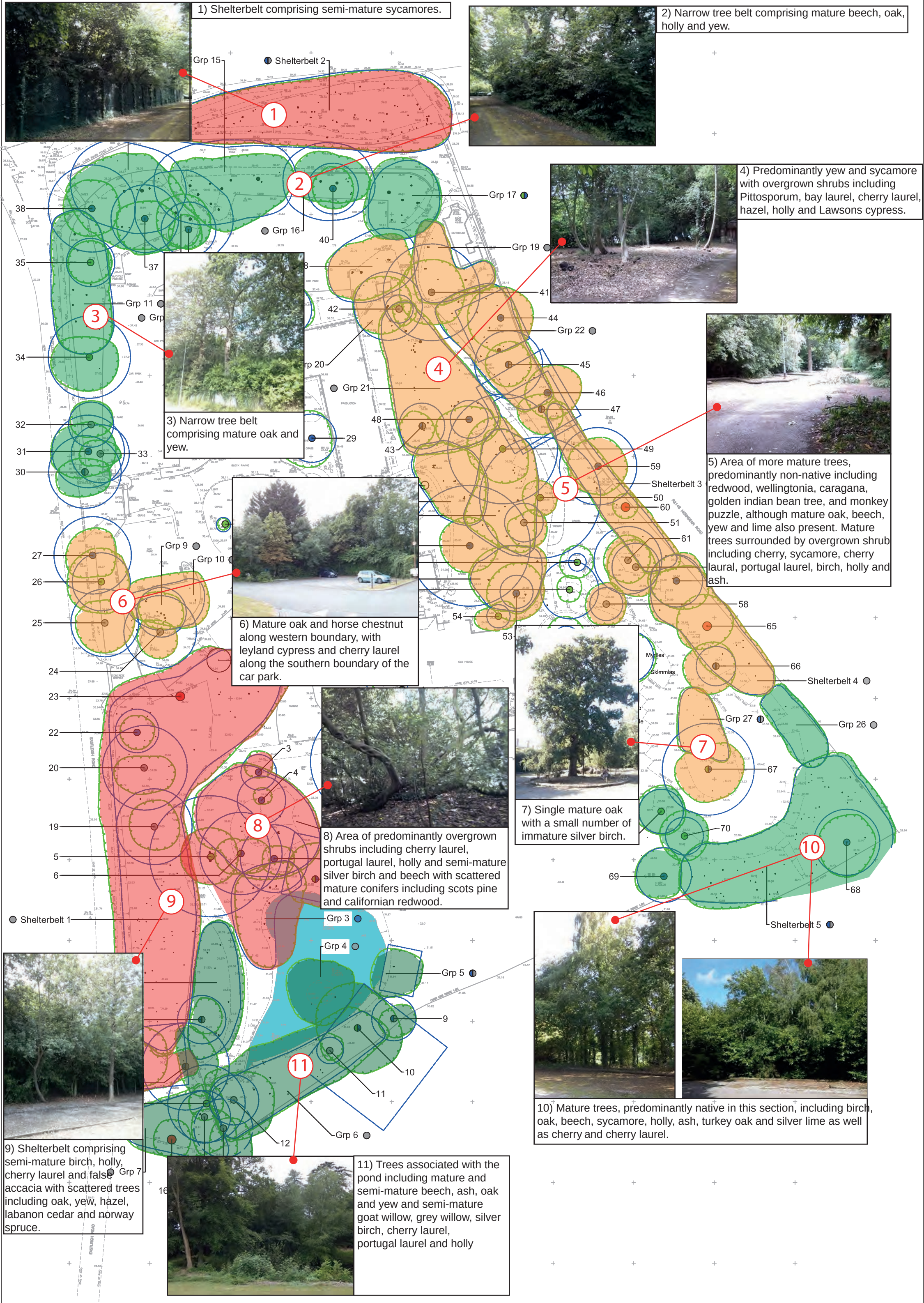


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Map 9 Relative Quality of On-site Habitat for Bat Foraging and Commuting



SOUTHLEIGH PARK HOUSE, PORTSMOUTH

ECOLOGICAL IMPACT ASSESSMENT

Map 9 - Relative Quality of On-site Habitat for Bat Foraging and Commuting

Client: Jill Manson & Associates

Date: November 2016

Status: Draft

KEY

High Quality

Medium Quality

Low Quality

Negligible Quality

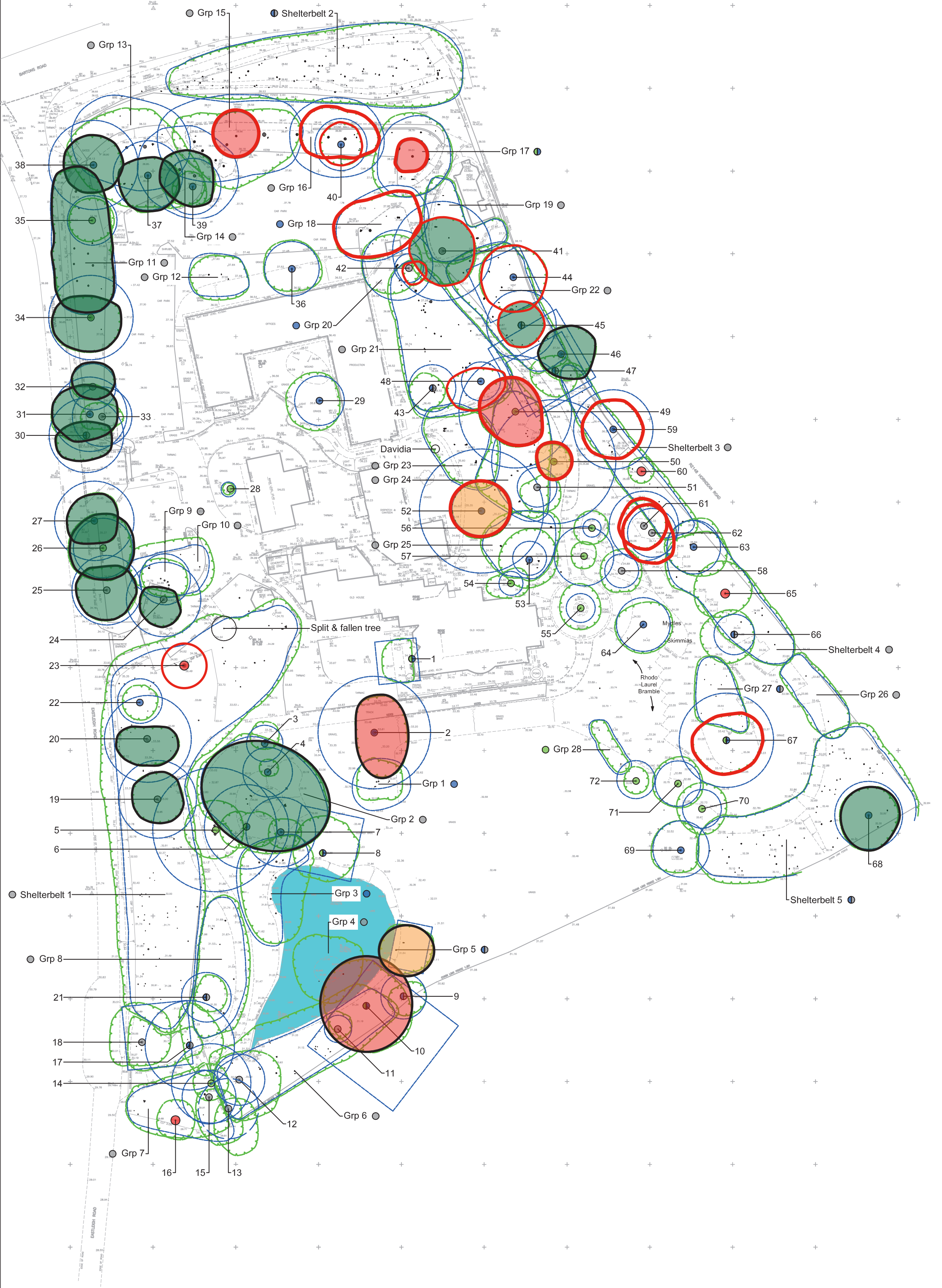
Basemap: Bernie Harverson (2015) *Southleigh Park House, East Leigh Road, Havant, -Tree Survey and Constraints Plan*. Drawing No: BJH 01/02. 1:400 @ A3

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Map 10 Ground Level Tree Assessment and Tree Climb and Inspect Results



SOUTHLEIGH PARK HOUSE, PORTSMOUTH

ECOLOGICAL IMPACT ASSESSMENT
Map 10 - Ground Level Tree Assessment and Tree
Climb & Inspect Results

Client: Jill Manson & Associates

Date: December 2016 Status: Draft

KEY

- | | | | |
|---|----------------------|---|--|
|  | High Potential |  | Tree subject to climb and inspect survey |
|  | Medium Potential | | |
|  | Low Potential | | |
|  | Negligible Potential | | |

Basemap: Bernie Harverson (2015) *Southleigh Park House, East Leigh Road, Havant, -Tree Survey and Constraints Plan*. Drawing No: BJH 01/02. 1:400 @ A3

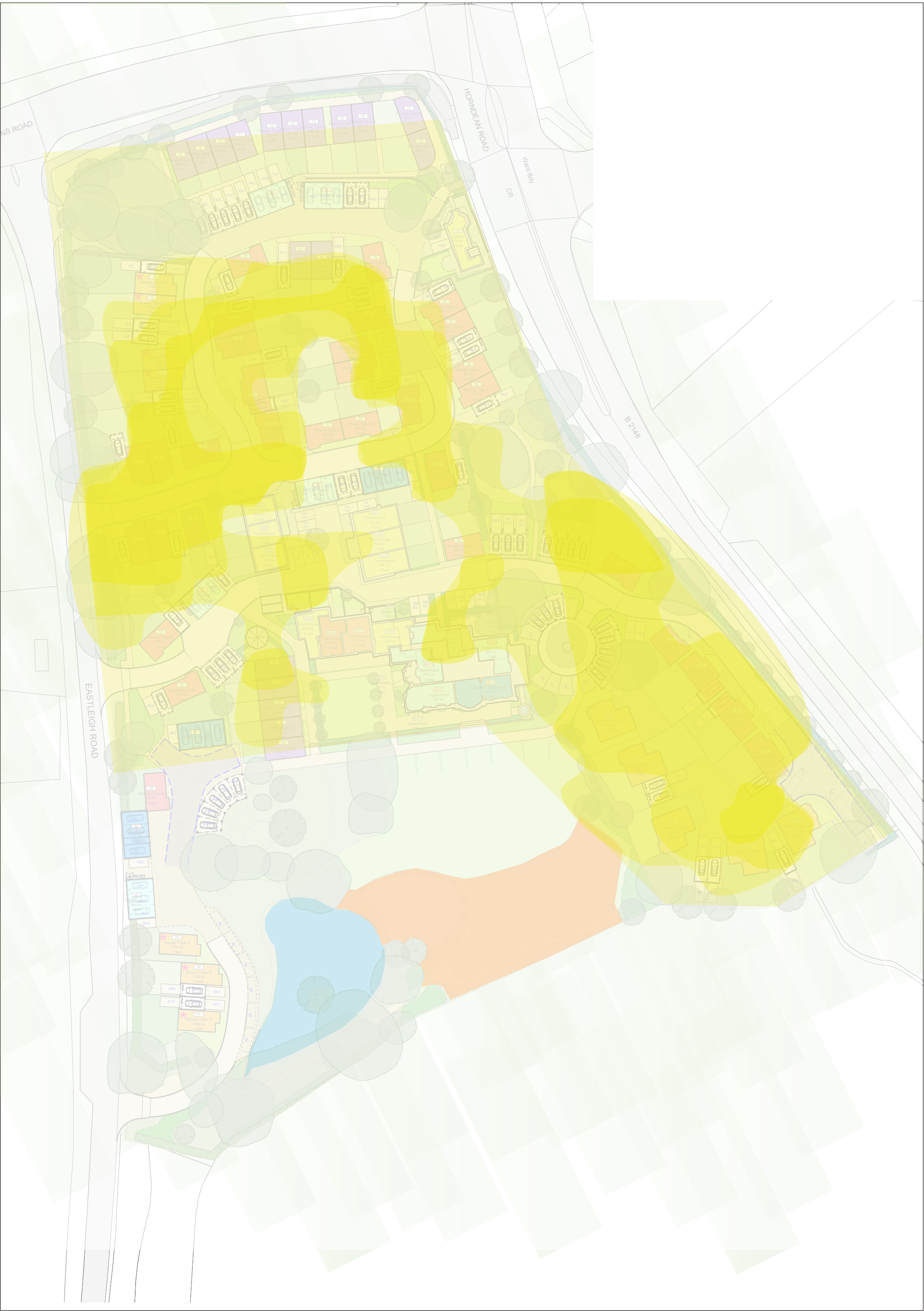


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Map 11 Existing Lighting Impacts



SOUTHLEIGH PARK HOUSE, PORTSMOUTH

ECOLOGICAL IMPACT ASSESSMENT

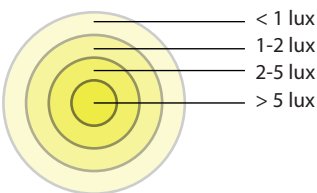
Map 11 - Existing Lighting Impacts

Client: Jill Manson & Associates

Date: July 2017

Status: Final

KEY



Basemap: Terence O'Rourke (2017) Indicative Site Layout (with parking allocation).
Drawing No. 245001/P006/0. 1:500 @ A1



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Map 12 Post-development Lighting Strategy



SOUTHLEIGH PARK HOUSE, PORTSMOUTH

ECOLOGICAL IMPACT ASSESSMENT

Map 12 - Post-development Lighting Strategy

Client: Jill Manson & Associates

Date: December 2016 Status: Final

KEY

- < 2 lux
- 2-4 lux
- 4-5 lux
- 5-7 lux
- 7-10 lux
- 10-15 lux

Basemap: Terence O'Rourke (2016) Indicative Masterplan Option 4 - Draft.
Drawing No. 245001/sk056/A. 1:500 @ A1



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Map 13 Mitigation Strategy



SOUTHLEIGH PARK HOUSE, PORTSMOUTH

ECOLOGICAL IMPACT ASSESSMENT

Map 13 - Mitigation Strategy

Client: Jill Manson & Associates

Date: July 2017

Status: Final

KEY

-  Schwegler 1FF or 2FN Bat Box
-  Schwegler 2H or 1B Bird Box
-  Log piles or pyramids

-  Trees Retained and Enhanced
-  New Native Tree and Hedgerow Planting
-  Grassland Enhanced

Basemap: Terence O'Rourke (2017) Indicative Site Layout (with parking allocation).
Drawing No. 245001/P006/0. 1:500 @ A1



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Appendix 1 Proposed Site Layout

CAR PARKING ANALYSIS

Havant Borough SPD standard - 1 bed / 1 space; 2 bed / 2 spaces; 3 bed 2 spaces; 4+ bed / 3 spaces

Allocated Car Spaces

One bed units with one allocated space = 11 units (100%)
Two bed units with two allocated spaces = 32 units (100%)
Three bed units with two allocated spaces = 35 units (100%)
Four bed units with three allocated spaces = 12 units (100%)

Units with shortfall of allocated car spaces to SPD = Nil

Visitor Car Spaces

Total number car spaces allocated to units = 181 spaces
Total number unallocated visitor spaces (entire development) = 24 spaces (12%)
Full planning application area (34 allocated spaces to listed building conversions) = 6 spaces (24%)



Southleigh Park House - Masterplan

ACCOMMODATION SCHEDULE SUMMARY

Main House - Residential Conversion

Plot No.	Unit Type	No. of Bedrooms	Count	Gross Internal Floor Area
MH1	Duplex Apartment	2 bed	1	1341 sq.ft
MH2	Apartment	1 bed	1	722 sq.ft
MH3	Apartment	1 bed	1	765 sq.ft
MH4	Apartment	2 bed	1	844 sq.ft
MH5	Apartment	1 bed	1	535 sq.ft
MH6	Townhouse	2 bed	1	1080 sq.ft
MH7	Townhouse	3.5 bed	1	1168 sq.ft
MH8	Townhouse	3.5 bed	1	1192 sq.ft
MH9	Townhouse	2 bed	1	950 sq.ft
MH10	Apartment	1 bed	1	597 sq.ft
MH11	Apartment	3 bed	1	1188 sq.ft
MH12	Apartment	2 bed	1	794 sq.ft
MH13	Apartment	1 bed	1	594 sq.ft
Totals		Units	13	11770 sq.ft

LEGEND

- One bed apartments/ flats over garage
- Two bed apartments/ FoGs
- Two bed townhouse conversions
- Two bed houses
- Three bed houses / townhouses
- Four bed houses
- Refuse & emergency vehicular access

Other Listed Structures (Cloak House, Coach House, Lodge) - Residential Conversion

Plot No.	Unit Type	No. of Bedrooms	Count	Gross Internal Floor Area
CL1	Townhouse	2 bed	1	922 sq.ft
CL2	Townhouse	2 bed	1	953 sq.ft
CL3	Townhouse	2 bed	1	794 sq.ft
CO1	Townhouse	2 bed	1	858 sq.ft
CO2	Townhouse	3 bed	1	920 sq.ft
CO3	Townhouse	2 bed	1	698 sq.ft
LO	Lodge	2 bed	1	936 sq.ft
Totals		Units	7	6081 sq.ft

Masterplan - Residential Units

Count	Unit Type	No. of Bedrooms	Unit Gross Floor Area	Subtotal GIFA
5	FOG Type 1	1 bed	594 sq.ft	55 sq.m
3	FOG Type 2	2 bed	712 sq.ft	66 sq.m
5	House Type A	4 bed	1588 sq.ft	148 sq.m
14	House Type B	3 bed	902 sq.ft	84 sq.m
4	House Type C	3 bed	1008 sq.ft	94 sq.m
17	House Type D	2 bed	800 sq.ft	74 sq.m
2	House Type E	2 bed	800 sq.ft	74 sq.m
13	House Type F	3 bed	907 sq.ft	84 sq.m
7	House Type G	4 bed	1180 sq.ft	110 sq.m
Totals		70 Units		64957 sq.ft

SUMMARY

	No.	Total Area
Main House Conversion	13 units	11770 sq.ft
Other Listed Buildings	7 units	6081 sq.ft
Residential Units - Houses	70 units	64957 sq.ft
TOTALS	90 units	82808 sq.ft



Appendix 2 Automated Detector Settings

SM2 Detector Settings

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

Table 22: Standard SM2 settings

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

Data Conversion Settings

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

Table 23: Noise File Filtering Settings

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

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

Appendix 3 Building Assessment in respect of Bats

Table 24: Building assessment – summary of features with bat roost potential and evidence of bat roost activity

Surveyed Feature	Figure	Building Description	Description of Potential Bat Roost Features	Evidence of Bat Roost Activity and Location	Assessment of Bat Roost Potential
Building 1	 Figure 11: Western elevation  Figure 12: Interior of southern roof void  Figure 13: Gap at eaves	Building 1 is locally listed building of brick and flint construction with a complex hip and gable ended roof structure. The roof is clad with slate tiles as is the large porch on the western elevation. The building also supports a clock tower (Figure 11). A single storey flat roofed continuation of Building 4 wraps around the rear of Building 1 connecting to its eastern elevation. Internally, the building supports two separate roof voids, one in the northern part of the building and one in the southern part of the building. The southern void is small, measuring approximately 0.5m high, 6m wide and 6.5m long. The void is supported by a timber frame with bitumen felt lining and old blanket loft insulation (Figure 12). Trusses are present in the centre of the void. The northern void was not accessible at the time of survey but is likely to be of similar construction to the southern void.	A number of potential bat roosting features were identified associated with Building 1, including: ▪ Gaps under slipped tiles on western elevation; ▪ Gaps in soffits; ▪ Gaps under barge boards; and ▪ Gaps at the eaves where the roof and porch protrude beyond the walls (Figure 13).	No evidence of roosting bats was recorded during the survey.	High potential

Surveyed Feature	Figure	Building Description	Description of Potential Bat Roost Features	Evidence of Bat Roost Activity and Location	Assessment of Bat Roost Potential
Building 2	 Figure 14: Southern and eastern elevations  Figure 15: Interior of southern roof void  Figure 16: Gap behind barge board	Building 2 is of brick and flint construction with a cropped hipped roof clad with plain slate tiles. There is a single storey extension on the northern elevation, of the same construction, and a second single storey extension on the eastern elevation which has a corrugated roof (Figure 14). Internally the roof void is divided across the middle, with a single large void in the south of the building and four smaller voids in the north of the building. The southern void measures approximately 2m high, 8m wide and 7m long. It is supported by a timber frame with bitumen roofing felt lining and thick blanket loft insulation. The southern wall is painted brick, while the northern dividing wall is clad with timber boarding (Figure 15). Only one of the smaller voids in the north of the building was accessed at the time of survey, although they are all likely to be of similar construction. The void was small, measuring approximately 0.25 the volume of the southern void with the ridge at one end. The entire void is clad with painted plaster board and supported by a painted timber frame. This void also has thick blanket loft insulation.	The roof of Building 2 is generally well sealed and in good condition. However there are gaps present behind the barge boards on the main part of the building and the northern extension (Figure 16) and a single lifted tile is present on the western elevation.	No evidence of bat roosting activity was recorded during the survey.	Medium potential

Surveyed Feature	Figure	Building Description	Description of Potential Bat Roost Features	Evidence of Bat Roost Activity and Location	Assessment of Bat Roost Potential
Building 3	 Figure 17: Southern elevation  Figure 18: Northern elevation  Figure 19: Internal void in the centre of the building.	Building 3 is of flint construction with a combination of pitched and flat roof sections (Figure 17 and Figure 18). There is a long central void which is closed timber boarded with a timber frame and blanket loft insulation. The void is 'L' shaped and measures approximately 1.5m high, 4m wide by 20m long (Figure 19). The presence of number of roof lights, mean the void is well lit during the day. A chimney stack with flint cladding is present in the north-western corner of the void. There are three smaller voids in the easternmost part of the building, comprising older timber frames with flint walls, closed boarding and lined in places. All have thick blanket loft insulation. There is a large void in the west of the building, which is lined and has a timber frame. The void is situated above a 'server room' and the machinery below results in a high temperature within the void. A large chimney stack is present at the far end of the void beyond which daylight could be seen, however due to the presence of electrical wires within the void and the fact that many of the cross beams were obscured by these and insulation it was considered unsafe to investigate beyond the chimney stack.	Due to the structure of the building, much of the roof was obscured from ground level and therefore some potential roosting features may not have been visible. However, a number of potential features were identified, including: ▪ Lifted lead flashing; ▪ Cracks in the flint walls; and ▪ Gaps behind barge boards	No evidence of bat roosting activity was recorded during the survey.	High potential

Surveyed Feature	Figure	Building Description	Description of Potential Bat Roost Features	Evidence of Bat Roost Activity and Location	Assessment of Bat Roost Potential
Building 4	 Figure 20: Southern and western elevations	Building 4 is a modern office block of brick and glass construction, with a flat roof (Figure 20). There are no internal roof voids within this building.	The building is considered generally unsuitable for bats due to the lack of roof void or any other features that provide potential for roosting bats, such as soffits or bargeboards.	No evidence of bat roosting activity was recorded during the survey.	Negligible potential
Building 5	 Figure 21: Northern and western elevations  Figure 22: Gap behind barge board	Building 5 is a small single-storey outbuilding of brick and flint construction with a gable ended slate roof (Figure 21). The building was not accessed during the survey.	A number of potential bat roosting features were identified associated with Building 5, including: - Gaps behind barge boards at the gable ends (Figure 22); - Gaps at the wall top where roof beams protrude; and - Cracks within the flint wall.	No evidence of bat roosting activity was recorded during the survey.	High potential

Surveyed Feature	Figure	Building Description	Description of Potential Bat Roost Features	Evidence of Bat Roost Activity and Location	Assessment of Bat Roost Potential
Building 6		Building 6 is a small octagonal building of brick and flint construction with a clay pan tile pyramidal roof (Figure 23). Internally the building is open to the apex, and well-lit due to a number of windows, with a timber frame and timber crossbeams at wall top height (Figure 24).	A number of potential bat roosting features were identified associated with Building 6, including: - Gaps under slipped tiles (Figure 25); - Gaps at wall tops; - Gaps around window frames; and - Gaps in brickwork and cracks in the flint walls.	No evidence of bat roosting activity was recorded during the survey.	Medium potential
					
					

Surveyed Feature	Figure	Building Description	Description of Potential Bat Roost Features	Evidence of Bat Roost Activity and Location	Assessment of Bat Roost Potential
Building 7	 Figure 26: Northern elevation  Figure 27: Gaps around windows  Figure 28: Gaps at wall top on extension	Building 7 is of flint and stone construction with a pitched slate roof (Figure 26). There is a small single storey brick extension to the rear which also has a slate roof. The building was not accessed during the survey.	A number of potential bat roosting features were identified associated with Building 7, including: ▪ Gaps under slipped tiles (although the roof appeared to be undergoing repair at the time of survey); ▪ Gaps around window frames (Figure 27); ▪ Gaps under barge boards; and ▪ Gaps at the wall tops of the single storey extension where roof beams protrude (Figure 28).	No evidence of bat roosting activity was recorded during the survey.	High potential

Appendix 4 Ground Level Tree Assessment and Tree Climb and Inspect Survey Results

Table 25: Phase 1 tree survey results

Tree Number	Species and Description	Description of Features	Climb and Inspect Survey?	Bat Potential
T1	Grand Magnolia	None	No	Negligible
T2	Pedunculate Oak	Callus Roll Split Ivy Cladding	No	High
T3	Silver Birch	None	No	Negligible
T4	Holly	None	No	Negligible
T5	Californian Redwood	None	No	Negligible
T6	Scots Pine	None	No	Negligible
T7	Scots Pine	Ivy cladding present but not dense enough to obscure potential features or act as a roosting feature in its own right.	No	Negligible
T8	Common Beech	Ivy cladding present but not dense enough to obscure potential features or act as a roosting feature in its own right.	No	Negligible
T9	Silver Birch	None	No	Negligible
T10	Pedunculate Oak	Highly suitable due to the presence of callus rolls, splits, snags, limb scars, ivy cladding and a potential hollow limb	No	High
T11	English Yew	None	No	Negligible
T12	Pedunculate Oak	None	No	Negligible
T13	Common Ash	None	No	Negligible
T14	Californian Redwood	None	No	Negligible
T15	Common Ash	None	No	Negligible
T16	Common Beech	None	No	Negligible
T17	Lebanon Cedar	None	No	Negligible
T18	Pedunculate Oak	None	No	Negligible

Tree Number	Species and Description	Description of Features	Climb and Inspect Survey?	Bat Potential
T19	English Yew	No visible features, however the tree is of a suitable size and age to support roosting features not visible at ground level	No	Low
T20	English Yew	Split limb	No	Low
T21	Hazel	Some loose bark but not suitable as a roosting feature	No	Negligible
T22	Holly	None	No	Negligible
T23	Norway Spruce	No visible features but dead stump could have rot holes etc. at height	Yes - no features present	Negligible
T24	Pedunculate Oak	No visible features, however the tree is of a suitable size and age to support roosting features and heavy ivy cladding could be obscuring them.	No	Low
T25	Pedunculate Oak	No visible features, however the tree is of a suitable size and age to support roosting features and heavy ivy cladding could be obscuring them.	No	Low
T26	Horse Chestnut	No visible features, however the tree is of a suitable size and age to support roosting features and heavy ivy cladding could be obscuring them.	No	Low
T27	Pedunculate Oak	No visible features, however the tree is of a suitable size and age to support roosting features and heavy ivy cladding could be obscuring them.	No	Low
T28	Rowan "Joseph Rock"	None	No	Negligible
T29	Wild Cherry	None	No	Negligible
T30	Pedunculate Oak	Potential roost features observed high in tree, but too high to	No	Low

Tree Number	Species and Description	Description of Features	Climb and Inspect Survey?	Bat Potential
		determine suitability. Also ivy cladding.		
T31	Pedunculate Oak	Potential roost features observed high in tree, but too high to determine suitability. Also ivy cladding.	No	Low
T32	Pedunculate Oak	Potential roost features observed high in tree, but too high to determine suitability.	No	Low
T33	English Yew	None	No	Negligible
T34	Pedunculate Oak	Visible split Likely to be more suitable features higher up.	No - Not safe to climb	Low
T35	English Yew	None	No	Negligible
T36	Weeping Willow	None	No	Negligible
T37	Common Beech	Heavily ivy clad. Tree of suitable size and age to support roosting features	No	Low
T38	Pedunculate Oak	No visible features, however the tree is of a suitable size and age to support roosting features not visible at ground level	No	Low
T39	Holly	None	No	Negligible
T40	English Yew	No visible features, however the tree is of a suitable size and age to support roosting features not visible at ground level	Yes - no features present	Negligible
T41	English Yew	Crevice	Yes - crevices suitable for day roost of a single bat	Low
T42	Silver Birch	No visible features, however the tree is of a suitable size and age to support roosting features not visible at ground level	Yes - no features present	Negligible
T43	Irish Yew	None	No	Negligible

Tree Number	Species and Description	Description of Features	Climb and Inspect Survey?	Bat Potential
T44	Sycamore	No visible features, however the tree is of a suitable size and age to support roosting features not visible at ground level	Yes - no features present	Negligible
T45	English Yew	Some low level splits in trunk	Yes - crevices suitable for day roost of a single bat	Low
T46	Pedunculate Oak	Suitable size and age. This tree had poor visibility from ground level.	No	Low
T47	English Yew	None	No	Negligible
T48	Pedunculate Oak	No visible features, however the tree is of a suitable size and age to support roosting features not visible at ground level	Yes - no features present	Negligible
T49	Pedunculate Oak	None	Yes - hole behind deadwood within callus roll extends into trunk	High
T50	Californian Redwood	Holes up and down trunk (rot/woodpecker holes?)	Yes - shallow limb scars and loose bark	Medium
T51	Silver Birch	None	No	Negligible
T52	Wellingtonia	Split Loose bark Ivy cladding Of suitable age and size to support further features higher up the tree.	Yes - Gap in limb scar. Ivy could obscure features	Medium
T53	Common Beech	None	No	Negligible
T54	Caragana	None	No	Negligible
T55	Golden Indian Bean Tree	None	No	Negligible
T56	Wellingtonia	None	No	Negligible
T57	Pedunculate Oak	None	No	Negligible

Tree Number	Species and Description	Description of Features	Climb and Inspect Survey?	Bat Potential
T58	Silver Birch	Broken branch but not suitable for roosting bats	No	Negligible
T59	Common Lime	Callus roll This tree had poor visibility from ground level.	Yes - no features present	Negligible
T60	English Yew	None	No	Negligible
T61	Monkey Puzzle	Callus rolls high up in tree. Not possible to assess suitability of features from ground level.	Yes - no features present	Negligible
T62	Pedunculate Oak	Split Of suitable size and age to have additional features further up, not visible from ground level.	Yes - no features present	Negligible
T63	Turkey Oak	None	No	Negligible
T64	Pedunculate Oak	None	No	Negligible
T65	Common Beech	None	No	Negligible
T66	Sycamore	None	No	Negligible
T67	Pedunculate Oak	The limb scar and callous rolls observed from ground level are considered unsuitable for roosting bats, however, the tree is of a suitable size and age that features could be present higher up the tree	Yes - no features present	Negligible
T68	Sycamore	No features visible, but tree is of a suitable size and age to support features further up	No	Low
T69	Turkey Oak	None	No	Negligible
T70	Pedunculate Oak	None	No	Negligible
T71	Silver Lime	None	No	Negligible
T72	Lebanon Cedar	None	No	Negligible
G1	Silver Birch	None	No	Negligible
G2	Cherry Laurel Portugal Laurel	'Dimples' in trunks and branches are mostly shallow and therefore	No	Low

Tree Number	Species and Description	Description of Features	Climb and Inspect Survey?	Bat Potential
		not suitable for bats, but a low level split has potential to provide access to a hollow stem.		
G3	Ash x 5 Oak x 2 Portugal Laurel	None	No	Negligible
G4	Birch Grey Willow Rhododendron Yew	None	No	Negligible
G5	Beech x 1 Ash x 1	A callus roll in the beech tree has potential as a roosting feature	No	Medium
G6	Cherry Laurel Portugal Laurel Ash Grey Willow	None	No	Negligible
G7	Cherry Laurel Ash Holly Yews x 2	None	No	Negligible
G8	Ash Goat Willow	None	No	Negligible
G9	Leyland Cypress x 7	None	No	Negligible
G10	Cherry Laurel	None	No	Negligible
G11	Pedunculate Oak x 7	Callus rolls Splits Rot holes	No - Not safe to climb	Low
G12	Weeping Willow Silver Birch	None	No	Negligible
G13	Pedunculate Oak x 2	None	No	Negligible
G14	Pedunculate Oak	No features visible, but tree is of a suitable size and age to support features further up	No	Low
G15	Pedunculate Oak x 6	Callous rolls within a single oak	Yes - woodpecker hole extends up approximately 15cm	High

Tree Number	Species and Description	Description of Features	Climb and Inspect Survey?	Bat Potential
G16	Pedunculate Oak	Group contains oak with callus rolls and heavy ivy cladding	Yes - no features present	Negligible
G17	Beech x 4 Yew x 2 Oak x 1 dead stump	Loose bark Rot holes	Yes - large hole suitable for roosting bats	High
G18	Yews x 2 Sycamore x 5	Split branches Crevices	Yes - no features present	Negligible
G19	Pittosporum Sycamore Ash Bay Laurel	None	No	Negligible
G20	Sycamore x 2	None	No	Negligible
G21	English Yew Sycamore Holly Cherry Laurel	None	No	Negligible
G22	Cherry Laurel Sycamore saplings Yews (young)	None	No	Negligible
G23	Sycamore x 3 Lawsons Cypress x 3	None	No	Negligible
G24	Cherry Laurel Hazel Holly Sycamore	None	No	Negligible
G25	Evergreen Shrubs Hazel Holly Birch Turkey Oak	None	No	Negligible
G26	Cherry Laurel	None	No	Negligible
G27	Silver Birch	None	No	Negligible
G28	Persian Ironwood Tree x 3	None	No	Negligible
Shelterbelt 1	Cherry Laurel Birch False Acacia Ash	Majority of trees unsuitable. A few features identified at ground level but inspected and found unsuitable (shallow), with the exception of a cherry laurel with a low level split limb which has potential.	No	Low

Tree Number	Species and Description	Description of Features	Climb and Inspect Survey?	Bat Potential
Shelterbelt 2	Sycamores	None visible, trees generally of an unsuitable age and size to support roosting bats	No	Negligible
Shelterbelt 3	Cherry Sycamore/Ash/Oak Holly/Cherry Laurel Portugal Laurel	None	No	Negligible
Shelterbelt 4	Laurels Sycamores Birch Oak Ash	Trees generally of an unsuitable age and size to support roosting bats. There is a single larger tree but this had no suitable features	No	Negligible
Shelterbelt 5	Cherry Cherry Laurel Birch Oak Beech Sycamore Holly Ash	None visible, trees generally of an unsuitable age and size to support roosting bats	No	Negligible

Appendix 5 Status of Bat Species Recorded

This section describes the national status of the bat species recorded during transect surveys, automated bat detector surveys and trapping surveys at the site, based upon the Bat Conservation Trust Bat Atlas⁴⁵.

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^{46 47}. 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 based on limited population data and exclude Northern Ireland⁴⁸. Populations of pipistrelle species declined by 70% in the UK between 1978 and 1993.

Long-eared bat

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.

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. This is both due to the location of the site relative to the known distributions of the two *Plecotus* species and based on the result of the trapping survey in which only brown long-eared bat was recorded.

Myotis Bat Species

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

⁴⁵ Phil Richardson (2000) Distribution atlas of bats in Britain and Ireland 1980 – 1999, Bat Conservation Trust.

⁴⁶ 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

⁴⁷ 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

⁴⁸ 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.

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 Iberia⁴⁹.

The UK population, which is thought to exist mainly in England, is estimated at 50,000⁴⁸. 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 decline⁴⁹.

Nathusius' Pipistrelle

Nathusius' pipistrelle is rare although widespread across the UK and records of this species are scarce⁵⁰. The population estimate currently stands at 16,000, although this is based on limited data⁴⁸. In Europe, Nathusius' pipistrelle is distributed from Western Europe to Asia Minor⁵¹.

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 northwards⁵².

Barbastelle

Barbastelle is rare species restricted to southern England and Wales with only a very few breeding sites currently known. The species is generally known to utilise pastoral landscapes with deciduous woodland, wet meadows and waterbodies⁵³.

⁴⁹ Bat Conservation Trust, BCT (2010) Noctule Bat.

http://www.bats.org.uk/publications_detail.php/217/species_information_sheet_Noctule, accessed 10th October 2015.

⁵⁰ Bat Conservation Trust, BCT (2010) Nathusius' Pipistrelle.

http://www.bats.org.uk/publications_detail.php/217/species_information_sheet_nathusius_Pipistrelle, accessed 10th October 2015.

⁵¹ Russ, J. (2004) Nathusius' Pipistrelle in Great Britain and Ireland: Life History.

http://www.nathusius.org.uk/Life_History.htm, accessed 10th October 2015

⁵² Bat Conservation Trust, BCT (2010) Serotine Bat.

http://www.bats.org.uk/publications_detail.php/217/species_information_sheet_Serotine, accessed 10th October 2015

⁵³ Bat Conservation Trust, BCT (2013) Barbastelle Bat.

http://www.bats.org.uk/data/files/Species_Info_sheet/barbastelle, accessed 11th November 2015.

Appendix 6 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 2010 (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 61 of the Conservation of Habitats and Species Regulations 2010 (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 7 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.

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.