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Phase 2 Ecology Surveys

Camp Field, Bartons Road, Havant

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Report Summary

1. Wessex Environmental Planning instructed the Ecology Co-op to undertake a Phase 1 Habitat Survey and Preliminary Ecological Appraisal of an area of land named 'Camp Field', located north of Bartons Road, Havant. This was completed in November 2017 and based on the findings of the assessment, presence/absence surveys for reptiles and dormice, along with surveys for badgers, great crested newts, breeding birds and bats were recommended. Bat surveys included dusk and dawn walked transects, static logger deployment, three bat trapping assessments and aerial assessments of trees followed by emergence surveys. Much of this survey effort has been undertaken due to the proximity of the site to a known Bechstein's bat maternity roost. This report presents the findings of these surveys, which were carried out between August 2017 and July 2018.

2. The site is approximately 6.2ha in area and comprises an arable field with poor semi-improved grassland margins and a strip of improved grassland, which supports scattered broadleaved trees. Delineating the sites boundaries, are a mixture of species-rich hedgerows with trees, species-poor defunct hedgerow, dry ditches and fences. Adjacent to part of the northern and western boundary is Ancient Semi-natural Woodland.

3. This proposal is in connection with the proposed development of the southern part of the site, which is likely to include approximately 72 properties with public open space and a community orchard. Green space will be retained along the northern portion of the site where there is the potential for a residential development in the future, should more housing be allocated by East Hants District Council. Therefore consideration has been given for a wider development proposal at this site.

4. Surveys confirmed high bat diversity at the site with common pipistrelle, soprano pipistrelle, nathusius pipistrelle, common noctule, serotine, brown long-eared, barbastelle and the following *Myotis* sp.; Natterer's bat, whiskered and Brandt's bat, recorded on site and Alcahloe just off site – identified through trapping. The majority of activity was associated with the boundaries of the Ancient Woodland along part of the north and western boundaries and along the western tree-line. Surveys did not identify bechstein's bat which has been recorded at Barton's Copse SINC immediately adjacent to the north.

5. Evidence of badger was identified along the northern boundary, but no setts were identified upon or within close proximity to the site.

6. No ground-nesting birds were identified across the site. Three red-listed species: marsh tit, mistle thrush and song thrush were identified, although not confirmed as breeding. The following species, all green listed by the RSPB, were confirmed as breeding: blackbird, blackcap, blue tit, chaffinch, robin and wren.

7. The surveys have concluded the likely absence of great crested newts, reptiles and dormice.



8. Outline mitigation measures for bats, breeding birds and badgers have been outlined in the relevant parts of Section 6. However, it is recommended that a separate Mitigation Statement and Habitat Creation and Management Plan is developed to detail how these species will be protected through the development works and where possible, net benefits to the conservation status of these species provided.

9. Targeted enhancement measures should include; native shrub planting within the 18m buffer along the Ancient Woodland, designing and planting of SuDS to provide ecological benefits, creation of wildflower habitat, planting of an orchard, tree and shrub planting and the inclusion of bat and bird boxes.

This report has been prepared by The Ecology Co-operation Ltd, with all reasonable skill, care and diligence within the terms of the Contract with the client. This report only becomes the property of the client once payment for it has been received in full.

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1 INTRODUCTION

1.1 Background to the Proposed Development

Wessex Environmental Planning intend to submit a planning application for a residential development at a site named 'Camp Field', located north of Bartons Road, Havant, Hampshire (see Figure 1). The National Grid Reference for the centre of the site is approximately SU 7333 0811 and the closest postcode to the site is PO9 5NA. The ecological impact assessments in this report are based on the Master Plan – Camp Field, Havant produced by Stainsby Architect (drawing number 089 PL 04 H) (see Figure 2). This proposal is in connection with developing the southern part of the site, which is likely to include approximately 72 properties with public open space and community orchard. Green space will be retained across the northern portion of the site. There is the potential for the northern portion of the site to be developed in the future should more housing be allocated by East Hants District Council and therefore consideration has been made to a wider development proposal at this site.



Figure 1. An aerial image showing the location of the site. The approximate site boundary is outlined in red. Images produced courtesy of Google maps (Map data ©2018 Google).



Figure 2. Master plan for Camp Field produced by Stainsby Architect and provided by email on 31st October 2018.

1.2 The Site

This site is approximately 6.2ha in area. It comprises an arable field with poor semi-improved grassland margins and a strip of improved grassland, which supports scattered broadleaved trees in the centre of the field. On the western boundary of the site is a native, species-rich hedgerow with trees, which connects directly to Ancient Semi-natural Woodland located directly adjacent to part of the site's western and northern boundaries. The other half of the northern boundary is marked with wire mesh fencing and meets the grounds of the adjacent crematorium. Along the southern boundary is a mixture of species-poor defunct hedgerow with trees and fencing – beyond which is Bartons Road. Finally, on the eastern boundary is high wire mesh fencing – beyond which is the access road to the crematorium. Dry ditches are also present along the western boundary and part of the northern boundary.

1.3 Purpose of this Report

A Phase 1 Habitat Survey and Preliminary Ecological Appraisal (PEA), completed by the Ecology Co-op on 14th November 2017, identified the potential for reptiles, dormice, foraging, commuting and roosting bats, breeding birds and great crested newts to be present on the site¹. As such, Phase 2

¹ The Ecology Co-op (2017) Preliminary Ecological Appraisal, Phase 1 Habitat Assessment – Land North of Bartons Road, Havant.



surveys for each of these species/taxonomic groups were recommended.

These surveys were undertaken between August 2017 and July 2018. This report provides details of the findings of all surveys completed and an outline of the potential impacts of the proposed development, together with an indication of impact avoidance and mitigation measures likely to be required for the development to proceed.

This work has been overseen by Briony Hill – a graduate member of the Chartered Institute for Ecology and Environmental Management (CIEEM) – and Paul Whitby, MCIEEM and Chartered Ecologist (CEcol).

The surveys and report were carried out and produced at the request of Wessex Environmental Planning.

1.4 Policy and Legislation

Legal protection applying to relevant bird, mammal, herpetofauna and invertebrate species and current nature conservation planning policy is outlined in Appendix 1 of this report.

2 SURVEY METHODOLOGY

All methodologies used in the Phase 2 surveys are in accordance with current best practice guidance for the respective species/taxonomic groups, as detailed below.

2.1 Badgers

During the Phase 2 surveys completed at the site, surveyors recorded any evidence of badgers *Meles meles* such as badger setts, latrines, foraging marks, footprints, worn pathways or trapped hairs on fences.

2.2 Bats

2.2.1 Natural Roosting Habitats – Climbed Tree Assessment

The Phase 1 and PEA identified three mature oaks and one dead oak tree exhibiting potential roost features (PRFs), and suggested that there may be more trees with potential roost features along the sites boundaries.

Therefore, an additional walkover survey was conducted on 28th March 2018 to assess all trees within and adjacent to the sites boundaries. Each tree was inspected from the ground using binoculars to search for features that could potentially support roosting habitat for bats. Features of interest include woodpecker holes, loose bark, cracks and splits in limbs, natural holes and hollows and cavities.

Where access allowed, trees with potential roost features were subject to a climbing inspection to look



for signs of occupation by bats and to categorise trees according to their potential to support roosting bats in accordance with Collins 2016². Each tree was climbed and each feature inspected using an endoscope for evidence of use by roosting bats, or for the suitability of the feature to potentially support roosting bats. Each feature was categorised as supporting a high, medium, low or negligible suitability to support roosting bats in accordance with Collins (2016) (see Table 1 below).

The climbing inspections were undertaken on 28th March 2018 by Dr Ryan Walker, MCIEEM, CEnv (Natural England licence holder: 2015-16736-CLS-CLS- Bat Survey Level 2) and assisted by Mr Jon Sydney, BSc. Dr Walker is also qualified to access trees using ropes and harnesses through a City and Guilds qualification.

Table 1. Characterising potential roost features in trees.

Category	Description
Negligible	A tree with negligible roosting habitat features likely to be used by bats.
Low	A tree of sufficient size to potentially support roosting features, but with none seen from the ground or features identified of limited roosting potential.
Medium	A tree with one or more potential roost sites that could be used by bats due to their size, conditions and surrounding habitat, but unlikely to support a roost of high conservation status such as a maternity or hibernation roost.
High	Trees with one or more potential roost sites that appear suitable for large numbers of bats or use as maternity or hibernation roosts.

2.2.2 Natural Roosting Habitats – Emergence Surveys

Tree 1

A climbed bat assessment identified this tree as having ‘moderate’ bat roosting potential. Due to its location with residential blocks proposed on the east and west, further surveys were recommended. One emergence survey was undertaken, which combined with the climbed inspection using an endoscope equates to two surveys in total in line with best practice guidance. The emergence survey was undertaken on Tree 1 on 17th May 2018, following best practice techniques as outlined by the Bat Conservation Trust (BCT) (Collins, J 2016)². Corresponding weather conditions and details of the surveyor are provided in Table 2 below.

The emergence surveys focused upon the interest features of the tree identified during the tree climbing assessment. Surveyors observed the interest features 15 minutes before sunset until 1:30-2hrs after sunset. All surveys were undertaken during weather conditions suitable for bat activity and at ambient temperatures above 10°C. Weather conditions, timings and temperature during each survey visit are presented in Table 2.

The surveyors recorded bat activity on or around the interest features using ‘Echo Meter Touch’ bat detectors, featuring auto-identification of bat species and automatically triggered recording for later review. The locations of all bat ‘registrations’ were recorded onto a field map during the survey to correspond with all sound recordings. Where possible, additional notes on size, flight height, type of flight (e.g. commuting, foraging, speed) and direction of flight were also recorded. Figure 3 details the

² Collins, J.(ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn)*. The Bat Conservation Trust, London.



location of the surveyor during the course of the tree emergence survey.

Table 2. Weather conditions during the bat emergence survey of Tree 1, Camp Field

Date	Survey start time/end time	Temp. degrees centigrade, weather conditions throughout survey	Surveyors
17/05/18	20:34 – 22:19 Sunset – 20:49	Max/Min temp.: 19-10°C 10% cloud cover, 1-3 Beaufort wind	Kristina Lewis, Natural England bat licence holder - Level 1

Tree 4

A climbed bat assessment identified this tree as having 'high' bat roosting potential. Due to its close proximity to the proposed residential blocks, further surveys were recommended. Two emergence surveys were undertaken, which combined with the climbed inspection using an endoscope equates to three surveys in total in line with best practice guidance. The two emergence surveys were undertaken on Tree 4 on 17th May and 12th June 2018. Surveys were completed following best practice techniques as outlined by the Bat Conservation Trust (BCT) (Collins, J 2016)². Corresponding weather conditions and details of the surveyors for each the survey, are provided in Table 3 below.

Figure 3 details the location of the surveyor during the course of the tree emergence surveys.

Table 3. Weather conditions during the bat emergence surveys of Tree 4, Camp Field

Date	Survey start time/end time	Temp. degrees centigrade, weather conditions throughout survey	Surveyors
17/05/18	20:34 – 22:19 Sunset – 20:49	Max/Min temp.: 19-10°C 10% cloud cover, 1-3 Beaufort wind	Morgane Accault
12/06/18	21:02 – 22:47 Sunset – 21:17	Max/Min temp.: 17.5-14.5°C 90% cloud cover, 0 Beaufort wind	Kristina Lewis, Natural England bat licence holder - Level 1



Figure 3. Locations of surveyors undertaking one emergence survey on Tree 1 and two emergence surveys on Tree 4 are indicated with red dots whilst the location of the trees are indicated with red arrows.

2.2.3 Bat Activity Surveys – Walked Transects

Six walked bat activity transects were carried out at the site on 22nd August, 14th September 2017 and 11th April, 16th May, 12th June and 12th July 2018. Bat activity surveys followed current standard best practice guidelines². Pre-determined transect routes were followed by surveyors, focussing on all linear features within the sites boundaries (tree-lines, woodland edge and hedgerows) (see Figure 4).

The transect routes were walked at a slow pace at dusk (during the period from sunset up to one and a half to two hours after sunset), or dawn (one and a half to two hours prior to sunrise) by two surveyors, such that each part of the route was passed approximately every 15 minutes. All surveys were undertaken during weather conditions suitable for bat activity and at ambient temperatures above 10°C. Weather conditions, timings and temperature during each survey visit is presented in Table 4.

The surveyors recorded bat activity using 'Echo Meter Touch' bat detectors featuring auto-identification of bat species and automatically triggered recording for later review. The locations of all bat 'registrations' were recorded onto a field map during the survey to correspond with all sound recordings. Where possible, additional notes on size, flight height, type of flight (such as commuting, foraging, fast or slow) and direction of flight were also recorded.



Table 4. Weather conditions during bat transect surveys carried out at Camp Field

Date	Survey start time/end time	Temp. degrees centigrade, weather conditions throughout survey	Surveyors
22/08/17	20:11 – 21:36 Sunset – 20:11	Max/Min temp.: 18.4-17.9°C 90% cloud cover, 0-5mph wind with 10mph gusts Brief downpour at 20:20. Survey started at sunset immediately after preceding rain finished. Survey finished early due to thunder and lighting.	Paul Whitby, Natural England bat licence holder - Level 2 Briony Hill, BSc, Grad CIEEM
14/09/17	19:10 – 20:49 Sunset: 19:21	Max/Min temp.: 12.4-9.3°C 80% cloud cover and 0-5mph breeze. Recent rain.	Paul Whitby Briony Hill
11/04/18	19:45 – 21:26 Sunset: 19:52	Max/Min temp.: 11.5-10°C 10% cloud, 0-5mph wind with 10mph gusts, dry.	Paul Whitby Briony Hill
16/05/18	03:20 - 05:15 Sunrise: 05:15	Max/Min temp: 13.5/14.5°C. 30% cloud, 5-10mph, dry.	Dr Ryan Walker, Natural England bat licence holder - Level 2 Briony Hill BSc, Natural England bat licence holder - Level 2
12/06/18	21:02 – 23:17 Sunset – 21:17	Max/Min temp: 17.5/14.5°C. 90% cloud at start, 10% cloud at finish, 0-5mph, dry.	Briony Hill Emma Baker
12/07/18	21:00- 23:00 Sunset: 21:15	Max/Min temp: 18/15.5°C. 30% cloud, 0-5mph, dry.	Paul Whitby Emma Baker

2.2.4 Bat Activity Surveys - Automated Static Bat Detecting

Two static bat detectors were deployed across the site on three separate occasions in August/September 2017 and April and June 2018. During the first two deployments “Peersonic Detector and Full Spectrum Recorder RPA2 enclosed within a waterproof IP67 box” were used, whilst BAT LOGGER A were used during the third deployment. Figure 4 indicates the locations they were deployed.

The static bat detectors comprise passive recording devices with real-time full-spectrum calls that can



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be viewed in detail on analysis software once downloaded – allowing accurate identification of most bat calls to species level (or genus level in the case of *Myotis* and *Plecotus* spp.). The loggers were programmed to record bat echolocation calls from 30 minutes prior to dusk until 15 minutes after dawn.

The recorded WAV files were analysed in full spectrum using Kaleidoscope software (version 4.5.5). All sound files were subject to manual analysis by an experienced bat ecologist. Where possible, identification was carried out to species level, except for the *Myotis* bats, as they are often inseparable through sound analysis alone due to overlapping call parameters, which were identified to genus level only. Descriptions of bat species assemblages therefore represent the minimum number present rather than a definitive list of all species present.

Analysed data was used to produce a Microsoft Excel table comparing the location of the static bat detectors and the total number of passes per species per night.

This methodology complements the transect surveys, which provide information on foraging and commuting patterns across the site, whilst automated static detector surveys provide more extensive coverage over the whole of the active foraging period for bats, thus increasing the likelihood of detecting scarce species.



Figure 4. Transect routes walked during all bat activity surveys. Transect route 1 is indicated with red, Transect route 2 is indicated with amber. Stop points are indicated with coloured numbers. Static logger locations indicated with blue dots.

2.2.5 Bat Harp Trapping Assessments

Trapping surveys for bats were carried out on 14th August, 19th September 2017 and 21st May 2018, as part of the survey effort for Camp Field, to ascertain the species of *Myotis* bats recorded during the static automated ultrasound surveys.

The trapping surveys were carried out at five locations during the first two surveys and two locations during the third survey. The locations were selected on the basis of habitats of value to bats within and adjacent to the proposed scheme. The number and locations of traps used during the final survey were reduced, due to changes in land ownership. Trapping locations are shown in Figure 5 below.

A harp trap was set up at each location and was fitted with an acoustic lure that produced simulations of a variety of bat social calls, to increase the likelihood of trapping bats. The trapping commenced at sunset and lasted for between four and six hours on each survey night. The sunset and sunrise times for surveys dates are included in Table 5 below.

The bats caught in the harp traps were removed, by or under the direction of Theresa Stewart (bat licence number 2017-28263-CLS-CLS), from the traps and transferred to a clean cloth bag. At the end



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of each trapping session the biometric information was obtained from all bats caught. Biometric data collection included, sex of the bat, weight obtained using a light line spring scale (Pesola), forearm measurement using digital callipers (Sealey S0707), reproductive status and any other general health observations.

Droppings were collected using a plastic vial from *Myotis* genus when species identification was not possible in-hand. The droppings were sent to Warwick University for DNA analysis. The results of the analysis are included.

All bats were released immediately after processing, in close proximity to the site of capture, during the hours of darkness.

Table 5: Weather conditions during bat harp trapping surveys carried out at Camp Field

Date	Survey start time/end time	Temp. degrees centigrade, weather conditions throughout survey	Surveyors
14/08/17	20:30 – 02:00 Sunset – 20:30	Max/Min temp.: 18 - 15 °C 4/8 – 2/8 ocktas cloud cover, 0-5mph wind, dry	Theresa Stewart (bat licence number 2017-28263-CLS-CLS) Briony Hill, BSc, Grad CIEEM
19/09/17	19:10 – 01:30 Sunset -19:10	Max/Min temp.: 12 - 8 °C 6/8 – 7/8 ocktas cloud cover with fog patches, 0-5mph wind, dry but high humidity	Theresa Stewart Clara Gonzalez
21/05/17	20:45 – 02:15 Sunset – 20:53	Max/Min temp.: 18 - 13 °C 3/8 – 4/8 ocktas cloud cover, 0-5mph wind, few drops of rain at start of survey then dry throughout	Theresa Stewart Briony Hill



Figure 5. The five trapping locations used during the first two bat trapping surveys in August and September 2017 are shown with red numbers. The two trapping locations used during the third bat trapping survey in May 2018, are shown with orange numbers

2.3 Breeding Bird Survey

The Common Birds Census territory mapping methodology, as defined by the British Trust for Ornithology, was used to survey the site for breeding birds. Two surveys were undertaken on 12th April and 16th May 2018.

A transect encompassing the field, boundary hedgerows and margins fringing the site, was walked slowly (see Figure 6). Each bird spotted during the course of the survey was recorded. Notes about the behaviour of the birds were made to determine their breeding status. Birds were said to be breeding and therefore within a territory, if:

- they were observed displaying or heard singing;
- nests, eggs, or recently fledged young were located;
- adults were heard repeatedly alarm-calling; and/or,
- distraction displays were seen.

The survey visits were made during appropriate weather conditions, avoiding heavy rain, poor visibility or strong winds. A summary of the weather conditions for these surveys is shown in Table 6.

In addition, records of bird, most notably farmland birds, were made during morning reptiles checks



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completed across April and May and casual observations were made and recorded by surveyors undertaking other protected species surveys.

Table 6. Weather conditions recorded during breeding bird surveys at Camp Field, Havant

Survey date	Survey time	Weather notes	Surveyor
12/04/18	06:25-07:16 Sunrise: 06:17	8°C and 0-5mph wind, 60% cc, good visibility	Paul Whitby, BSc, MIEEM, CEcol Briony Hill BSc GradCIEEM
16/05/18	05:38 – 06:15 Sunrise: 05:15	16°C, 5-10mph, 40%cc and good visibility.	Dr Ryan Walker BSc, MSc, MCIEEM, CEnv Briony Hill

After the surveys were completed, the total number of territories was estimated by comparing the locations of birds recorded on each of the survey visits. The total number of territories is based on the maximum number of territories recorded on any one visit, plus any territories recorded on another visit in a different area of the site.

In the UK, the conservation status of birds is recorded by the Royal Society for the Protection of Birds (RSPB) under a traffic-light system, with birds that regularly occur in the UK recorded as 'green', birds with an unfavourable conservation status recorded as 'amber' and birds that are globally threatened or showing severe decline in the UK as 'red'³.

³ The details for this classification can be seen on the RSPB website at:
http://www.rspb.org.uk/birds-and-wildlife/bird-and-wildlife-guides/bird-guide/status_explained.aspx



Figure 6. Transects walked for the two breeding bird surveys.

2.4 Great Crested Newts – eDNA Assessment

The Phase 1 and PEA identified four ponds within 500m of the site boundary (see Figure 7). Pond 1 was assessed as having a 'Good' Habitat Suitability index (HSI) and an eDNA survey was recommended.

Pond 2 was dry at the time of the assessment in November. Pond 3 and 4 were scoped out given their location beyond 250m of the site – the most utilised area of habitat by a great crested newt population from a breeding pond – and the presence of significant barriers to movement – wide kerbed roads, between the ponds and the site.

An environmental DNA (eDNA) assessment was carried out on Pond 1 – located 60m north of the site. An eDNA assessment was made by taking at least 20 water samples from suitable locations spaced around the banks of the pond between mid-April and the end of June. The water samples were collected on 16th April 2018 by Kristina Lewis MSc MCIEEM and Emma Baker MSc. The samples are mixed, added to ethanol and sent for testing by ADAS. A report is produced by ADAS indicating the presence or absence of great crested newt DNA.

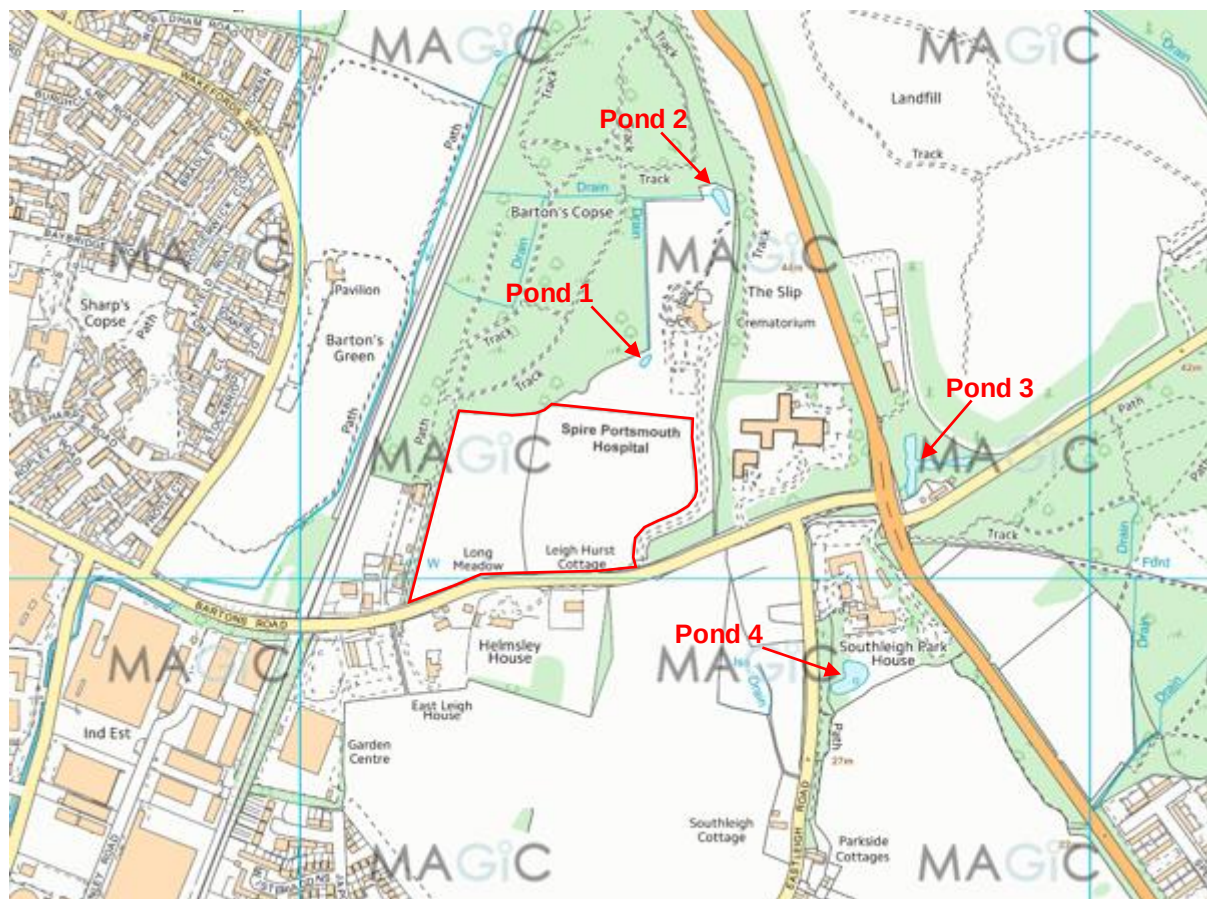


Figure 7. Locations of four ponds within 500m of the sites boundaries, which are shown in red.

2.5 Common Dormouse

Dormouse surveys are undertaken by attaching purpose built 'nest tubes' on trees and shrubs in suitable habitat such as woodland, scrub and hedgerows. Nest tubes are used by dormice as places of shelter and they will often construct their nests within them during periods of activity (typically between April and November). In accordance with current best practice guidelines⁴, a minimum of 50 nest tubes are deployed approximately 15-20m apart and left *in situ* for the survey season. These are checked on a monthly basis, for a set period, for presence of animals and evidence of dormouse presence (distinctively woven nests). Since the likelihood of use by dormice varies throughout the year, an index of probability score is used to determine confidence in a particular survey (see Table 7 below) comprising checks over several months. A score of 20 or above is normally accepted to establish 'likely absence' in the event that no signs of dormice are found during the survey. The scores may be doubled if the site is large enough to accommodate 100 or more nest tubes.

⁴ Bright, B., Morris, P., Mitchell-Jones, A.J. and Mitchell-Jones, T (1997) *The Dormouse Conservation Handbook*. English Nature.



Table 7. Index of probability of finding dormice present in nest tubes in any one month.

Month	Index of probability
April	1
May	4
June	2
July	2
August	5
September	7
October	2
November	2

For this survey, a total of 50 dormouse nest tubes were installed along the western boundary tree-line, along the defunct hedge on the southern boundary and in the edge of the woodland immediately north of the site on 31st August 2017 (see Figure 8). Dormice checks were undertaken in the mornings and commenced one month after the nest-tubes were positioned, in September, October and November 2017, and April, May, June and July 2018. It is usually possible to determine the difference between the nests of dormice and other animals, as well as positive identification through actual sightings of dormice and other species. Surveys were undertaken under the supervision of licenced surveyor Paul Whitby (Natural England dormouse licence holder).



Figure 8. The red line indicates the linear placement of dormouse nest tubes every 15-20m in tree-lines and hedgerows across Camp Field, Havant.



2.6 Reptiles

Standard reptile presence/likely absence surveys involve setting out artificial refugia (reptile ‘mats’) in potentially suitable habitat for reptiles. Reptile mats are either pieces of roofing bitumen felt or corrugated metal sheets, which absorb heat from the sun more rapidly than the surroundings, and provide cover and basking places attractive to reptiles. The refugia are then checked for presence of animals under suitable weather conditions. There are no up-to-date guidelines for reptile surveys, but a minimum of seven survey visits under suitable weather conditions is generally considered to be sufficient to determine their presence/likely absence.

A total of 25 roofing felt mats were used in this survey and placed along the field edges and around patches of bramble scrub in sunny locations around the site (see Figure 9 below). The mats were left *in situ* for a minimum of ten days to ‘bed in’ and allow reptiles to locate them before the first check of the seven checks was completed. The survey was undertaken by Sophie Bradfield BSc.

The highest count of reptiles from the seven visits is used to categorise the population of each reptile species on the site as low, medium or exceptional, based on best practice guidance⁵.



Figure 9. The location of reptile survey sheets placed across the proposed development site to maximise the potential of identifying reptiles within the most suitable habitat present.

⁵ Froglife (1999). *Froglife Advice Sheet 10: reptile survey*. Froglife, London.



2.7 Botanical Assessment

A botanical search was carried out for corn mint *Mentha arvensis* on 12th July 2018, during the flowering period for this plant species. Notes were taken on its presence (if any) and location, and photographs taken as evidence.

2.8 Assessment Methodology

The assessment of ecological impacts in Section 4 of this report follows best practice guidelines for impact assessment⁶.

The mitigation hierarchy underpins this assessment:

- Avoidance - “Seek options that avoid harm to ecological features (for example, by locating on an alternative site).”
- Mitigation - “Adverse effects should be avoided or minimised through mitigation measures, either through the design of the project or subsequent measures that can be guaranteed – for example, through a condition or planning obligation.”
- Compensation – “Where there are significant residual adverse ecological effects despite the mitigation proposed, these should be offset by appropriate compensatory measures.”
- Enhancements – “Seek to provide net benefits for biodiversity over and above requirements for avoidance, mitigation or compensation.”

Six steps are required as part of an ecological impact assessment. These are summarised below and explained in more detail in Appendix 2:

1. Identify important ecological features (habitats, species, ecosystems and their functions/processes);
2. Identify and characterise the impact to important ecological features;
3. Incorporate measures to avoid and mitigate these impacts;
4. Assess the significance of any residual effects after mitigation;
5. Identify appropriate compensation measures to offset significant residual effects; and
6. Identify opportunities for ecological enhancement.

2.9 Constraints/Limitations to Surveys

Surveys record any flora or fauna that is present at the time of the survey visits. It is therefore possible that some species may not have been present during the surveys, but may be evident at other times of the year and may appear or disappear from the site if habitat conditions change. For this reason, the surveys are considered valid for up to 18 months for badgers and bats, two years for reptiles and three years for great crested newts and dormice. If the habitat conditions change significantly beyond that time, it is recommended that the surveys are updated.

⁶ CIEEM (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal*. Chartered Institute of Ecology and Environmental Management, Winchester.



3 RESULTS

3.1 Badgers

No badger setts were identified upon the site or within 10m of the sites boundaries. During the Phase 1 Habitat Survey, three mammal runs/push-throughs with badger guard hairs were identified along the northern boundary of the site. A mammal run was identified within the woodland to the north; this could not be traced to any setts with the mammal run diminishing along its length.

No additional badger evidence was identified by surveyors.

3.2 Bats

3.2.1 Natural Roosting Habitats – Climbed Tree Assessment

The ground-based assessment identified four trees with PRFs visible. All four were subject to climbing inspections. Table 8 provides full details of each tree that was climbed and potential roosting features whilst Figure 10 indicates the location of each of these trees.

In summary:

- one tree supports features that could be considered to have high suitability for roosting bats;
- two trees support features that could be considered to have moderate suitability for roosting bats; and,
- one tree supports features that could be considered to have low suitability for roosting bats.

No roosting bats were recorded within any of the trees inspected; however, the incidence of detection of roosting bats is often low, whereby bats often exploit the deepest recesses of the crevices within trees that are hard to access with an endoscope. In addition, indicators such as bat droppings on or around the roosting access points within trees, are normally consumed by woodlouse and other invertebrates quite quickly.

Table 8 provides full details for trees with bat roosting potential.

As detailed within the methodology section, two bat emergence surveys were carried out on Tree 4 with 'high' bat roosting potential and one bat emergence survey was carried out on Tree 1 with 'moderate' bat roosting potential due to their proximity to proposed residential blocks. Combined with the endoscope assessment this equates to three surveys being completed upon Tree 4 and two upon Tree 1 in line with best practice guidelines.



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Table 8. Tree assessment data recorded from climbing assessments carried out at Camp Field, Havant.

Tag No. (refer to Figure 10)	Grid reference	Species	DBH (m)	Roosting feature	Height	Orientation	Assessment of potential bat roosting feature	Description of feature
1	SU732910 8139	Oak	1.5	Branch Cavity	7	S	Moderate	Branch union 20cm cavity goes up a little
2	SU733010 8216	Ash	1	Woodpecker hole x 2	8	S	Moderate	Two woodpecker holes on underside of branch
3	SU731950 8175	Oak	0.8	Woodpecker hole	12	E	Low	6cm opening goes up about 3cm cobwebbed
				Branch union	10	S	Low	Cavity goes 20cm vertical along branch
4	SU731780 8091	Oak	1	Woodpecker hole	5	SE	High	5cm diameter opening goes 35cm up into confined crevice.

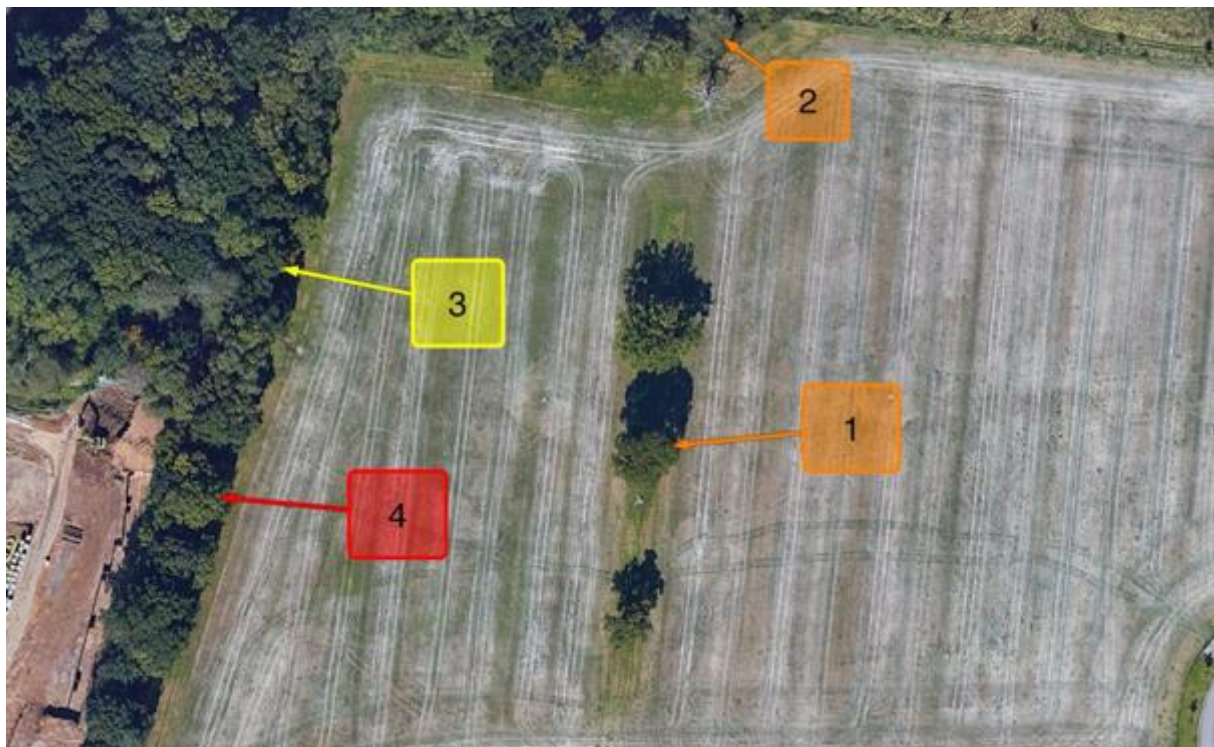


Figure 10. Location of trees with identified potential roost features for bats. Red represents trees with 'high' potential roosting features, orange 'moderate' potential roosting features and yellow 'low' potential roosting features.

3.2.2 Natural Roosting Habitats – Emergence Surveys

Tree 1

No bats were recorded emerging from this tree during the emergence survey completed on 17th May 2018. Bat activity throughout this time was moderate, with three species heard but not seen commuting between 21:12 and 22:19. This included 12 passes by common pipistrelle *Pipistrellus pipistrellus*, 4 passes by soprano pipistrelles *Pipistrellus pygmaeus* and 2 passes by common noctule *Nyctalus noctula*.



Tree 4

No bats were recorded emerging from this tree during the emergence survey completed on 17th May or 12th June 2018.

On the 17th May, bat activity in this location was low, with three species heard but not seen between 21:20 and 21:55. This included 3 passes by common pipistrelle, 1 pass by long-eared species *Plecotus sp.* and 1 pass by common noctule.

On the 12th June, bat activity was moderate with four species recorded commuting and foraging between 21:37 and 22:47. A soprano pipistrelle flew along the western tree-line from north to south at 21:37: 17 passes by this species were recorded as heard but not seen. A noctule was heard but not seen at 21:38. A common pipistrelle flew parallel to the western tree-line north to south at 22:17: 22 passes by this species were recorded as heard but not seen.

3.2.3 Bat Activity Surveys – Walked Transects

Six bat activity surveys have been completed in August and September 2017 and April, May, June and July 2018.

Below, the transects have been described separately so that the value of each can be assessed in greater detail. A table detailing the number of recordings made for each bat species on each activity survey is provided, whilst a map illustrating the use of the site by these bat species is also provided as a summary of all three surveys. The colour coding for bat species is provided in the figure reference for each map.

3.2.3.1 Transect 1

Activity across this transect was moderate with high species diversity recorded. A minimum of seven species; common pipistrelle, soprano pipistrelle, common noctule, serotine *Eptesicus serotinus*, *Myotis spp.*, long-eared species and barbastelle *Barbastella barbastellus* were recorded across the six surveys. Table 9 details the number of passes made by each bats species recorded during the bat activity surveys. Figure 11 below illustrates a summary of the locations and flight routes of all individuals encountered across all of the activity surveys carried out along Transect 1.

A large proportion of activity recorded was by common pipistrelle bats foraging and commuting along the northern and western boundary, and central tree-line. Soprano pipistrelles were recorded regularly and long-eareds occasionally, across the northern and western boundaries. *Myotis sp.* and noctule activity was scattered across the north and western boundaries and central tree-line. Serotine was heard on one occasion along the northern boundary. Barbastelles were recorded in June along the northern boundary where Ancient Woodland is adjacent.



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Table 9. Total bat passes recorded during each activity survey of Transect 1.

Survey date	Number of passes						
	Common pipistrelle	Soprano pipistrelle	Noctule	<i>Myotis</i> sp.	Serotine	Long-eared	Barbastelle
22/08/17	45+	-	4	1	-	-	-
14/09/17	5	8	4	10	-	-	-
11/04/18	12	24	-	-	-	3	-
16/05/18	33+	3	1	9	1	-	-
12/06/18	35	23	2	-	-	1	6
12/07/18	19+	2	5	3	-	1	-

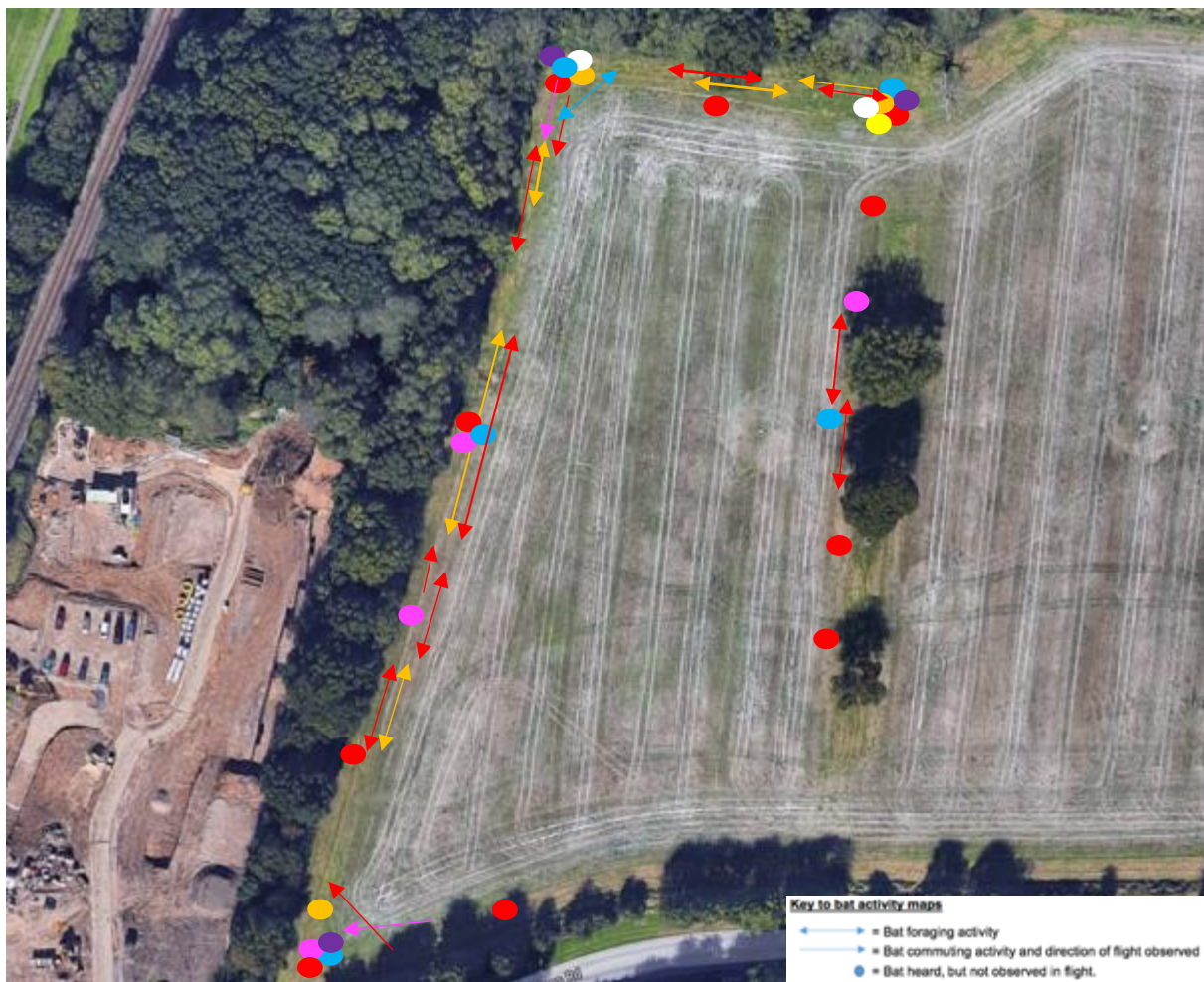


Figure 11. Bat activity recorded along Transect 1 across all surveys, with red representing common pipistrelle bats, orange representing soprano pipistrelle, blue representing common noctule, yellow representing serotine, pink representing *Myotis* sp., purple representing long-eared bat and white representing barbastelle. Thicker lines represent greater activity observed.

3.2.3.2 Transect 2

Activity across this transect was significantly lower than the first, with lower bat diversity also recorded. Four species; common pipistrelle, soprano pipistrelle, common noctule and long-eared species were recorded across the six surveys. Table 10 details the number of passes made by each bats species



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recorded during the six bat activity surveys. Figure 12 below illustrates a summary of the locations and flight routes of all individuals encountered across all of the activity surveys carried out along Transect 2.

Bat activity was highest in June, whilst April and May were very quiet. The majority of activity recorded was by common and soprano pipistrelle with these species recorded scattered across all boundaries. Long-eareds were occasionally recorded at the north-western corner by the adjacent woodland and along the southern boundary. Noctules were occasionally recorded along the north, east and southern boundaries.

Table 10. Total bat passes recorded during each activity survey of Transect 2.

Survey date	Number of passes			
	Common pipistrelle	Soprano pipistrelle	Noctule	Long-eared
22/08/17	4	1	2	-
14/09/17	3	2	-	2
11/04/18	-	1	-	1
16/05/18	-	-	1	-
12/06/18	20+	13+	8+	2
12/07/18	6	2	1	-

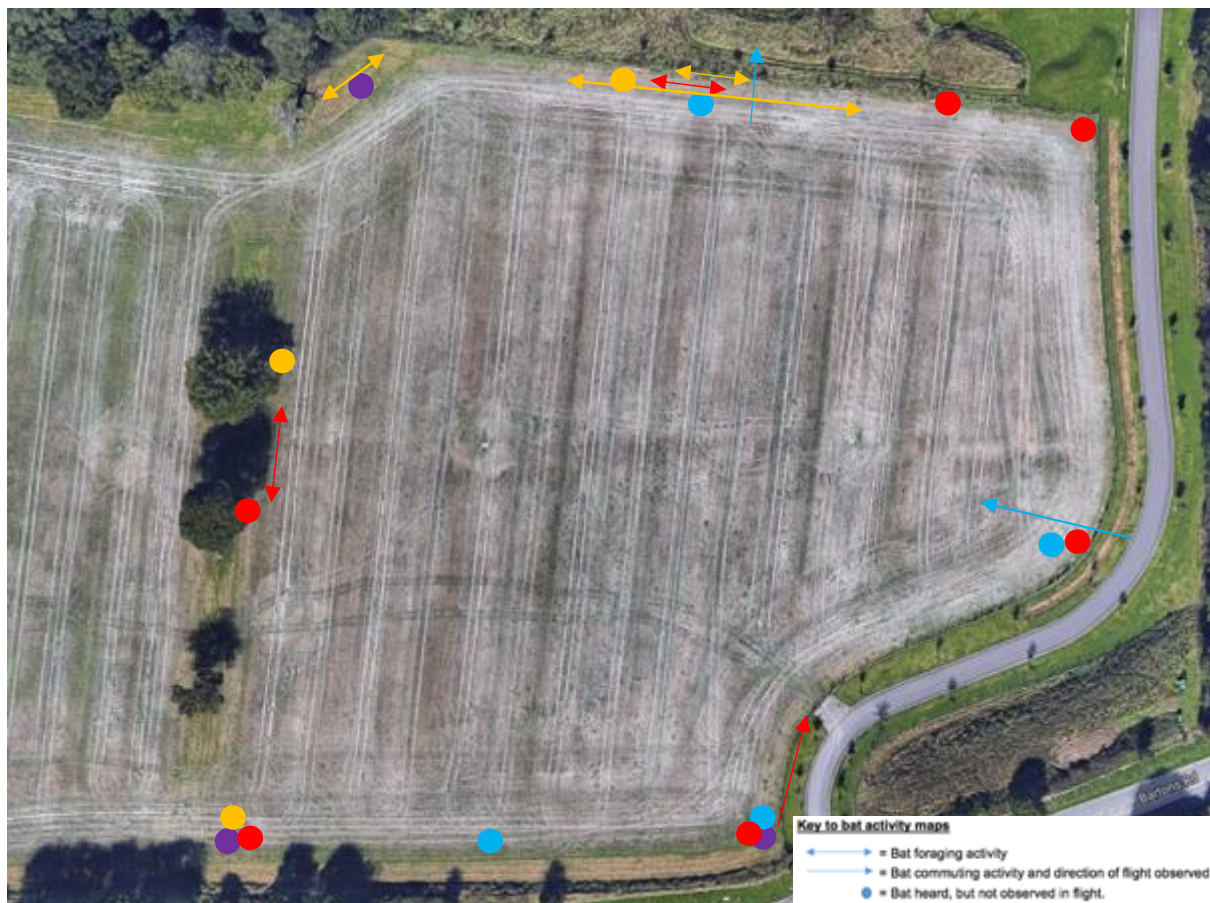


Figure 12. Bat activity recorded along Transect 2 across all surveys, with red representing common pipistrelle bats, orange representing soprano pipistrelle, blue representing common noctule, purple representing long-eared



bat. Thicker lines represent greater activity observed.

By far the most frequently recorded species during the bat activity surveys was common pipistrelle and soprano pipistrelle. Significantly more foraging and commuting bats were recorded across Transect 1 (western section of the site) compared with activity across Transect 2 (eastern section of the site). This is in line with the habitats present, with Ancient Woodland adjacent to the northern boundary and part of the western boundary.

Myotis sp. was recorded across the western section of the site only. Barbastelles were recorded in June, only on the northern boundary of Transect 1. Noctule was recorded occasionally in August, September and May, while the serotine was recorded once only in May, across the site as a whole. Long-eared bats were detected in September and May across the site as a whole.

3.2.4 Bat Activity Surveys - Automated Static Bat Detecting

Static loggers have been deployed in autumn (September) 2017 and spring (April) and summer (June) 2018.

In summary, across the deployment of two loggers in autumn, spring and summer a minimum of eight species were recorded by the static loggers; common pipistrelle (56.4% of all recorded calls), soprano pipistrelle (23.4%), *Myotis spp.* (13.3%), long-eared (1.5%), barbastelle (1.3%), common noctule (2.4%), serotine (0.7%) and nathusius pipistrelle *Pipistrellus nathusii* (1.0%).

These figures reflect the level of activity by bats and not the number of individuals, and should be viewed with caution.

September

Location 1

The detector recorded calls for three consecutive nights from 31st August to 2nd September 2017.

A total of 666 calls were recorded. A minimum of seven species were detected during this deployment: common pipistrelle, soprano pipistrelle, serotine, common noctule, barbastelle, long-eared species and *Myotis spp.*.

All the species listed above, except for serotine, were recorded on all three nights. Common and soprano pipistrelle bats accounted for just over 65.6% of the calls recorded with a peak count of 152 and 44 calls respectively, while *Myotis spp.* accounted for just under 27.9%, with a peak count of 74 calls. The remaining 6.6% was accounted for by long-eared bats with a peak count of 9 calls, common noctule with a peak count of 5 calls, barbastelle with a peak count of 5 and finally serotine with a peak count of 3 calls.

Table 11 shows the full results from the static logger deployment in Location 1 during September 2017.



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Table 11: Species recorded and the total number of passes per night in Location 1 September 2017.

Date	Serotine	Common Noctule	Myotis spp.	Common pipistrelle	Soprano pipistrelle	Nathusius pipistrelle	Long-eared bat	Barbastelle
31/08/17	2	3	74	70	27	-	5	4
01/09/17	-	5	70	152	33	-	9	2
02/09/17	3	2	42	111	44	-	3	5
Percent age total	0.8%	1.5%	27.9%	50.0%	15.6%	0%	2.6%	1.7%

Location 2

A total of 88 calls were recorded, which is significantly less than at Location 1. The detector recorded calls for five consecutive nights from 31st August to 4th September 2017.

A minimum of six species were detected during this deployment: common pipistrelle, soprano pipistrelle, nathusius pipistrelle, common noctule, long-eared species and *Myotis spp.*.

Only common pipistrelle and common noctule were recorded across the five nights, with these species accounting for 63.6% of calls with a peak count of 23 calls and 10.2% of calls with a peak count of 4 calls respectively. Soprano pipistrelles were recorded across four of the five nights and accounted for 12.5% of all calls with a peak count of 4 calls. The remaining 13.6% was accounted for by long-eared bats with a peak count of 5 calls, *Myotis spp.* with a peak count of 1 call and nathusius pipistrelle with a peak count of 1 call.

Table 12 shows the full results from the static logger deployment in Location 2 during September 2017.

Table 12: Species recorded and the total number of passes per night in Location 2 September 2017.

Date	Serotine	Common Noctule	Myotis sp.	Common pipistrelle	Soprano pipistrelle	Nathusius pipistrelle	Long-eared bat	Barbastelle
31/08/17	-	4	1	22	2	-	3	-
01/09/17	-	1	1	23	3	-	1	-
02/09/17	-	2	-	9	4	1	5	-
03/09/17	-	1	-	1	-	-	-	-
04/09/17	-	1	-	1	2	-	-	-
Percent age total	0%	10.2%	2.3%	63.6%	12.5%	1.1%	10.2%	0%

April

Location 1

The detector recorded calls for four consecutive nights between 26th and 29th April 2018.

A total of 385 calls were recorded, which is less than during the autumn deployment. A minimum of four species were detected during this deployment: common pipistrelle, soprano pipistrelle, barbastelle



and *Myotis spp.*.

Only soprano pipistrelles were recorded across all four nights, with this species accounting for 61.8% of the calls recorded with a peak count of 217. Common pipistrelles and *Myotis spp.* were recorded on two nights with these species accounting for 25.7% of calls with a peak count of 64 calls and 9.6% of calls with a peak count of 36 calls, respectively. Finally, barbastelles accounted for 2.9% of calls with a peak count of 11 calls.

Table 13 shows the full results from the static logger deployment in Location 1 during April 2018.

Table 13: Species recorded and the total number of passes per night in Location 1 April 2018.

Date	Serotine	Common Noctule	Myotis sp.	Common pipistrelle	Soprano pipistrelle	Nathusius pipistrelle	Long-eared bat	Barbastelle
26/04/18	-	-	36	35	217	-	-	-
27/04/18	-	-	-	-	2	-	-	-
28/04/18	-	-	1	64	18	-	-	11
29/04/18	-	-	-	-	1	-	-	-
Percent age total	0%	0%	9.6%	25.7%	61.8%	0%	0%	2.9%

Location 2

The detector recorded calls for four consecutive nights between 26th and 29th April 2018.

A total of 50 calls were recorded, which is significantly less than at Location 1. A total of four species were recorded during this deployment: common pipistrelle, soprano pipistrelle, common noctule, and long-eared species.

Common pipistrelle bats were recorded on three nights accounting for 50% of calls with a peak count of 23 calls. Soprano pipistrelles were recorded on one night and accounted for 46% of calls with a peak count of 23 calls. Common noctule and long-eared sp. were recorded on one night only with both these species accounting for 2% of calls with a peak count of 1 call.

Table 14 shows the full results from the static logger deployment in Location 2 during April 2018.



Table 14: Species recorded and the total number of passes per night in Location 2 April 2018.

Date	Serotine	Common Noctule	Myotis sp.	Common pipistrelle	Soprano pipistrelle	Nathusius pipistrelle	Long-eared bat	Barbastelle
26/04/18	-	-	-	23	23	-	1	-
27/04/18	-	1	-	-	-	-	-	-
28/04/18	-	-	-	1	-	-	-	-
29/04/18	-	-	-	1	-	-	-	-
Percent age total	0%	2.0%	0%	50.0%	46.0%	0%	2.0%	0%

June

Location 1

The detector recorded calls for seven consecutive nights between 4th and 10th June 2018.

A total of 479 calls were recorded. A minimum of eight species were recorded during this deployment: common pipistrelle, soprano pipistrelle, nathusius pipistrelle, serotine, common noctule, barbastelle, long-eared species and *Myotis spp.*

Common pipistrelle, soprano pipistrelle, *Myotis sp.* and common noctule were recorded across all seven nights accounting for 57.8%, 22.8%, 12.1% and 3.3% of calls respectively. *Myotis sp.* had a peak of 17 calls. Serotine, barbastelle and long-eared were recorded on four nights accounting for 1.7%, 1% and 0.8% respectively. There was a peak count of 2 calls for barbastelle. Nathusius pipistrelle was recorded on two nights accounting for 0.4% of all calls.

Table 13 shows the full results from the static logger deployment in Location 1 during June 2018.

Table 13: Species recorded and the total number of passes per night in Location 1 June 2018.

Date	Serotine	Common Noctule	Myotis sp.	Common pipistrelle	Soprano pipistrelle	Nathusius pipistrelle	Long-eared bat	Barbastelle
04/06/18	1	3	3	66	11	1	1	-
05/06/18	-	1	13	54	25	1	-	-
06/06/18	-	5	6	23	9	-	1	-
07/06/18	1	1	4	16	11	-	1	2
08/06/18	-	1	17	43	20	-	1	1
09/06/18	1	3	1	39	14	-	-	1
10/06/18	5	2	14	36	19	-	-	1
Percent age total	1.7%	3.3%	12.1%	57.8%	22.8%	0.4%	0.8%	1.0%



Location 2

The detector recorded calls for seven consecutive nights between 4th and 10th June 2018.

A total of 468 calls were recorded – similar to Location 1. A minimum of seven species were detected during this deployment: common pipistrelle, soprano pipistrelle, nathusius pipistrelle, serotine, common noctule, long-eared species and *Myotis spp.*.

Common pipistrelle and common noctule were recorded on all seven nights, accounting for 88.4% and 3.2% of calls. These species had a peak count of 99 and 4 calls each. Soprano and Nathusius pipistrelles were recorded on five nights and accounted for 3.2% and 3.8% of calls respectively. Nathusius pipistrelles had a peak count of 9 calls. Serotine and *Myotis sp.* were recorded on two nights accounting for 0.4% of calls each. Long-eared were recorded on one night accounting for 0.4% of calls.

Table 13 shows the full results from the static logger deployment in Location 2 during June 2018.

Table 13: Species recorded and the total number of passes per night in Location 2 June 2018.

Date	Serotine	Common Noctule	Myotis sp.	Common pipistrelle	Soprano pipistrelle	Nathusius pipistrelle	Long-eared bat	Barbastelle
04/06/18	-	4	-	21	-	-	-	-
05/06/18	-	1	-	27	1	-	-	-
06/06/18	-	1	-	72	2	2	-	-
07/06/18	-	1	1	67	6	9	-	-
08/06/18	-	2	-	59	5	5	2	-
09/06/18	1	4	1	99	1	1	-	-
10/06/18	1	2	-	69	-	1	-	-
Percent age total	0.4%	3.2%	0.4%	88.4%	3.2%	3.8%	0.4%	0%

3.2.1 Bat Harp Trapping Assessment

In total, eight species were caught during the bat trapping surveys. This includes four *Myotis* species; Alcahloe, Brandt's, Natterer's and whiskered, along with brown long-eared, common noctule, common pipistrelle and soprano pipistrelle. See Figure 13 and Figure 14.

August

Sixteen bats of seven species – Alcahloe *Myotis alcathoe*, Brandt's *Myotis brandtii*, Natterer's *Myotis nattereri*, whiskered *Myotis mystacinus*, brown long-eared, common noctule and soprano pipistrelle – were caught during the assessment summarised below in Table 15. Bat 8 was confirmed as Alcahloe through DNA analysis by Warwick University.



Table 15. Details of bats trapped during the trapping survey on 14th August 2018

Bat no	Trap no	Bat species	Sex and breeding condition	Weight (g)	Forearm measurements (mm)	Notes
1	4	<i>Myotis nattereri</i>	Male, immature, testes size 0	7.5	39.60	
2	4	<i>Plecotus auritus</i>	Female, adult, post lactating	7.5	38.90	
3	1	<i>Myotis nattereri</i>	Male, immature, testes size 1	7.0	37.00	Mites
4	2	<i>Myotis mystacinus</i>	Male, immature, testes size 1	4.5	33.10	Mites
5	2	<i>Myotis brandtii</i>	Male, immature, testes size 0	4.0	32.00	
6	2	<i>Pipistrellus pygmaeus</i>	Male, adult, testes size 2	5.5	31.60	
7	2	<i>Pipistrellus pygmaeus</i>	Female, immature, non-parous	5.5	32.00	
8	1	<i>Myotis alcathoe</i>	Male, adult, testes size 2	4.0	31.05	Confirmed <i>Myotis alcathoe</i> through DNA analysis
9	4	<i>Nyctalus noctula</i>	Male, adult, testes size 2	29.0	54.20	
10	4	<i>Plecotus auritus</i>	Male, adult, testes size 1	8.0	36.70	
11	4	<i>Nyctalus noctula</i>	Male, adult, testes size 1	31.5	53.40	
12	4	<i>Myotis mystacinus/brandtii</i>	Female, adult, post lactating	5.0	36.15	
13	2	<i>Myotis mystacinus</i>	Female, adult	5.0	35.10	
14	4	<i>Nyctalus noctula</i>	Female, adult, post lactating	27.0	49.60	
15	2	<i>Myotis mystacinus/brandtii</i>	Female	5.5	-	Flew off before all measurements made
16	2	<i>Myotis mystacinus</i>	Male, immature, testes size 0	5.0	34.40	



Figure 13. Bat species caught at the five trapping locations used during the bat trapping survey in August 2017.

September

No bats were caught during this trapping assessment.

May

Twelve bats of four species – common pipistrelle, soprano pipistrelle, brown long-eared and common noctule – were caught during the assessment as summarised below in Table 16.

Table 16. Details of the bat trapped during the trapping survey on 21 May 2018

Bat no	Trap no	Bat species	Sex and breeding condition	Weight (g)	Forearm measurements (mm)	Notes
1	1	<i>Pipistrellus pipistrellus</i>	Male, adult, testes size 1	4.0	31.40	
2	1	<i>Pipistrellus pipistrellus</i>	Male, adult, testes size 1	4.5	20.15	
3	1	<i>Pipistrellus pipistrellus</i>	Female, adult, pregnant	5.5	31.70	
4	1	<i>Pipistrellus pygmaeus</i>	Male, adult, testes size 0	4.5	30.74	
5	1	<i>Pipistrellus pygmaeus</i>	Male, adult, testes size 1	4.0	31:00	
6	1	<i>Pipistrellus pipistrellus</i>	Female, adult, nonparous	4.0	30.90	



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7	2	<i>Nyctalus noctula</i>	Male, adult, testes size 0	28.5	53.40	
8	2	<i>Nyctalus noctula</i>	Male, adult, testes size 0	29.0	52.20	
9	2	<i>Plecotus auritus</i>	Male, adult, testes size 1	8	40.90	
10	2	<i>Nyctalus noctula</i>	Male, adult, testes size 1	30.5	51.60	Only one testes
11	1	<i>Pipistrellus pipistrellus</i>	Female, adult, nonparous	4.5	31.60	
12	2	<i>Nyctalus noctula</i>	Male, adult, testes size 0	30.5	51.30	



Figure 14. Bat species caught at the two trapping locations used during the bat trapping survey in May 2018.

3.3 Breeding Birds

The results of the bird surveys are provided in Table 17. The species columns have been highlighted red, amber or green according to their conservation status, as listed by the RSPB. Under this traffic-light coding system, green represents species of little current conservation concern, amber represents species that have seen moderate declines in recent decades and red represents species that are threatened or have seen significant population declines. White represents species with 'no status'⁷. A total of 13 bird species were recorded upon the site over the two breeding bird surveys. Table 17 provides details of bird species, numbers and any activities associated with breeding. These results

⁷ Eaton MA, Aebischer NJ., Brown AF., Hearn R., Lock L., Musgrove AJ., Noble DG., Stroud D. and Gregory R.D (2015) *Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man*. British Birds 108, pp 708–746.



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are illustrated on a map (Figure 15).

Importantly, no ground-nesting birds were identified during breeding bird surveys nor observed during morning reptiles checks or as casual observances during other protected species surveys.

Three red-listed species; marsh tit *Poecile palustris*, mistle thrush *Turdus viscivorus* and song thrush *Turdus philomelos* were identified, although there was no evidence that these species were breeding upon the site. Six species, all green listed, were confirmed as breeding upon the sites boundaries; blackbird *Turdus merula*, blackcap *Sylvia atricapilla*, blue tit *Cyanistes caeruleus*, chaffinch *Fringilla coelebs*, robin *Erithacus rubecula* and wren *Troglodytes troglodytes*.

A barn owl *Tyto alba*, a green listed species, was observed during the dawn bat activity survey, commuting across the site along the west and eastern boundary and foraging within the long grassland habitat beyond but adjacent to the northern boundary.

Casual observances were made of the following additional species; tawny owl *Strix aluco* – an amber listed species and buzzard *Buteo buteo* and pied wagtail *Motacilla alba* – both green listed species.

Table 17. Bird species, number of individuals and estimated number of territories recorded during breeding bird surveys at Camp Field, Havant

Species	12/04/17		16/05/17		Breeding status	Estimated no. of territories
	No. individuals	Notes	No. individuals	Notes		
Marsh tit	1		-			
Mistle Thrush	-		1			
Song thrush	1		-			
Blackbird	1		4	1 territory calling individual	Confirmed	1
Blackcap	2	1 territory calling individual	-		Confirmed	1
Blue tit	3	1 territory calling individual	4		Confirmed	1
Chaffinch	-		1	1 territory calling individual	Confirmed	1
Great tit	2		2			
Greater spotted woodpecker	2		-			
Magpie	-		1			
Robin	4	1 territory calling individual	-		Confirmed	1
Wren	3	1 territory calling individual	2		Confirmed	1
Pheasant	1		-			

3.4 Common Dormouse

Over the seven survey visits, equating to a score of 20, no common dormice or dormice nests were found. This indicates the likely absence of this species, although it should be noted that unlike presence, absence cannot be proved.

The detailed results of each nest tube check are presented in Appendix 3.

3.5 Great Crested Newts – eDNA Assessment

The eDNA result for Pond 1 was negative, indicating that no great crested newt DNA was present within the waterbody. See Appendix 4.

3.6 Reptiles

A total of 25 survey refugia were placed across the wide grassy margins on the southern, western and northern boundaries of the arable field at Camp Field. These were left for a minimum of ten days to 'bed in' before the commencement of the survey process. No reptiles were identified during the seven survey visits. Below, Table 18 provides all of the weather data and findings from each reptile survey.

The results indicate the likely absence of that group of species from the site, although it should be noted that unlike presence, absence cannot be proved.

Table 18: Results of reptile survey undertaken at Camp Field, Havant. SW – slow worm, GS – grass snake, CL – common lizard, Juv – juvenile, SA – sub adult, F- female, M – male, A - adult

Date	Start time/end time	Air temp/refugia temp °C	Weather notes	Species total
05/04/18	11:05	13/16°C	20% cc, 0mph	None
11/04/18	15:00	15/23°C	40% cc, 10mph	None
13/04/18	14:30	14/19°C	100% cc, 4mph	None
17/04/18	14:00	17/20°C	40%cc, 12mph	None
23/04/18	12:00	15/24°C	70% cc, 8mph	None
26/04/18	11:30	16/30°C	50% cc, 12 mph	None
01/05/18	10:20	11/29°C	10% cc, 8mph	None

3.7 Botanical Assessment

A search of the site on the 12th July 2018 did not identify any corn mint plants and based on this it is assumed to be absent from the site.



4 POTENTIAL IMPACTS AND OUTLINE MITIGATION RECOMMENDATIONS

In the sections below, the important ecological features are summarised and the impacts and effects that would result from the proposed development, are characterised. This has been undertaken in accordance with the methodology set out in Section 2.8. Measures to avoid, mitigate and compensate the impacts and their effects are outlined.

A site-specific detailed Habitat Creation and Management Plan should be produced for the site to outline site-wide ecological mitigation for protected species and habitats, compensation and enhancement measures including the management objectives, and responsibilities and maintenance schedules. Targeted enhancement measures should include; native shrub planting within the 18m buffer alongside the Ancient Woodland, designing and planting of sustainable drainage systems (SuDS) to provide ecological benefits, creation of wildflower habitat, planting of an orchard, tree and shrub planting and the inclusion of bat and bird boxes.

4.1 Habitats

4.1.1 Potential Impacts

Ancient Woodland borders the site to the north and along part of the western boundary, but is not located within the site's boundary. This habitat is deemed to be of **county** importance. There will be no direct loss of this habitat; however, during the construction phase, there is the potential for damage to the woodland edge and compaction to root protection areas as a result of construction works and associated material storage.

It is unlikely that during construction the woodland edge would be damaged from machinery as the construction zone is located across the southern portion of the site and will not be adjacent to the Ancient Woodland. Post construction there is the potential for trampling of understorey vegetation, increase soil compaction, increased littering, fly tipping or dumping of garden waste, damage to trees and increased nutrient levels from dog fouling, as a result of increased site use by residents.

In combination, these impacts can lead to a range of effects which may alter understorey vegetation such as a reduction of species diversity and abundance or decreasing tree health and the resultant reduction in the value of the woodland.

Overall, in the absence of mitigation, the effects of the proposed development on Ancient Woodland habitat, are considered to comprise a **high (certain) impact**, which is considered **to be significant negative** at a **county level**.

4.1.2 Outline Mitigation Measures

Standard national guidance states that a buffer of at least 15m is created around Ancient Woodland. An 18m buffer is recommended along the parts of the northern and western boundary, which meet the Ancient Woodland. Shrub and low tree planting should be included within the buffer strip, not only as a habitat enhancement measure but also to reduce public access to the Ancient Woodland and reduce the impact of degradation. Thorny species should be incorporated to reduce public access and



a mixture of the following species are recommended: hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, dog rose *Rosa canina*, sweet briar *Rosa rubiginosa*, butchers broom *Ruscus aculeatus*, wild cherry *Prunus avium*, hazel *Corylus avellana*, field maple *Acer campestre*, alder buckthorn *Rhamnus frangula* and dogwood *Cornus sanguinea*. This would be fully detailed within a site-specific detailed Mitigation, Habitat Creation and Management Plan.

The residual impact following mitigation is considered to be a **significant (negative) impact** at a **local level**.

4.2 Badgers

4.2.1 Potential Impacts

No badger setts were identified upon the site or within 10m of the site's boundaries, whilst three mammal runs/push-throughs used by badgers, were identified along the northern boundary of the site.

Badger populations have been rising for several decades and they are now a common and widespread species across most of the UK countryside. Badgers are therefore not currently considered to be of great conservation concern in the UK, although the UK supports a significant proportion of the global population.

The semi-improved grassland is potentially important to the badgers for foraging, although no evidence of foraging such as snuffle holes have been identified across the site and there is extensive alternative foraging habitat for badgers to the north of the site, in the form of Ancient Woodland and rough grassland at the crematorium

This site is considered to have **local** ecological value in relation to badgers.

The proposed development will not impact upon any known badger setts upon or within close proximity of the site. However, there is a small risk that badgers may establish new setts at any time between the production of this report and the start of construction.

The proposed development will result in the loss of arable field habitat and a strip of semi-improved grassland along the southern boundary. This habitat loss represents a small proportion of the total resource available. Badgers are generally quite adaptable to some degree of human disturbance, with foraging, commuting routes and occupation or establishment of new setts constantly adjusting in response to new food sources and disturbance.

Badgers are known to commute across the site and pass through the northern boundary. Therefore, there is the potential for them to become trapped in deep open excavations, disturbed by lighting used in the evenings (if any) and directly injured from machinery used.

Overall, in the absence of mitigation, there is considered to be a **moderate (likely) impact** on badgers as a result of the proposed development, which is considered **significant negative** at a **local level**.



4.2.2 Outline Mitigation Measures

The proposed development layout has been designed to maintain an 18m buffer along part of the northern and western boundaries of the site, which will be enhanced with shrub planting. This will increase the area of foraging habitat available for badgers. It will also reduce impacts from lighting, noise and those resulting from public access within the woodland.

As badgers have the potential to commute across the site, indicated by a push-through on the northern boundary, the following mitigation measures must be put in place to prevent any potential harm to badgers while foraging during the construction period:

- No food or waste will be left out overnight and tools will be locked away after each day.
- Any excavations more than 50cm deep will either be covered up over night or have a means of escape provided (ramp or ladder) to prevent entrapment of badgers.
- Chemicals must be securely stored.

Finally, if any digging by large mammals is identified an ecologist should be contacted for advice. If any active setts are established within the construction zone, specific mitigation measures are likely to be required that may include obtaining a licence from Natural England.

Foraging badgers will benefit from the sensitive lighting scheme measures proposed for bats (see below).

The residual impact is considered to be a **significant (negative) impact** at a **less than neighbourhood level**.

4.3 Bats

4.3.1 Potential Impacts

Roosting

The proposed development does not require the demolition of any buildings or felling of any trees that are known to support roosting bats. Therefore, no direct impacts on bat roosts are predicted.

During and post construction there is the potential for indirect effects from lighting pollution within the woodland edge where there is the possibility for trees within the woodland, outside of the red line boundary, to support bat roosting features and potential bat roosts. However, the area to be developed will be across the southern half of the site whilst the northern section, adjacent to the Ancient Woodland will remain as green space with an 18m planted buffer.

Overall, the development is considered to result in a **neutral impact** on roosting bats, which is considered to be **not significant**.

Foraging and Commuting

A large proportion of bat activity identified by activity surveys and static logger deployment was associated with the boundaries of the Ancient Woodland, along part of the northern and western



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boundaries and along the western tree-line. There was high species diversity and high levels of activity along these features with the following species recorded; common pipistrelle, soprano pipistrelle, *Myotis spp.*, long-eared bat, serotine, common noctule and barbastelle. *Myotis spp.* activity was considered to be moderate and regular, while low numbers of barbastelle calls were recorded during the June activity survey and by static loggers.

Activity across the remainder of the site was much lower with common pipistrelle, soprano pipistrelle, nathusius pipistrelle, common noctule, long-eared species and *Myotis spp.* recorded. *Myotis spp.* were recorded on two occasions only by the static logger and nathusius were recorded on one occasion by the static logger.

Trapping surveys identified common pipistrelle, soprano pipistrelle, common noctule, brown long-eared, Natterer's bat and whiskered/Brandt's bat on the boundaries of the ancient woodland adjacent to the site. In the wider area whiskered, Brandt's, Alcahloe and Natterer's were caught with Alcahloe and Natterer's recorded along the eastern boundary of the entrance track to the crematorium.

The most significant findings are the presence of barbastelle bat using the adjacent ancient woodland and Alcahloe trapped beyond the eastern boundary of the site.

Barbastelle's, an Annex II species, are rare in the UK and found only in the south, with an estimated population of 5,000 individuals according to the Bat Conservation Trust's website. Barbastelle bats are very sensitive to light disturbance.

Alcahloe has only been recently described as a separate species in 2001, with DNA analysis confirming it as present in the UK as recently as 2010. There is currently little information on the ecological preferences of this species, and it is assessed as 'Data deficient' on the IUCN Red List. It is known to be present at two swarming sites in the south of the UK.

Nathusius is one of the less common bat species in the UK, with an estimated population of 16,000 individuals according to the Bat Conservation Trust's website. The species has a scattered distribution in the UK, but is generally more common in the southeast and it is a species believed to be expanding, with greater records having been made in successive years.

HBIC returned nine records for Bechstein's bat, dated between 2005 and 2016. The closest of these records was located approximately 280m to the north, within the Ancient Woodland adjacent to the site designated as Barton's Copse & The Slip Sites of Importance for Nature Conservation (SINC). The survey methods completed including climbed assessment of trees, bat emergence surveys, bat activity surveys, deployment of static loggers and three bat trapping assessments are considered appropriate to determining the presence of Bechstein's bat as detailed by Policy E 18 of the Draft Havant Local Plan. Activity and static logger surveys identified *Myotis sp.*; however, this species was not trapped during the three trapping surveys. It is possible that individuals of this species may commute and forage within the adjacent woodland and along the woodland edge at other times of the year. However, the results suggest that use of the sites boundaries by this species is not regular and the site is not of high importance.



This site is considered to be of **National** ecological value in relation to foraging and commuting bats.

The proposed development has potential to result in permanent loss of habitat (semi-improved grassland margins and a short section of defunct hedgerow with trees along the southern boundary) used by foraging and commuting bats. The western tree-line will be retained and an 18m buffer established along part of the western and northern boundary.

There is the potential for disturbance to commuting and foraging bats, both temporary during construction and permanently after completion, through increased artificial lighting, which would illuminate foraging and commuting habitats.

Overall, in the absence of mitigation, the impact of the proposed development on foraging and commuting bats is considered to be a **high (certain) impact**, which is considered **significant negative** at a **County level**.

4.3.2 Outline Mitigation Measures

Roosting

As part of mitigation measure for bats a sensitive lighting scheme will be employed across the site. This will include a no-light-zone along the northern and western boundaries, thereby reducing illumination along the woodland edge.

Incorporating integral bat roosting opportunities into new buildings will be necessary to provide a net gain in roosting opportunities for bats. The creation of no less than ten new roosting features is recommended across the development. This should include a mixture of the following features; bat access tiles, Schwegler 2FR bat tubes, 2FE Schwegler Wall-Mounted bat shelters and 1FQ Schwegler Bat Roost. These features should be positioned on south and east facing elevations. Where bat access tiles are used, bitumen must be used instead of Tyvec type linings which over time fray and entangle bats. Lighting must not face towards new bat roosting features.

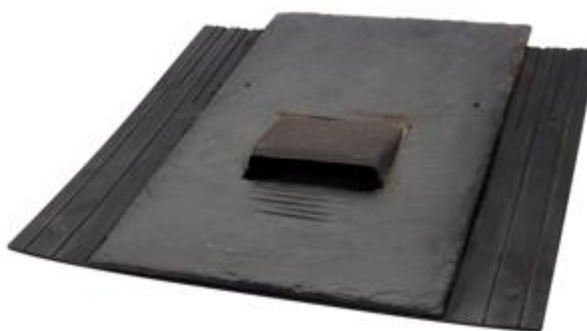
In addition, five Schwegler woodcrete bat boxes should be hung on suitable mature trees upon the western and northern site boundaries. The boxes would be hung by a suitably qualified ecologist to ensure that the positioning is optimal, but generally locations above 3.5m in the most southeasterly facing aspect of a tree is best.

Proposed locations for the recommended bat roosting features would be fully detailed within a site-specific detailed Mitigation, Habitat Creation and Management Plan.

The residual impact is considered to be a **significant (positive) impact** at a **neighbourhood level**.



Bat Access Tile Set



Habibat Bat Access Slate



2FR Schwegler Bat Tube



2FE Schwegler Wall-Mounted bat shelters



1FQ Schwegler Bat Roost

Foraging and Commuting

To minimise impacts on existing habitat features used by foraging and commuting bats, most notably the Ancient Woodland along the northern boundary, part of the western boundary and the tree-line along the western boundary, the proposed development layout has been designed to retain these features. Further to this, the current proposal is to develop the southern portion of the site. Therefore, a large area of green space will be retained to the north.

The edge of the Ancient Woodland and western tree-line are important for foraging and commuting bats. To ensure that the value of these habitats is not reduced, an 18m planted buffer will be created where the Ancient Woodland is adjacent to the site's boundaries.

In addition, the proposed scheme will incorporate a 'sensitive lighting plan' developed as part of the detailed design, in accordance with guidelines set out by the Bat Conservation Trust. This must include measures to create 'dark corridors' along the retained tree belts and adjacent Ancient Woodland, and measures to minimise light spill onto all semi-natural habitats. All street lighting upon lamp-posts must not be more than 3.5m in height and have shields installed to focus light towards footpaths and roads only with no light allowed to emit light past horizontal (90 degrees from the ground). Light sources should not exceed 3 lux and have a narrow spectrum emitting minimal ultra-violet light so they are not attractive to insects.



The loss of a short section of defunct hedgerow with trees along the southern boundary of the site and grassland margins will be offset by habitat creation. This includes:

- native shrub planting within the 18m Ancient Woodland buffer;
- native scattered tree and shrub planting;
- wildflower habitat creation;
- native planting of SuDS features;
- planting of an orchard; and,
- ornamental planting schemes which include species known to be beneficial to insects.

This will create structural variation in vegetation and increase foraging resources for bats by increasing invertebrate prey.

Creation of species-rich habitats would be fully detailed within a site-specific detailed Mitigation, Habitat Creation and Management Plan.

The residual impact is considered to be a **significant (negative) impact** at a **neighbourhood level**.

4.4 Breeding Birds

4.4.1 Potential Impacts

Importantly, no ground-nesting birds were identified using this site. Three red-listed species – marsh tit, mistle thrush and song thrush – were identified, although they were not confirmed as breeding upon the site. The following species, all green listed by the RSPB, were confirmed as breeding upon the site: blackbird, blackcap, blue tit, chaffinch, robin and wren.

This site is considered to be of **local** ecological value in relation breeding birds.

There will be loss of scrub and defunct hedgerow with trees, where an access point will be cut through the southern boundary of the site. Clearance of scrub and hedgerow habitats within the breeding bird season may result in loss of, or damage to, birds' nests, eggs or live young. In the absence of mitigation this would also lead to a reduction in suitable nesting habitat.

Permanent disturbance from increased site use by residents, uncontrolled management of garden spaces and a potential increase in the number of cats could result in a reduction in the number and diversity of breeding birds.

Overall, in the absence of mitigation, there is considered to be a **medium (certain) impact** as a result of the proposed development, which is considered **to comprise a significant negative impact** at a **local level**.

4.4.2 Outline Mitigation Measures

Any scrub, hedgerow or trees to be cleared, must be removed outside of the nesting bird season (1 March to 31 August), unless features are first hand-searched by a suitably qualified ecologist and



declared clear of any active bird nests. In the event that any active nests are identified, a buffer of at least 5m will need to be created and the nest must be left undisturbed until the young have fledged.

New nesting opportunities are to be included within the development. It is recommended that house sparrow boxes are included upon four new buildings, two swift boxes on four buildings and eight woodcrete bird boxes (three types) are installed upon trees retained on the site's boundaries.

The proposed locations for the recommended boxes would be fully detailed within a site-specific detailed Mitigation, Habitat Creation and Management Plan.

Habitat creation, which will include native shrub planting within the 18m Ancient Woodland buffer and planting of scattered trees and shrubs will, in the future, increase nesting opportunities.

The residual impact is considered to be a **significant (positive) impact** at a **neighbourhood level**.



1SP Schwegler Sparrow Terrace



Schwegler Lightweight Swift Box Type 1A

4.5 Great Crested Newts

4.5.1 Potential Impacts

The eDNA result for Pond 1 was negative, indicating that no great crested newt DNA was present within the waterbody. Therefore, the site is considered to have **negligible** ecological value in relation to great crested newts.

Based on these survey results the impact of the proposed development upon great crested newts is considered to be **not significant**.

As a result, no further mitigation measures are recommended for great crested newts.

4.6 Common Dormouse

4.6.1 Potential Impacts

No dormice or dormouse nests were identified across the seven survey visits, indicating the likely absence of this species. Based on these survey results it is considered highly unlikely that this species would be present upon the site. Therefore, the site is considered to have **negligible** ecological value in relation to dormice and the impact of the proposed development on this species is



considered to be **not significant**.

As a result, no further mitigation measures are recommended for dormice.

4.7 Reptiles

4.7.1 Potential Impacts

Whilst there are known to be reptile populations close to the site, the results of the presence/absence survey indicate the likely absence of reptiles upon the site itself, although it should be noted that it can be difficult to prove absence, especially for very low residual populations. It is likely that the barrier of Bartons Road has led to the local extinction of any reptile populations that may have existed here in the past.

Therefore, the site is considered to be of **negligible** ecological value in relation to reptiles and the impact of the proposed development on this species is considered to be **not significant**.

As a result, there is no requirement for specific mitigation measures for reptiles.

4.8 Botanical Assessment

A search of the site on 12 July 2018 did not identify any corn mint plants and based on this it is assumed to be absent from the site.

Therefore, the site is considered to be of **negligible** ecological value in relation to corn mint and the impact of the proposed development on this species is considered to be **not significant**.

4.9 Cumulative impact assessment

In order to better quantify the impacts summarised above for the proposed development of the Camp field site, a search has been made to account for recent development and development under construction in the nearby landscape that may contribute to a cumulative negative impact upon protected species. This has identified two notable developments, which are as follows:

1. Bartons Rise - Linden Homes

This is a development of 53 Homes immediately to the west of Camp Field, which is recently completed and occupied. The development was a mixture of approximately 30% brownfield and 70% greenfield land, utilising a former commercial site and pasture. The development immediately borders woodland to the north and a railway line to the west, with Bartons Road forming the southern boundary.

2. Bartons Road south – Bellway Homes

A site under ownership by Bellway Homes with outline planning for 175 homes is situated on the southern side of Bartons Road opposite the Camp Field site. This development is similar in nature to the Camp field development, in that the vast majority of the development footprint is also arable habitat of low ecological value. The site is bordered by a young plantation on its western



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boundary and includes the loss of some semi-improved grassland that supports a population of common lizards and slow worms.

Cumulative effects arising from these developments may include the following:

- Increased effects of artificial light at a landscape level, leading to reduced available foraging habitat for bats.
- Loss of arable habitat for farmland birds.
- A reduction in available foraging habitats for badgers, or increased risk of conflict (for example with dogs).
- An increased pressure upon local greenspaces and designated sites, including the Chichester and Langstone Harbours SPA.

A joined-up strategy for limiting the impacts of artificial light at a landscape level is being driven in Hampshire through Technical Guidance Note TG13 – Street Lighting. Further site-specific lighting controls will need to be considered through a detailed mitigation statement specific to the needs of each development.

A review of the findings of surveys on both the Camp Field and Bartons Road developments indicates that important farmland bird assemblages have not been identified on either site, with no nesting lapwing or skylark presence, however as these birds are mobile, the long-term loss of potential nesting sites should be considered. Adequate site-level mitigation for this loss is unfortunately not possible.

The loss of potential badger foraging habitat and the potential for conflict with domestic pets is also unavoidable, though the majority of grassland habitat at Camp Field is being retained and indeed there will be an increase in grassland habitat, which has a higher foraging value for badgers than cultivated arable land. As the impact upon badgers from the Camp Field is considered very low, the cumulative impact risk is also considered low.

The potential effects upon Natura 2000 sites should be considered through a Habitat Regulations Assessment, which should be submitted separately to the planning authority. This document should address any cumulative impact risk.



5 APPENDIX 1 – Legislation and Policy

Introduction

The following text is intended for general guidance only and does not constitute comprehensive professional legal advice. It provides a summary of the current legal protection afforded to wildlife in general and certain species. It includes current national planning policy relevant to nature conservation.

The ‘Birds Directive’, ‘Habitats Directive’ and ‘Natura 2000 Sites’.

The Council Directive 79/409/EEC on the Conservation of Wild Birds (“the Birds Directive”) sets a framework for the protection of wild birds. Under the directive, a number of provisions are made including the designation and protection of ‘Special Protection Areas’ (SPAs) – areas which support important bird populations, and the legal protection of rare or vulnerable species.

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the “Habitats Directive”) directs member states of the EU to take measures to maintain favourable conservation status of important habitats and species. This requires the designation of a series of sites which contain important populations of species listed on Annex II of the directive. Together with ‘Special Areas of Conservation’ (SPAs), designated under the Birds Directive, SACs form a network across Europe of protected areas known as the ‘Natura 2000’.

Annex IV lists species in need of more strict protection, these are known as “European Protected Species (EPS)”. All bat species, common dormice *Muscardinus avellana*, otter *Lutra lutra* and great crested newts *Triturus cristatus* are examples of EPS that are regularly encountered during development projects.

The ‘Habitats Regulations’

The Conservation of Habitats and Species Regulations 2010 (the Habitats Regulations”) is the principle means of transposing the Habitats Directive and the Birds Directive, and updates the Conservation (Natural Habitats, &c.) Regulations 1994 (“the 1994 regulations”) in England and Wales.

‘Natura 2000’ sites receive the highest level of protection under this regulation which requires that any activity within the zone of influence of these sites would be subject to a Habitats Regulations Assessment (HRA) by the competent authority (e.g. planning authority), leading to an Appropriate Assessment (AA) in cases where ‘likely significant effects on the integrity of the site are identified.

For European Protected Species, Regulation 41 makes it a criminal offence to;



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- Deliberately capture, injure or kill any such animal;
- Deliberately disturb wild animals of such species;
- Deliberately take or destroy their eggs (where relevant);
- Damage or destroy a *breeding or resting place* of such an animal;
- Possess, control, sell or exchange any live or dead animal or plant, of such species;
- Deliberately pick, collect, cut, uproot or destroy a wild plant of such species.

The Habitats Directive and Habitats Regulations provide for the derogation from these prohibitions for specific reasons provided certain conditions are met. An EPS licensing regime allows operations that would otherwise be unlawful acts to be carried out lawfully. Natural England is the licensing Authority and, in order to grant a license, ensures that three statutory conditions (sometimes referred to as the ‘three derogation tests’) are met:

- A licence can be granted for the purposes of “preserving public health or safety or for other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment” (Regulation 53 (2) (e).
- A licence can be granted if “there are no satisfactory alternatives” to the proposed action.
- A licence shall not be granted unless the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

Wildlife and Countryside Act (1981) as amended.

This remains one of the most important pieces of wildlife legislation in the UK. There are various schedules to the Act protecting birds (Schedule 1), other animals including insects (Schedule 5), plants (Schedule 8), and control of invasive non-native species (Schedule 9).

Under the Wildlife and Countryside Act (WCA) 1981, all wild birds (with the exception of those listed on Schedule 2), their eggs and nests are protected by law and it is an offence to:

- Take, damage or destroy the nest of any wild bird while it is in use or being built.
- Take or destroy the egg of any wild bird.
- Disturb any bird listed on Schedule 1, while it is nest building, or at a nest with eggs or young, or disturb the dependant young of any such bird.

Schedule 5 lists all non-avian animals receiving protection to a varied degree. At its strongest, the Act makes it an offence to intentionally kill, injure or take any wild animal listed on Schedule 5, and prohibits interference with places used for shelter or protection, or intentionally disturb animals while occupying such places. Examples of species with *full protection* include all EPS, common reptile species, water vole *Arvicola amphibius*, white-clawed crayfish *Austropotamobius pallipes* and Roman snail *Helix pomatia*. Other species are protected from sale, barter or exchange only, such as white letter hairstreak *Satyrrium w-album*.

The Act makes it an offence to intentionally pick, uproot or destroy any plant or seed, and sell or possess any plant listed on Schedule 8. It is also an offence to intentionally uproot any wild plant not listed on Schedule 8 unless authorised [by the land owner]. Species on Schedules 5 and 8 are reviewed every 5 years when species can be added or removed.

Measures for the prevention of spreading non-native species which may be detrimental to native wildlife is included in the Act, which prohibits the release of animals or planting of plants into the wild of species listed on Schedule 9 (for example Japanese knotweed *Fallopia japonica*, Himalayan balsam *Impatiens*



glandifera, New Zealand Pygmyweed *Crassula helmsii*).

The Wildlife and Countryside Act 1981 (as amended) also prohibits certain inhumane methods of traps and devices for the capture or killing of wild animals and certain additional methods such as fixed trap, poisoning with gas or smoke, or spot-lighting with vehicles for killing species listed on Schedule 6 of the Act (this includes all bat species, badger, otter, polecat, dormice, hedgehog and red squirrel).

Natural Environment and Rural Communities (NERC) Act (2006)

The NERC Act (2006) places a statutory duty under Section 40 on all public bodies, including planning authorities, to take, or promote the taking by others, steps to further the conservation of *habitats and species of principal importance for the conservation of biodiversity* in England (commonly referred to as the 'Biodiversity Duty'). This duty extends to all public bodies the biodiversity duty of Section 74 of the Countryside and Rights of Way (CROW) Act 2000, which placed a duty only on Government and Ministers. Section 41 lists the habitats and species of principle importance. This includes a wide range of species from mosses, vascular plants, invertebrates through to mammals and birds. It originates from the priority species listed under the UK Biodiversity Action Plan (UK BAP) with some omissions and additions.

Protection of Badgers Act (1992)

The Badger *Meles meles* is afforded specific legal protection in Britain under the Protection of Badgers Act (1992), and Schedule 6 of the Wildlife and Countryside Act 1981 (as amended) (see above).

Under this legislation, it is a criminal offence to:

- intentionally kill, injure, take, possess, or cruelly ill-treat, a Badger, or to attempt to do so;
- interfere with a sett, by damaging or destroying it;
- to obstruct access to, or any entrance of, a Badger sett; or
- to disturb a Badger when it is occupying a sett.

A licence may be obtained from Natural England to permit certain prohibited actions for a number of defined reasons including interference of a sett for the purpose of development, provided that a certain number of conditions are met. Note that licenses are not normally granted for works affecting badgers between the end of November and the start of July.

National Planning Policy Framework

The National Planning Policy Framework (NPPF 2018) sets out the Government's view on how planners should balance nature conservation with development and helps ensure that Government meets its biodiversity commitments with regard to the operation of the planning system.

The NPPF states that the wider benefits of an ecosystem should be recognised and the presence of a protected species is a material consideration for a development proposal (Circular 06/2005, 2005).

UK Post-2010 Biodiversity Framework

The UK Biodiversity Action Plan (UK BAP), published in 1994, was the UK's response to the commitments of the Rio Convention on Biological Diversity (1992). The UK BAP was replaced by the UK Post-2010 Biodiversity Framework. This framework covers the period 2011 to 2020 and forms the UK government's response to the new strategic plan of the United Nations Convention on Biodiversity (CBD) published in 2010. This promotes a focus on individual countries delivering target for protection for biodiversity through their own strategies.



The most recent biodiversity strategy for England, 'Biodiversity 2020: A strategy for England's wildlife and ecosystem services' was published by Defra (2011), and a progress update was provided in July 2013 (Defra 2013).

'Biodiversity 2020' builds on the Natural Environment White Paper for England – 'The Natural Choice', published on 7 June 2011, and sets out the strategic direction for biodiversity policy for the next decade.

Biodiversity 2020 deliberately avoids setting specific targets and actions for local areas because Government believes that local people and organisations are best placed to decide how to implement the strategy in the most appropriate way for their area or situation.

In Havant, development must:

- Protect and where possible enhance the borough statutory and non-statutory designated landscapes, habitats and features of hydrological and geological interest. Which can be achieved by appropriate mitigation measures including creation of new habitats and water bodies/courses or planting of new trees and woodlands. Attention should be paid to: SPAs, SACs, SSSIs, NNRs, SINCs and LNRs.
- Support an ongoing programme of survey of habitats and species and designation of Sites of Importance for Nature Conservation.
- Ensure partnership working with landowners to ensure land management practices restore and enhance where possible new valued landscapes, habitats and their soil structure, particularly the Ancient Woodland remnants of the Forest of Bere.
- Protect wildlife corridors to prevent the fragmentation of existing habitats and to allow species like Brent Geese to respond to the local affects of climate change⁸

Birds of Conservation Concern (BoCC)

In 1996, the UK's leading non-governmental bird conservation organisations reviewed the conservation status of all bird species in the UK against a series of criteria relating to their population size, trends and relative importance to global conservation. The lists, known as the 'Red', 'Amber' and 'Green' lists (in order of decreasing concern) are used to inform key conservation policy and decisions. The lists are reviewed every 5 years and are a useful reference for determining the current importance of a particular site for birds. The most recent review was undertaken in 2015 (Eaton et al, 2015), which provides an up to date assessment of the conservation status of birds in the UK.

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⁸ Havant Borough Council – Havant Borough Council Core Strategy Local Development Framework (March 2011) [Currently forming a Local Plan stretching to 2036]



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APPENDIX 2 – Methodology for Assessment of Ecological Impacts

The assessment of ecological impacts follows best practice guidelines for impact assessment⁹.

Six steps are required as part of an ecological impact assessment which are detailed below:

1. Identify important ecological features (habitats, species, ecosystems and their functions/processes)

A summary of the approach to valuing important ecological features is detailed in Table 1.

Table 1: Categorisation of the level of value an important ecological feature has

Level of value	Example
International	Internationally designated site; Special Protected Area (SPA), Special Areas of Conservation (SAC), Ramsar, Biosphere Reserves. A viable area of a habitat or area important for maintaining viability listed as in Annex 1 of the Habitats Directive. Regularly occurring population of internationally important species listed in Annex 1, 2 or 4 of the Habitats Directive and Annex 1 of the Birds Directive.
National	Nationally designated sites; Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), Local Nature Reserves (LRN). Regularly occurring population of nationally important species listed in UK BAP, Schedules 1, 5 and 8 of the Wildlife and Countryside Act or UK Red Data Book Species.
County / Regional	Non-statutory designated sites; Local Wildlife Sites (LWSs), Sites of Nature Conservation (SNCIs) and Site of Importance for Nature conservation (SINCs). Ancient woodland more than 0.25ha. A viable area of a habitat or area important for maintaining viability identified in local/county BAPs listed as in Annex 1 of the Habitats Directive. Regularly occurring population of a species listed as being nationally scarce or a local/county BAP due to its rarity or localisation.
Local	Sites designated at a local level due to meeting ecological selection criteria. Habitats and species which are scarce in the local area.
Neighbourhood	Common widespread habitats (poor-semi improved grassland, arable fields, coniferous plantations etc).
Less than neighbourhood / negligible	Habitats with little to no ecological value (amenity grassland and hardstanding)

2. Identifying and characterising impacts to important ecological features

Impacts are characterised based on the changes expected to the extent and integrity of the important ecological features. This takes in to account permanent and temporary effects, timings and

⁹ CIEEM (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal*. Chartered Institute of Ecology and Environmental Management, Winchester.



reversibility.

Impacts can be high, medium, low or neutral – see table 2. Each impact has a varying probability of occurring – see table 3. Impacts can either be negative or positive.

Table 2: Categorisation of the level of impact occurring to important ecological features

Impact type	Description
High	Large-scale, permanent changes to an important ecological feature which will impact on its integrity. This will likely result in changes in the conservation status of a species population or habitat type at the site.
Medium	Moderate-scale, permanent changes to an important ecological feature or large-scale temporary changes which will not impact upon its integrity. This will likely result in temporary changes in the conservation status of a species population or habitat type at the site, however these are unlikely to be reserved long-term.
Low	Small-scale, temporary changes to an important ecological feature or large-scale temporary changes which will not impact upon its integrity. This will likely result in temporary changes in the conservation status of a species population or habitat type at the site, however these are unlikely to be reserved long-term.
Neutral	No change in important ecological features.

Table 3: Categorisation of the probability of an impact occurring to important ecological features

Impact type	Description
Certain	It is reasonable to conclude that the impact will occur as a result of the proposal
Likely	It is reasonable to conclude that the impacts are more likely to will occur than not as a result of the proposal.
Unlikely	It is reasonable to conclude that these impacts are less likely to occur than to occur as a result of the proposal.

The following four steps lead on from the information identified in the above two steps:

- 3. Incorporating measures to avoid and mitigate these impacts;**
- 4. Assessing the significance of any residual effects after mitigation;**
- 5. Identifying appropriate compensation measures to offset significant residual effects; and**
- 6. Identifying opportunities for ecological enhancement.**



APPENDIX 3 – Common Dormouse Nest-Tube Checks: Results

Abbreviations: DM=dormouse; WM=wood mouse; YN=yellow-necked mouse; ad=adult; juv=juvenile, N=nest only; NM=nest material, not woven, unspecified; F=food cache (wood mouse); E=empty; nf=tube not found, r = tube replaced

	September	October	November	April	May	June	July
Tube number	29/09/17	27/10/17	29/11/17	17/04/18	21/05/18	20/06/18	23/07/18
1	E	E	E	E	E	E	E
2	E	E	E	E	E	E	E
3	E	E	E	E	E	E	E
4	E	E	E	E	E	E	E
5	E	E	E	E	E	E	E
6	E	E	E	E	E	E	E
7	E	E	E	E	E	E	E
8	E	E	E	E	E	E	E
9	E	E	E	E	E	E	E
10	E	E	E	E	E	E	E
11	E	E	E	E	E	E	E
12	E	E	E	E	nf	E	E
13	E	E	E	E	E	E	E
14	E	E	E	E	E	E	E
15	E	E	E	E	E	E	E
16	E	E	E	E	E	E	E
17	E	E	E	E	E	E	E
18	E	E	E	E	E	E	E
19	E	E	E	E	E	E	E
20	E	E	E	E	E	E	E
21	E	E	E	E	E	E	E
22	E	E	E	F	F	E	E
23	E	E	E	F	F	E	E
24	E	E	E	F	F	E	E
25	E	E	E	F	F	E	E
26	E	E	E	E	E	E	E
27	E	E	E	E	E	E	E
28	E	E	E	E	E	E	E
29	E	E	E	E	E	E	E
30	E	E	E	E	E	E	E
31	E	E	E	E	E	E	E
32	E	E	E	E	E	E	E
33	E	E	E	E	E	E	E
34	E	E	E	E	E	E	E
35	E	E	E	E	E	E	E
36	E	E	E	E	E	E	E



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	September	October	November	April	May	June	July
Tube number	29/09/17	27/10/17	29/11/17	17/04/18	21/05/18	20/06/18	23/07/18
37	E	E	E	E	E	E	E
38	E	E	E	r	E	E	E
39	E	E	E	E	E	E	E
40	E	E	E	E	E	E	E
41	E	E	E	E	E	E	E
42	E	E	E	E	E	E	E
43	E	E	E	E	nf	nf	E
44	E	E	NM	WM-N	WM-N	Wm-N	WM-N
45	E	E	r	r	E	nf	nf
46	WM-N	WM-N	NM	E	E	E	E
47	E	E	E	E	E	E	E
48	E	E	E	E	E	E	E
49	E	E	E	E	E	E	E
50	E	E	E	E	E	E	E



APPENDIX 4 - Great Crested Newt eDNA Survey Results

Client: Paul Whitby,
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Lodsworth,
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Helsby
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Tel: 01159 516747
Email: Helen.Rees@adas.co.uk
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Sample ID: 2018-0076 Condition on Receipt: Good Volume: Passed
Client Identifier: Havant Crematorium Description: pond water samples in preservative
Date of Receipt: 18/04/2018 Material Tested: eDNA from pond water samples

Determinant	Result	Method	Date of Analysis
Inhibition Control [†]	2 of 2	Real Time PCR	19/04/2018
Degradation Control [‡]	Within Limits	Real Time PCR	19/04/2018
Great Crested Newt*	0 of 12 (GCN negative)	Real Time PCR	20/04/2018
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10 ⁻⁴ ng/μL) [§]	4 of 4	Real Time PCR	As above for GCN

Report Prepared by: Dr Helen Rees Report Issued by: Dr Ben Maddison

Signed:

Signed:

Position:

Director: Biotechnology

Position:

MD: Biotechnology

Date of preparation:

23/04/2018

Date of issue:

23/04/2018

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

[†] Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

[‡] No degradation is expected within time frame of kit preparation, sample collection and analysis.

[§] Additional positive controls (10⁻¹, 10⁻², 10⁻³ ng/μL) are also routinely run, results not shown here.



APPENDIX 5 - Reducing Impacts of Artificial Light

Bright external lighting can have a detrimental impact upon foraging and commuting bat flight paths, but more importantly can also cause bats to remain in their roosts for longer. Artificial lighting can also cause significant impacts on other nocturnal species, most notably moths and other nocturnal insects. It can also result in disruption of the circadian rhythms of birds, reducing their fitness. Guidelines issued by the Bat Conservation Trust¹⁰ should be considered while designing the lighting scheme. This includes the following measures:

Do not:

- provide excessive lighting. Use only the minimum amount of light needed for the task.
- directly illuminate bat roosts or important areas for nesting birds

Avoid:

- installing lighting in ecologically sensitive areas such as: near ponds, lakes, rivers, areas of high conservation value; sites supporting particularly light-sensitive species of conservation significance (e.g. glow worms, rare moths, slow-flying bats) and habitat used by protected species.
- using reflective surfaces under lights.

Do:

- consider employing a competent lighting designer who will apply the principals of providing the right light, in the right place, at the right time and controlled by the right system.
- minimise the spread of light to at, or near horizontal and ensure that only the task area is lit. Flat cut-off lanterns or accessories should be used to shield or direct light to where it is required.
- consider the height of lighting columns. It should be noted that a lower mounting height is not always better. A lower mounting height can create more light-spill or require more columns. Column height should be carefully considered to balance task and mitigation measures.
- consider no lighting solutions where possible such as white lining, good signage, and LED cats eyes. For example, light only high-risk stretches of roads, such as crossings and junctions, allowing headlights to provide any necessary illumination at other times.
- use temporary close-boarded fencing until vegetation matures, to shield sensitive areas from lighting.
- limit the times that lights are on to provide some dark periods. The task being lit often varies, for example roads are less used after 23.00hrs and car parks are empty. A lighting designer can vary the lighting levels as the use of the area changes reducing lighting levels or perhaps even switching installations off after certain times. This use of adaptive lighting can tailor the installation to suit human health and safety as well as wildlife needs.

¹⁰ Bat Conservation Trust (2014) Artificial Lighting and Wildlife - Interim Guidance: Recommendations to help minimise the impact artificial lighting. Available at: http://www.bats.org.uk/pages/bats_and_lighting.html



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