



Photograph 4. A view of the grassland within the south-east corner of the site.



Photograph 5. A view inside the ancient woodland within the southern half of the site (left) and north-east of the site (right). Note the dense carpet of bluebells (left) and yellow archangel (right).



Photograph 6. An example of the dense moss, liverworts and ferns within the ghyll woodland at the site.

Appendix G2: Bat Trapping and Radiotracking Report

Greater Ansty New Village

Bat Trapping and Radiotracking Report

Report for Fairfax Properties

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Summary of Key Findings

Temple was commissioned by Fairfax Properties in February 2022 to provide specialist bat consultancy services to identify species assemblage, roosts and flightlines for bats that may be adversely affected by the proposed development at Greater Ansty New Village, Haywards Heath.

The development proposal includes the construction of a new settlement at Ansty to include approximately 1600 new homes, community hall and playing fields, primary school, and a relief road opening up access to the site, and removing through-traffic from the village.

Surveys undertaken on site included trapping of bats within the development boundary. Subsequent radio-tracking of tagged bats was undertaken up to 2km from the site boundary to determine roost locations and flightlines. These surveys were undertaken to provide baseline information on bats within and adjacent to the site, that can be used to inform the mitigation design of the proposed development.

The surveys included three bat trapping sessions undertaken over nine nights on 6th-8th June, 1st-3rd August and 22nd-24th September 2022. Trapping of bats was undertaken at six locations within and adjacent to the site boundary, with a minimum of two traps placed at each location.

A total of 67 bats from ten species were captured. The species included barbastelle *Barbastella barbastellus*, Bechstein's bat *Myotis bechsteinii*, Alcathe bat *Myotis alcathoe*, Brandt's bat *Myotis brandtii*, brown long-eared bat *Plecotus auritus*, common pipistrelle *Pipistrellus pipistrellus*, Daubenton's bat *Myotis daubentonii*, Natterer's bat *Myotis nattereri*, soprano pipistrelle *Pipistrellus pygmaeus*, and whiskered bat *Myotis mystacinus*. All species of bat are included under Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended). Breeding females from four species Alcathe bat, brown long-eared bat, common pipistrelle and whiskered bat were trapped during surveys. Radio-transmitters were fitted to three Bechstein's bats and one barbastelle. Subsequent radio-tracking surveys identified roost locations and flightlines

from the roost for these bats where possible. During the surveys, six roosting locations were identified, all between 300m east and 1.2km north-east.

The site is used by a wide assemblage of bats and the trapping and radio-tracking surveys have confirmed the importance of the site at a regional level for the rare Bechstein's bats, barbastelle and Alcahloe bats. Although roosts were not discovered within site, the presence of these species, including breeding Alcahloe increases the significance of the site for bats. The site provides high value roosting, foraging and commuting opportunities for bats in the form of mature hedgerows and trees, ancient woodland and riparian habitat. The proposed development therefore has the potential to impact the favourable conservation status of bats on site should these habitats be impacted.

The results of these surveys, along with those undertaken by The Ecology Co-Op (2023) should be used to inform any necessary mitigation and compensation for the proposed development.

1 Introduction

BACKGROUND TO COMMISSION

- 1.1 Temple was commissioned by Fairfax Properties in February 2022 to undertake specialist bat consultancy services to identify species assemblage, roosts and flightlines for bats that may be impacted the proposed development at Greater Ansty New Village, Haywards Heath.
- 1.2 The surveys were undertaken to form part of the baseline bat surveys on site, alongside surveys undertaken by The Ecology Co-Op. The results of the surveys will be used to inform design proposals.
- 1.3 The trapping survey covered the areas within the redline boundary (henceforth referred to as 'the site') as indicated on the plan provided by the client (shown in red in Appendix 1, Figure 1), and up to 2km from the boundary for radio-tracking surveys. The radio-tracking surveys aimed to determine roost locations of tagged bats. A 2km search area for this survey type was considered proportionate to the potential impacts of the proposals.

PROJECT AIMS

- 1.4 The aims of the project are to:
 - investigate the species assemblage within the site; and
 - collect data on roosting locations, roost type, and flightlines from the roost for Alcaethoe *Myotis alcathoe*, barbastelle *Barbastella barbastellus*, and Bechstein's bat *Myotis bechsteinii* located up to 2km from the site boundary.
- 1.5 The above species were chosen due to their rarity, legislative protection and / or known susceptibility to impacts from development. All three species are considered very rare or data deficient within both the UK and Sussex (BCT, 2010 and Sussex Bat Group, 2019). Bechstein's bat (and some other species not recorded in the current survey) receive a higher level of legislative protection than other bat listed on Schedule 2, Conservation of Habitats and Species Regulations 2017 (as amended).

- 1.6 The survey proposes to radio-tag up to a maximum of two Alcathoe, eight barbastelle, and eight Bechstein's bat per survey session. However, overall numbers will be limited to 10 bats per survey session. The proposal for tagging up to 30 individuals over the 2022 survey season of the aforementioned species is due to the presence of highly suitable habitats for these species, the possible impacts upon these habitats, and the numbers of bats required to get adequate data to determine impacts.

SITE CONTEXT AND STATUS

- 1.7 The site at Ansty Farm is located to the south of the village of Cuckfield and the north-east of the village of Ansty, West Sussex.
- 1.8 The site is approximately 197ha in size, of which 98ha would be utilised for the proposed development, and the remaining 99ha for a Country Park (as shown in Appendix 1). This application relates only to the proposed development site.
- 1.9 The site comprises hedgerow and tree lined arable and pasture fields, along with areas of Deciduous Woodland, a Habitat of Principal Importance, including at least 7.3ha Ancient and Semi-Natural Woodland (ASNW). A watercourse runs through the site.

DEVELOPMENT PROPOSALS

- 1.10 The development proposal includes the construction of a new settlement at Ansty to include:
- approximately 1600 new homes;
 - a new community hall and playing fields;
 - a new primary school;
 - a network of informal open spaces and new footpaths;
 - screening planting along contours to soften the views into the scheme;
 - a new relief road opening up access to the site, and removing through-traffic from the village;

- new paths and trails along existing hedgerows; and
- a masterplan design which features a network of linear green routes permeating the scheme on the alignment of the streams, hedgerows, tree belts and woodland groups.

RELEVANT LEGISLATION AND PLANNING POLICY

1.11 The following key pieces of nature conservation legislation are relevant to this assessment. A more detailed description of this legislation is provided in Appendix 3.

- The Conservation of Habitats and Species Regulations 2017 (as amended);
- The Wildlife and Countryside Act 1981 (as amended);
- Natural Environment and Rural Communities Act 2006; and
- The Environment Act 2021.

1.12 The National Planning Policy Framework (Ministry of Housing, Communities and Local Government, 2021) and The Environment Act 2021 requires local authorities to avoid and minimise impacts on biodiversity and to provide net gains in biodiversity when taking planning decisions. In addition, in England, under Section 40 of the Natural Environment and Rural Communities Act 2006, all public bodies are required to have regard to biodiversity conservation when carrying out their functions.

2 Methodology

- 2.1 The methods used generally followed the standard best practice guidance for trapping and radio-tracking (Collins, 2016). Any specific deviations due to objectives of the surveys are highlighted where necessary.
- 2.2 The sites for trapping were selected on the basis of a site walkover led by Rosie McLaughlin BSc (Hons) MSc (Natural England level 4 bat licence holder) and obtaining records of Annex II species from Sussex Bat Group (Sussex Bat Group, pers comm.), and, using analysis of aerial photography and Ordnance Survey (OS) map data to assess the landscape and habitat connectivity. Sites were chosen to maximise coverage of the habitats of high suitability for bats within the site boundary.
- 2.3 Initial trapping surveys focussed on six points located within the site boundary. These trapping locations were subject to a ground truthing assessment prior to each session to ensure the habitat remained suitable for trapping surveys, with slight deviations made if required, for example for health and safety reasons. The extent of the site boundary and proposed trapping locations can be found in Figures 1 and 2 respectively in Appendix 1.
- 2.4 Roosts for target species were then identified through radio-tracking surveys where possible.

DESK STUDY

- 2.5 A desk study was obtained from Sussex Biodiversity Records Centre to acquire data relating to bats within a 2km radius of the site, and up to 15km for any internationally designated sites with bats included in their designations. Additional contextual information was compiled from publicly available data sources:
- MAGIC (<http://www.magic.gov.uk>) – the Government's on-line mapping service. Information was sought regarding: the presence of ASNW, statutory

designated nature conservation sites and extant or historic mitigation licences for bats; and

- Ordnance Survey mapping and publicly available aerial photography to determine any features such as: running and standing water, woodland, tree lines, hedgerows, railway corridors and the surrounding landscape uses.

TRAPPING SURVEYS

2.11 The bat trapping and radio-tracking survey work targeted three bat species that form part of the bat assemblage, as per the aims listed in Section 1:

- Alcahoie bat;
- Barbastelle; and
- Bechstein's bat.

2.12 These species were selected with reference to their rarity, legislative protection and / or known susceptibility to impacts from development.

2.13 All bats were caught, handled and radio-tracked under Natural England project licence 2022-61182-SCI-SCI and 2022-61182-SCI-SCI-1.

2.14 Trapping surveys were carried out for a total of nine nights over three sessions (three nights per session) on:

- 6th to 8th June 2022 (pre-maternity);
- 1st to 3rd August 2022 (post-maternity); and
- 22nd to 24th September 2022 (autumnal dispersal).

2.15 Trapping locations are provided in Table 2.1 below and Appendix 1, Figure 2.

Table 2.1: Trapping locations

Trapping location	Easting	Northing	Description
1a	529462	123239	Field edge adjacent to treeline and hedge
1b	529436	123029	Within woodland
1c	529613	123053	Within woodland
2a	530087	123084	In centre of Ridden's Wood, under oak
2b	530150	123114	On edge of Ridden's Wood, under oak
2c	530256	123154	On edge of Furnace Wood
3a	530206	123287	Under oak tree on edge of hazel coppice
3b	530222	123361	On woodland track within hazel coppice
3c	530249	123362	Under beech adjacent to stream
4a	529618	123579	On edge of small, wet oak/alder woodland, under immature ash
4b	529796	123573	On edge of woodland, between deadwood and oak
4c	530010	123574	Within wet oak/alder woodland
4d	529905	123608	Within wet oak/alder woodland
4e	529824	123636	Within wet oak/alder woodland
5a	530219	123680	Woodland edge
5b	530213	123608	Woodland edge, stream
5c	530276	123640	Woodland edge
5d	530102	123584	Woodland, stream
6a	530332	122959	Within woodland
6b	530264	122836	Within woodland
6c	530376	122841	Within woodland

2.16 Trapping surveys were carried out using Faunatech Austbat Harp Traps. A harp trap consists of a bank of vertical fine nylon filaments tightly strung to a rectangular frame of aluminium pole further supported by aluminium pole legs. The trap safely catches bats in flight by taking away their momentum. The bats then safely fall into a large cotton bag affixed below the trap where they can be removed by hand. A combination of two-bank and three-bank harp traps were used for the trapping surveys.

- 2.11 In addition to harp traps, a single mist net was also deployed on 22nd September 2022 at Location 1c. Mist netting was carried out using Ecotone ultra-thin Series M Mist nets mounted on telescopic poles. Mist nets consist of a nylon monofilament, available in a variety of lengths stretched between two poles. Each net is 2.4m in height and comes in 6, 9 and 12m lengths with four shelves which are tensioned lines that allow the trap to safely catch bats in flight by taking away their momentum. The bats then become trapped between folds of the net where they can then be removed by hand.
- 2.12 The locations of traps were selected to maximise capture of bats, based on the presence of habitat features commonly used by commuting and / or foraging bats including woodland habitat, hedgerows and watercourses.
- 2.13 Each trap was fitted with a Sussex Autobat acoustic lure to increase the likelihood of catching bats. The acoustic lure simulates a variety of bat social calls. Simulations of barbastelle, Bechstein's bat, small Myotis bats (whiskered bat, Alcaho bat, and Brandt's bat) and Nathusius' pipistrelle were used during the surveys.
- 2.14 The bats captured in the traps were removed by a suitably experienced ecologist, under the direction of the licensed ecologist or accredited agent, and each bat was transferred to an individual clean cloth bag. The bats were identified to species wherever possible (see DNA analysis below), and sexed, with reproductive status ascertained. If required for identification, or if the bat was selected for radio-tagging, it was also weighed using a Pesola light line spring scale or Ascher portable digital scale, forearm measured using callipers, and any other general health observations were noted.
- 2.15 Bats selected for radio-tagging were retained, so as to have a radio-transmitter attached and ring fitted and were released at the site of capture after processing. All other bats were safely released immediately, in close proximity to the site of capture.

2.16 Female bats (specifically reproductive females) were selected for radio-tagging in preference to male bats, as tracking breeding females enables the increased likelihood of identification of maternity roosts which are of higher conservation significance than other roost types used by bats in the active season. Bats were selected so that the radio-tag comprised no more than 5% of the total weight of the bat. Bats which were in the advanced stages of pregnancy were not selected for radio-tracking for welfare reasons of the unborn young.

DNA ANALYSIS

2.17 DNA analysis was undertaken conducted through the non-invasive method of dropping analysis. This technique was used for small Myotis bats (whiskered bat, Alcaethoe bat, and Brandt's bat) when there was uncertainty regarding species identification in the hand.

2.18 Bat droppings were collected from the clean cloth bags in which the bats were held, using gloves to avoid contamination of the sample. Droppings were then transferred into a clean, dry and sterile Eppendorf-type plastic tube. When possible, up to five droppings from an individual were added to a sample tube, to allow for a retest if required. The samples were labelled, noting likely species, sex, biometrics, health status and trapping location of each animal. Samples were then sent to University of Warwick for analysis to confirm bat species. In certain scenarios, it is not always possible to retrieve a faecal sample from a bat, due to the short duration of capture. Therefore, these bats are identified to genus level.

RADIO-TRACKING SURVEYS

2.19 Fur was clipped from the area between the shoulder blades of bats selected for radio-tagging. Transmitters (Holohill radio-tags) were attached to each bat in this area using an adhesive (Skin-Bond® Pfizer Inc). Each radio-tagged bat was assigned a unique identification number associated with the radio frequency of the transmitter attached to it. This frequency was programmed into the radio receiver carried by the radio-tracking team. Any bats selected for radio-tagging were also ringed using 2.9 millimetre (mm) rings obtained from the Bat Conservation Trust.

The use of rings allowed the project team to avoid tagging any bat twice in one season, should it be recaptured.

2.20 Bats fitted with radio-transmitters were released on the same night of capture in close proximity to the capture site. A day-time roost search team located the tagged bats using a Biotrack® 'Sika' radio receiver, which in turn enabled an emergence survey to be undertaken to ascertain the colony size and type and, also (see Bat Emergence Surveys below) to identify the features used by the radio-tagged bats as flight lines to commute between roosting locations and foraging habitat.

2.21 Each bat fitted with a radio-tag was tracked for up to five consecutive days.

BAT EMERGENCE SURVEYS

2.22 From a total of six confirmed roosting locations identified by this study, emergence surveys were undertaken at four bat roost locations. Not all roosting locations were subject to emergence surveys due to constraints detailed in the Data Validity and Limitations section below.

2.23 The emergence surveys aimed to locate the roost access / egress points where possible and to determine the number of bats using the roost and characterise the roost type. Surveys were undertaken by experienced bat surveyors in appropriate weather conditions following standard guidelines on emergence survey procedure (Collins, 2016).

2.24 Observations were made from the outside of the tree identified as a roost. Dusk emergence surveys commenced approximately 15 minutes before sunset and lasted for approximately 90 minutes after sunset with reference to best practice methods (Colins, 2016) to confirm use of a bat roost, or 30 minutes after the last bat emergence was recorded.

2.25 Real time detectors (Elekon Batlogger M) were used to record bat echolocation calls of any emerging bats and to identify species where possible.

- 2.26 Canon XA10 / XA20 / XA30 Camcorders with IR lamps (COP LIR-IC88 IR LED Flood Lamp) or with thermal equipment (FLIR T1020 with 45 degree lens) were used in conjunction with surveyor's observations during the bat emergence surveys to ensure appropriate coverage of all elevations and to ensure that accurate individual counts were obtained. The recordings were later examined using VLC media player (version 2.2.6 Umbrella) to confirm the number of bats (if any) that emerged from the videoed location.
- 2.27 All bat emergences were noted, and bats were identified to species where possible. Echolocation calls were recorded onto the in-built sound card of the detector (Elekon Batlogger M). These were subsequently analysed using Elekon BatExplorer or Wildlife Acoustics Kaleidoscope Pro computer software, which facilitates species identification, by an ecologist with experience of call analysis.
- 2.28 If the bat was recorded within or close to the site boundary, estimates of flightlines were obtained following emergence from the roost to determine which features the bats were using to commute. This was obtained by radio-tracking the bat upon emergence, taking multiple bearings based on the signal from the receiver to determine the likely commuting route. Flightlines from the roost were not obtained for bats roosting outside the site boundary due to lack of proposed impacts to these areas.

DATA VALIDITY AND LIMITATIONS

- 2.29 Both two-bank and three-bank harp traps were used during the trapping sessions. Although there is anecdotal evidence that the three-bank is a more efficient harp trap, there is no scientific evidence base to support this. Therefore, the interchanging use of both trap types poses no limitation to the survey.
- 2.30 Biometric data was not collected for every bat caught due to IUCN guidelines on bat handling during the Covid-19 pandemic (IUCN SSC Bat Specialist Group (BSG), 2021). This was not considered to be a significant constraint to surveys as the data required to determine the species and breeding status of bats was always obtained, with the exception of a small number of small *Myotis* bats (see next paragraph).

- 2.31 As the duration of capture was short and Covid-19 restrictions limited handling of bats, it was not always practicable to collect a DNA sample from each bat. DNA analysis was therefore not feasible in two cases for whiskered/Alcathoe bats (Bats 49 and 50). Where identification to species level was not possible with Bats 49 and 50, these two individuals were identified to species group e.g. small Myotis.
- 2.32 Bat activity surveys by The Ecology Co-Op (2023) provided records for barbastelles. As such, the August and September trapping sessions at trapping location 2 were moved to the areas closest to the highest barbastelle activity. In addition, trapping location 2 were changed due to health and safety concerns. This is not considered to be a significant constraint to surveys.
- 2.33 The positions of the radio-tagged bats were received at intervals after leaving the roost when considered necessary (see paragraph 2.28) and this information was used to identify flightlines between the roost and foraging areas. Therefore, flightlines were partially estimated based on the best available data. The implications of partially estimating flight lines and foraging areas on the best available data may result in missing areas that are not identified as core foraging area or flightlines. This is an acceptable limitation as assumptions on direction and use of landscape features can be made based on known bat behavioural ecology.
- 2.34 Due to the rarity of Alcathoe bat, this species would have been selected for tagging. However, all individuals captured were too small for the radio-tags available. Data for this species is therefore limited.
- 2.35 Some emergence surveys undertaken during the radio-tracking study could not identify the exact location of the roosting feature due to the cluttered nature of the woodland and / or the roost feature being obscured by branches from ground level (Roost R1 and R5). Access was not possible for all emergence surveys due to landowner restrictions and health and safety concerns (Roost R3 and R6). In these cases, an accurate roost count could not be obtained and, therefore, the roost could not be characterised. This is not considered to be a significant constraint to surveys

as all roosts identified were located outside the site boundary and therefore not subject to impacts of the proposed development.

3 Results

DESK STUDY

Designated sites

- 3.1 No internationally designated sites with bats listed on the designation are located within 15km of the site.
- 3.2 Two statutory designated sites are located within 2km of the site. These are Ashenground and Bolnore Woods Local Nature Reserve (LNR) located approximately 1.4km east-south-east, and Blunts and Paiges Wood LNR located approximately 1.25km to the north-west.
- 3.3 Two areas of ASNW, Hangar Wood and Freizeland Wood, were present on site. Furthermore, there were several areas of Lowland Mixed Deciduous Woodland and Open Water, both listed as Habitats of Principal Importance in Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. The site is connected to other areas of ancient, deciduous and ghyll woodland, and wood pasture and parkland in the wider landscape.

Species

- 3.4 Bat species records within 2km of the site boundary from the last ten years are shown in Table 3.1 below.

Table 3.1: Desk study results

Species	Type of record	Approximate direction and distance from closest point of site boundary
Bechstein's bat	Grounded male bat	1.75km east
Brown long-eared bat	Several records of roosts/presence	Closest record 1.4km south
Common pipistrelle	Several records of roosts/presence	Closest record 150m south
Pipistrelle species	Roost – two bats	2km east
Soprano pipistrelle	Grounded bats and roost	1km west and 1.5km west
Whiskered bat	Grounded male bat	1km north-east
Myotis Bat	Roost -one bat	2km west
Daubenton's Bat	2 present during field observation	1.5km south-west

TRAPPING SURVEYS

- 3.5 A total of 67 bats from ten species were captured over nine nights between 6th June and 24th September 2022, over six different locations. Each location was surveyed one night per survey session (three nights in total in 2022).
- 3.6 Figure 2 in Appendix 1 shows the trapping locations for the surveys. The number of bats of each species that was caught is shown in Table 3.2 and the number of bats caught at each trapping location described in Table 2.1 is shown in Table 3.3 below.

Table 3.2: Number of bats caught by species

Species	Number of bats
Alcathoe bat	4
Barbastelle	1
Bechstein's bat	4
Brandt's bat	1
Brown long-eared bat	11
Common pipistrelle	13
Daubenton's bat	1
Natterer's bat	10
Soprano pipistrelle	10
Whiskered bat	10
Whiskered/Alcathoe bat	2

Table 3.3: Number of bats caught by location

Location	Trapping location description	Number of bats
1	Three locations – two within woodland and one on field edge	13
2	Three locations – one within Ridden's Wood, one on the edge of Ridden's Wood, and one on the edge of Furnace Wood	11
3	Three locations – one on edge of hazel coppice, one within hazel coppice, one adjacent to stream	12
4	Five locations – three within wet oak/alder woodland, and two on edge of wet oak/alder woodland	3
5	Four locations – three on woodland edge (one by stream), one within woodland by stream	17
6	Three locations – within woodland	11

3.7 A summary of the results for each species is provided below. Full details are provided in Appendix 2.

Alcathoe bat

3.8 Four Alcathoe bats were captured during surveys comprising two adult males, one breeding female, and one pregnant female. This species was captured during pre-maternity and post-maternity surveys, at Locations 2, 5 and 6.

Barbastelle

- 3.9 One barbastelle was captured during surveys. The bat was a juvenile male, captured during autumnal dispersal surveys, at Location 5.
- 3.10 The bat was selected for radio-tracking and is identified elsewhere throughout the report as Bat 4.

Bechstein's bat

- 3.11 Four male Bechstein's bats were captured during surveys. One was an adult, one was a young adult, and two juveniles. Bechstein's bats were captured during all three survey sessions, at Locations 1, 2, 3 and 6.
- 3.12 Three of the four Bechstein's bats were selected for radio-tracking. The young adult is identified elsewhere throughout the report as Bat 1, and the two juveniles as Bats 2 and 3.

Brandt's bat

- 3.13 One Brandt's bat, an adult male, was captured during the surveys. The bat was captured during the post-maternity survey session, at Location 2.

Brown long-eared bat

- 3.14 Eleven brown long-eared bats were captured during surveys. The bats comprised three breeding females, one non-breeding adult female, one juvenile, and six adult males. This species was captured during all three survey sessions, and captured at all locations.

Common pipistrelle

- 3.15 Thirteen common pipistrelles were captured during surveys. The bats comprised one pregnant female, two non-breeding adult females, one juvenile female, one juvenile male, six adult males, and two bats that escaped from the trap. This species was captured during all three survey sessions, and were captured at Locations 1, 2, 3, and 5.

Daubenton's bat

- 3.16 One Daubenton's bat, a non-breeding adult female, was captured during surveys. The bat was captured during the pre-maternity survey session, at Location 2.

Natterer's bat

- 3.17 Ten Natterer's bats were captured during surveys. The bats comprised three non-breeding adult females, three juvenile/immature females, and four adult males. This species was captured during all three survey sessions, at Locations 3, 5, and 6.

Soprano pipistrelle

- 3.18 Ten soprano pipistrelles were captured during surveys. The bats comprised four non-breeding females, five adult males, and one juvenile male. This species was captured during all three survey sessions, at Locations 1, 2, 3, 5 and 6.

Whiskered bat

- 3.19 Ten whiskered bats were captured during surveys. The bats comprised two post-lactating females, one pregnant female, one non-breeding female, four adult males, one juvenile male, and one male that was released before the age was determined. This species was captured during all three survey sessions, at Locations 1, 2, 3, and 5.

Small Myotis

- 3.20 Two bats that could not be identified to species level were captured during surveys (Bats 49 and 50) grouped as Small Myotis bats, likely to be either whiskered or Alcahoie bats. Both bats were juvenile males, captured during the post-maternity session at Location 4. The bats were released due to IUCN covid guidelines on bat handling (IUCN SSC Bat Specialist Group (BSG), 2021), before a dropping could be obtained for DNA analysis.

DNA Analysis

- 3.21 Droppings were obtained for DNA analysis from small Myotis bats (whiskered / Brandt's bat / Alcahoie bat) whenever possible. Two samples were sent to the

University of Warwick for analysis which confirmed the bats to be an Alcaethoe bat and a whiskered bat. Samples were not obtained for all small Myotis species (see Limitations section).

RADIO-TRACKING SURVEY

- 3.22 Four bats were selected for radio-tracking including three Bechstein's bats, and one barbastelle. No Alcaethoe bats were selected for radio-tracking as the individuals caught were too light to carry the radio-tags available (the bats needed to be a minimum weight of 5.4 grams).
- 3.23 All bats tagged were male, with Bat 1 being young adult, and Bats 2-4 being juveniles born in 2022.
- 3.24 The radio-tracking survey aimed to identify roosting locations, and flightlines from the roost wherever possible for the four radio-tagged bats. Radio-tagged bats are described in Table 3.4 below.

Table 3.4: Number and species of radio-tagged bats caught by species

Bat identification number	Species and breeding status	Date of capture	Location of capture
1	Bechstein's bat – male, last year's young	05/06/2022	3
2	Bechstein's bat – male – juvenile	01/08/2022	1
3	Bechstein's bat – male – juvenile	23/09/2022	6
4	Barbastelle – male – juvenile	24/09/2022	5

ROOST AND EMERGENCE SURVEY

- 3.25 A total of six confirmed roosting locations were identified from two of the radio-tagged bats. The locations of the roosts are shown in Table 3.5 below and in Appendix 1, Figure 3. All roosts were located outside the site boundary.

- 3.26 A total of four emergence surveys were undertaken on four of the confirmed roosts, the results of which are also shown in Table 3.5 below.
- 3.27 Four roosts were identified for Bat 1 (R1-4), all off site, with the closest identified approximately 410 metres (m) east (R4). Emergence surveys were undertaken on three of the roosts which recorded a peak count of one bat in two of the roosts (R2 and R4). The bat remained in its roost during the emergence survey undertaken on R1. An emergence survey was not undertaken on R3 as this roost was inaccessible.
- 3.28 Bat 3 was a juvenile Bechstein's bat radio-tracked in the autumnal dispersal session (September 2022). Two roosts were identified for this bat, the closest of which was approximately 300m from the site boundary. An emergence survey was undertaken on one of the roosts (R5) but no bats were recorded emerging from the roost and the radio-tracked bat remained within the tree. An emergence survey was not undertaken on R6 as this roost was inaccessible.
- 3.29 The roosts of Bat 2 and Bat 4 were not found, despite a thorough search of the site and all accessible areas up to 2km from the site boundary. This indicates the bats were likely roosting off site.

Table 3.5 Roost and emergence summary

Bat number	Roost identifier	Species	Sex	Breeding status	Estimated/ confirmed	Easting	Northing	Detail	Direction and distance from closest point of site boundary	Date of emergence survey	Roost count	Roost character- isation
1	R1	M.bec	M	Imm	Confirmed	531081	123410	Mature oak in tree line south of Copyhold Lane, 2x branch tear out visible at 8m and 10m on south-east. Diameter at breast height (DBH) approximately 60cm.	570m east	07/06/2022	0	Unknown
1	R2	M.bec	M	Imm	Confirmed	530940	123450	Immature aspen south of Copyhold Lane. Trunk cavity and callous (6cm internal width). Seems to extend upwards.	430m east	08/06/2022	1	Day
1	R3	M.bec	M	Imm	Confirmed	531456	124372	Mature oak tree south of Blunts Wood. Old tear out and callous which appears hollow, extending into branch. Lots of dead wood visible. Tree in mature tree line on bank of stream.	1.2km north east	N/A - access not possible	N/A	N/A
1	R4	M.bec	M	Imm	Confirmed	530929	123478	Young aspen at edge of wooded copse close to R2 south of Copyhold Lane. Multiple trunk cavities and callous wounds. Trunk appears hollow. Fractures facing NW out either 5m or 7m.	410m east	10/06/2022	1	Day
2	N/A	M.bec	M	Juv	N/A	N/A	N/A	N/A no roost found	N/A	N/A	N/A	N/A
3	R5	M.bec	M	Juv	Confirmed	530625	122940	Mature oak tree within Heaseland Hanger	300m east	24/09/2022	0	Unknown

Bat number	Roost identifier	Species	Sex	Breeding status	Estimated/ confirmed	Easting	Northing	Detail	Direction and distance from closest point of site boundary	Date of emergence survey	Roost count	Roost character- isation
3	R6	M.bec	M	Juv	Confirmed	530829	122871	Oak tree within Hanger Wood	500m east	N/A - access not possible	N/A	N/A
4	N/A	B.bar	M	Juv	N/A	N/A	N/A	N/A no roost found	N/A	N/A	N/A	N/A

FLIGHTLINES

- 3.30 A flightline for Bat 1 was recorded north/north-west from R2 on 8th June 2022, and north-west from R4 on 10th June 2022. The flightlines were recorded outside the site boundary, but the bat was recorded flying towards the site on both occasions.
- 3.31 A flightline from the roost was not discovered for Bat 2 as the roost was not found. However, the bat was suspected to be foraging in the west of Riddens Wood (based on single bearings taken during trapping surveys) on subsequent nights following capture. Signal from the radio-tagged bat was first heard around three hours after sunset, for approximately two-three hours on both 3rd and 4th August 2022.
- 3.32 A flightline from the roost was not discovered for Bat 3 as the bat was not recorded emerging from R5, and access for an emergence survey was not possible for R6.
- 3.33 A flightline from the roost was not discovered for Bat 4 as the roost was not found.

4 Evaluation

SPECIES ASSEMBLAGE

- 4.1 A total of 67 bats of ten species were captured over nine trapping nights over three survey sessions. The species included barbastelle, Bechstein's bat, Alcahloe bat, Brandt's bat, brown long-eared, common pipistrelle, Daubenton's bat, Natterer's bat, soprano pipistrelle, and whiskered bat, indicating a broad assemblage of bat species present within site.
- 4.2 Table 4.1 provides information on the UK and local distribution and conservation status of species captured on site. This shows that three species listed as 'very rare' by Sussex Bat Group (2019) were recorded on site (Bechstein's bat, barbastelle, and Alcahloe bat).

Table 4.1 Distribution and status of bats captured during trapping surveys

Species (* indicating breeding on or near the site)	Relative UK Distribution and Status (BCT, 2010)	Local Distribution & Status (Sussex Bat Group, 2019)
Bechstein's bat	Very rare, (restricted to southern Wales and parts of southern England)	Very rare
Barbastelle	Widespread, very rare	Widespread, very rare
Alcahloe bat*	Data deficient	Very rare, hardly known
Brandt's bat	Widespread, uncommon (slightly less common and widespread than Whiskered bat)	Widespread, scarce
Brown long-eared bat*	Widespread, relatively common	Relatively abundant, widespread
Common pipistrelle *	Widespread, common	Widespread, abundant
Daubenton's bat	Widespread, fairly abundant	Widespread, fairly abundant

Species (* indicating breeding on or near the site)	Relative UK Distribution and Status (BCT, 2010)	Local Distribution & Status (Sussex Bat Group, 2019)
Natterer's bat	Widespread, locally common	Widespread, scarce
Soprano pipistrelle	Widespread, common	Widespread, fairly common
Whiskered bat*	Widespread, scarce	Widespread, scarce

4.3 The majority of bats were captured during the pre-maternity session, with 30 bats caught in June, as shown in Table 4.2. Twenty bats were captured during the post-maternity session in August, and 17 in the autumnal dispersal session in September.

4.4 The location with the highest rate of capture over all survey sessions was location 5, an area characterised by woodland edge and a stream. The location with the highest rate of capture within a survey session was location 2, an area characterised by ancient woodland with a stream running through. This indicates the importance of woodland, woodland edge and riparian habitats on site.

Table 4.2 Bats caught per location and survey session

Trapping location	Pre-maternity	Post-maternity	Autumnal dispersal	Total
1	7	4	2	13
2	10	1	0	11
3	3	3	6	12
4	0	2	1	3
5	8	4	5	17
6	2	6	3	11
Total	30	20	17	67

4.5 The one barbastelle bat captured was at Location 5a, an area characterised by woodland edge and a stream. The Alcahoie bats were captured at Locations 2a, 5d, 6a and 6c, areas characterised by ancient woodland, woodland edge, and streams. The Bechstein's bats were captured at Locations 1b, 2a, 3a, and 6a, areas characterised by woodland (including ancient), hazel coppice, and streams. One of

the Bechstein's bats was also recorded foraging in the proximity of Location 1. This further indicates the importance of woodland, woodland edge and riparian habitats for these species of concern.

- 4.6 Breeding females from four species were trapped during surveys (shown by * in Table 4.1) including Alcathe bat, brown long-eared, common pipistrelle, and whiskered bat indicating the importance of the site and/or nearby area for breeding.

RADIO-TRACKING SURVEYS

Alcathe bat

- 4.7 The core sustenance zone (CSZ)¹ is considered to be 1km for this species. Although Alcathe bats were not radio-tracked during surveys, breeding females have been recorded on site. Therefore, due to the CSZ for this species, it is likely that maternity roosts are located within or closely adjacent to the site.
- 4.8 The site/nearby area is considered to be of importance at a regional level for Alcathe bats (Wray et al., 2010) due to this being one of the rarest species, the presence of maternity roosts nearby, and the suitable habitats on site.

Barbastelle

- 4.9 One juvenile male barbastelle was captured during the autumnal dispersal survey session. Barbastelle bats are typically associated with deciduous woodland, wet meadows, and waterbodies (BCT, 2016). This species commutes along hedgerows, riparian corridors, and treelines, all of which were targeted for trapping surveys. No roosts were identified for the radio-tracked barbastelle, indicating that the bat was not likely to be roosting on site, or within the nearby area. The site has therefore not been confirmed as providing an important roosting function for this species. Furthermore, no breeding individuals were captured during surveys, meaning the site cannot be confirmed as providing a breeding function for this species.

¹ The area around a communal roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost (BCT, 2016)

- 4.10 No flightlines were recorded for the radio-tracked barbastelle as the bat's roost was not identified. However, data from automated static bat detector surveys, and activity transects, provides information on how this species uses the site (Ecology Co-Op, 2023).
- 4.11 The site is considered to be of importance at a regional level (Wray et al., 2010) for barbastelle due to the rarity of this species, the presence of an individual caught during surveys, and the complex network/mosaic of habitats on site.

Bechstein's bat

- 4.12 Three Bechstein's bats were radio-tracked during surveys, two juveniles and one young adult.
- 4.13 A total of six roosts were identified for Bechstein's bats, with a peak count of one bat recorded during emergence surveys of accessible roosts.
- 4.14 A juvenile Bechstein's bat was radio-tracked in the post-maternity session (Bat 2) when the bat would likely still be roosting within a maternity colony. However, no roosts were identified for this bat, indicating that the maternity roost is unlikely to be on site.
- 4.15 Although flightlines for radio-tracked Bechstein's bats were not identified on site, Bat 2 was recorded foraging within the woodland in the south of the site, close to where the bat was caught. Although the site is not being used for roosting by this species, the woodlands were used as a foraging resource, indicating the importance of the area for this type of activity.
- 4.16 The site is considered to be of importance at a regional level (Wray et al., 2010) for Bechstein's bats due to the rarity of this species, the presence of bats captured during surveys, a small number of roosts/potential roosts nearby and a complex network/mosaic of suitable habitats on site.

RECOMMENDATIONS

- 4.17 It is recommended that the results of the trapping and radio-tracking surveys undertaken at the Ansty site are used, in conjunction with the other bat surveys undertaken on site (The Ecology Co-Op, 2023), to determine impacts to site and inform any necessary mitigation/compensation. Any mitigation should take the presence of Bechstein's bat, barbastelle and Alcaethoe into account to ensure complex woodlands, including all Ancient Semi-Natural Woodland and riparian habitats are retained and protected. The impacts of lighting on bats should be considered and kept to a minimum with reference to best practice e.g. Institution of Lighting Professionals (2018), with details included within the masterplan design.

References

BCT (2016) *Core Sustenance Zones and habitats of importance for designing Biodiversity Net Gain for bats*. Bat Conservation Trust, London.
<https://www.bats.org.uk/resources/guidance-for-professionals/bat-species-core-sustenance-zonesand-habitats-for-biodiversity-net-gain> accessed: 08.09.2022

British Standards Institution (BSI) (2013). *Biodiversity. Code of practice for planning and development: 42020*. BSI, London.

CIEEM (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal. Version 1.1*. Chartered Institute of Ecology and Environmental Management, Winchester

Collins. (2016) *Bat Surveys - Good Practice Guidelines* 3rd Edition. Bat Conservation Trust, London.

The Ecology Co-op (2023) Ecological Impact Assessment: Ansty, Haywards Heath

Hutson, A.M. and Paunovic, M. (2016) *Myotis alcathoe*. The IUCN Red List of Threatened Species 2016 <https://www.iucnredlist.org/species/136680/518740> last accessed 07 November 2019

Institution of Lighting Professionals (2018) *Bats and Artificial Lighting in the UK*. Guidance Note 08/18. Institution of Lighting Professionals and Bat Conservation Trust
<https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting>

IUCN SSC Bat Specialist Group (BSG) (2021) *Recommended Strategy for Researchers to Reduce the Risk of Transmission of SARS-CoV-2 from Humans to Bats AMP: Assess, Modify, Protect version 2.0*. Available as a live document online at <https://www.iucnbsg.org/bsg-publications.html> last accessed 11th October 2022.

Mathews F, and Harrower C. (2020). IUCN – compliant Red List for Britain’s Terrestrial Mammals. Assessment by the Mammal Society under contract to Natural England, Natural Resources Wales and Scottish Natural Heritage. Natural England, Peterborough ISBN 978-1-78354-485-1.

Matthews, F., Kubasiewicz, L.M., Gurnell, J., Harrower, C.A., McDonald, R.A., Shore, R.F. (2018) A Review of the Population and Conservation Status of British Mammals. A report by the Mammal Society under contract to Natural England, Natural Resources Wales and Scottish Natural Heritage. Natural England, Peterborough. ISBN 978-1-78354-494-3.

Ministry of Housing, Communities and Local Government (2019). National Planning Policy Framework. DCLG. London.

Sussex Bat Group (2019) Bats In Sussex <http://www.sussexbatgroup.org.uk/batsinsussex>
last accessed 8 January 2021

Wray, S., Wells., Long, E., Mitchell-Jones, T. (2010) Valuing Bats in Ecological Impact Assessment. In Practice December 2010: pp. 23-25.

Appendix 1: Survey Maps

Figure 1: Site Boundary Map

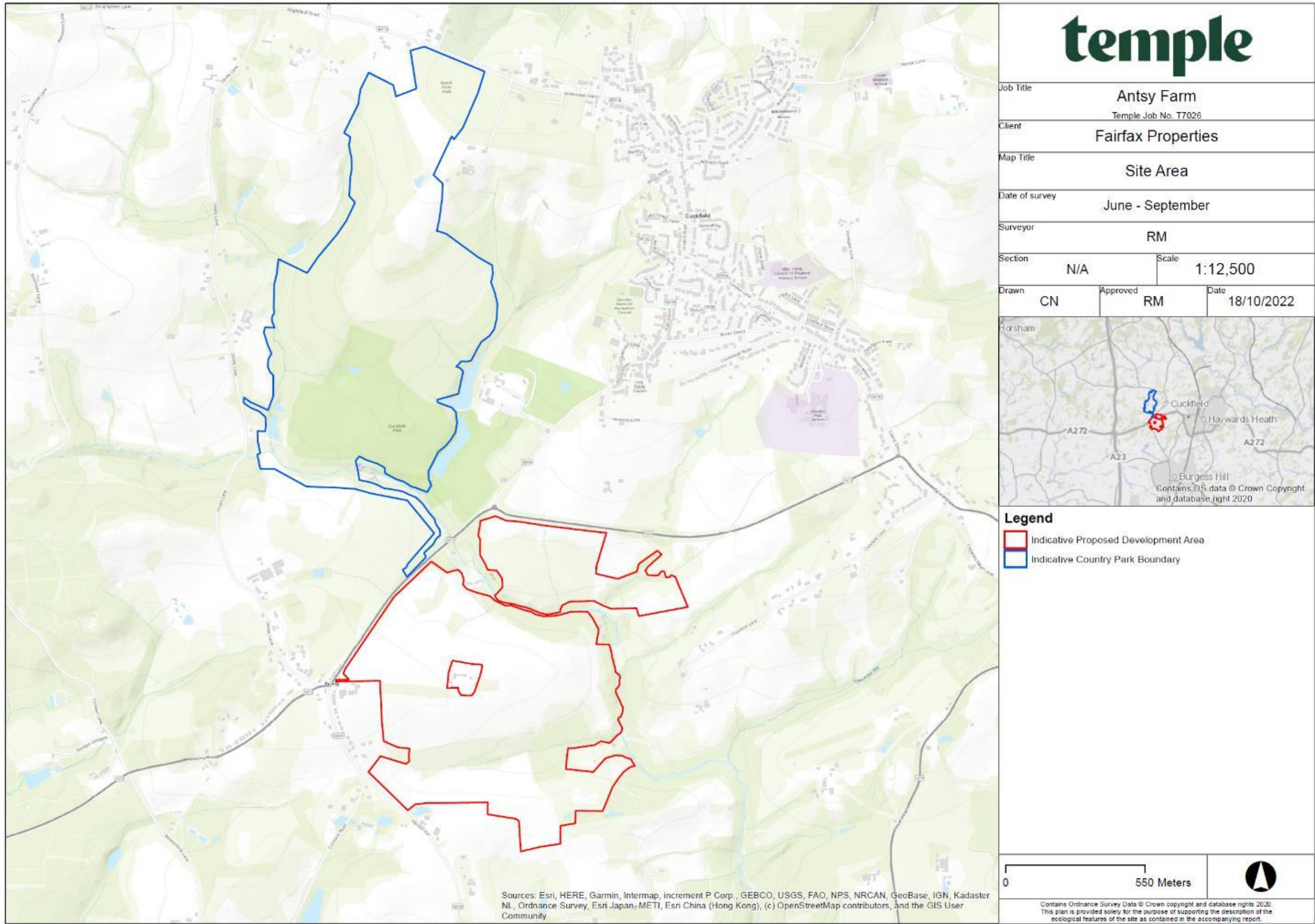


Figure 2: Trapping Locations

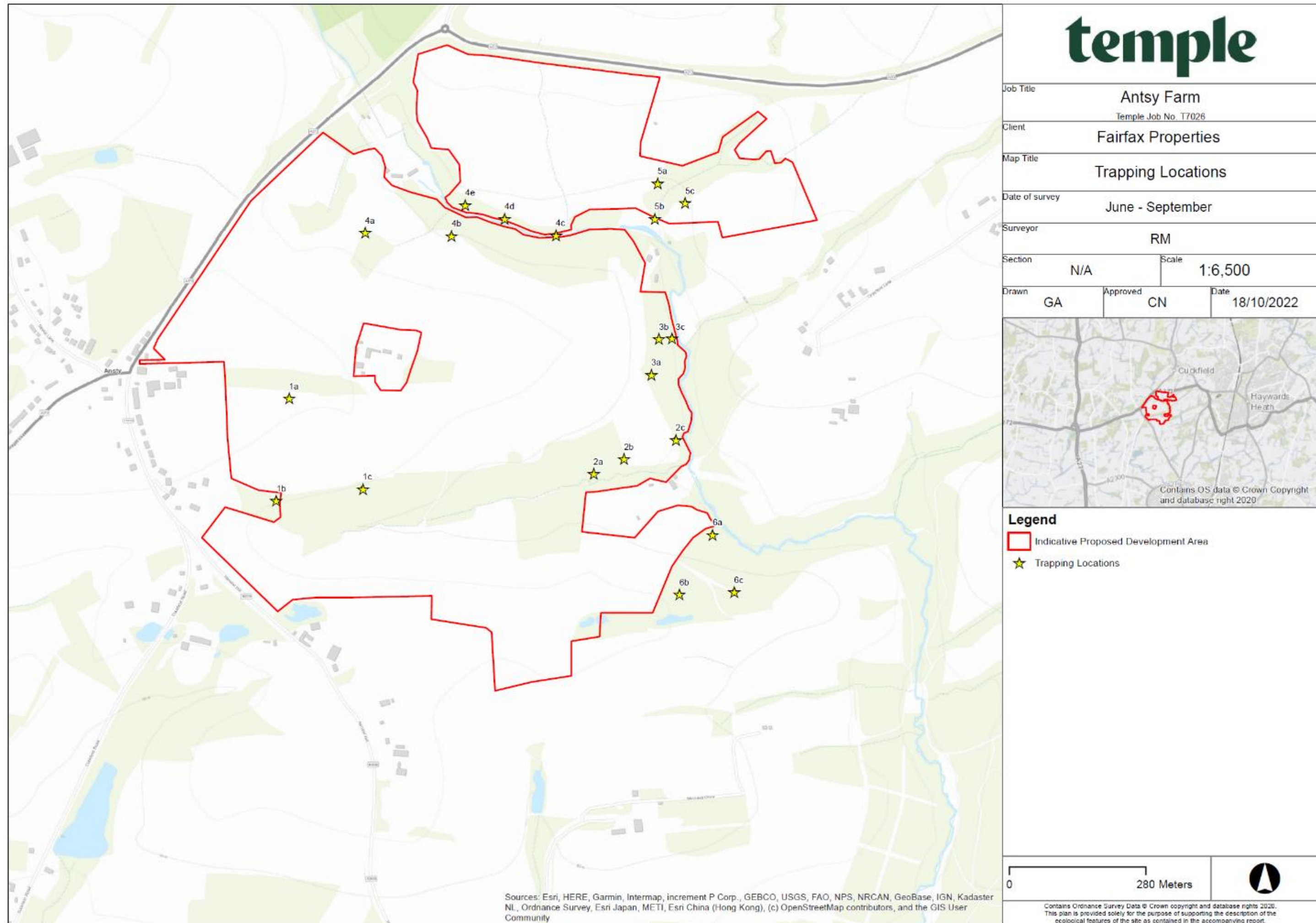
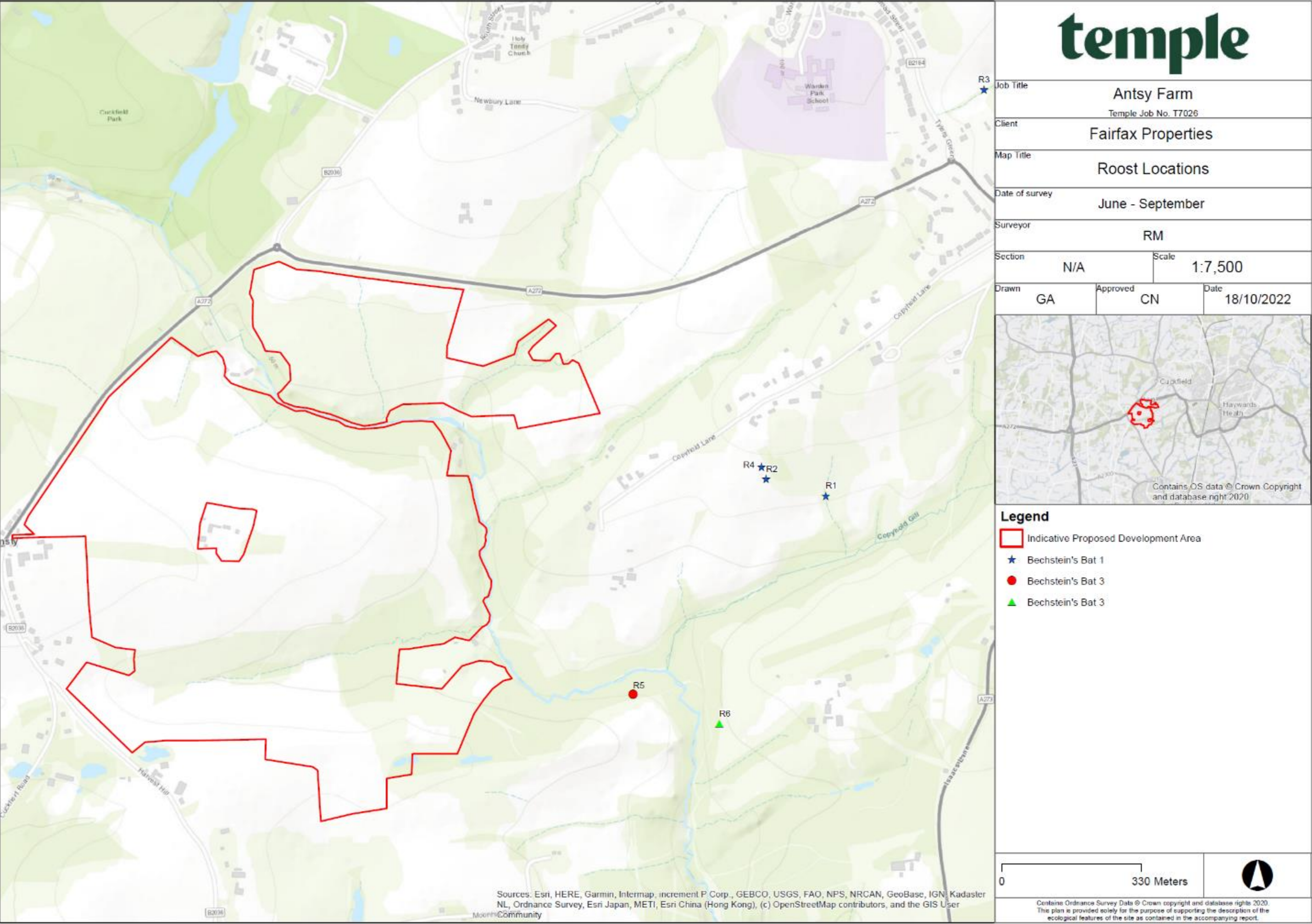


Figure 3: Roost Locations



Appendix 2: Survey data

Trapping mastersheet

Date	Bat No.	Time (24hr)	Trap	Species	M/F	Juv/ Imm/ Ad	Testes size 0-2	Par / NP / Preg / Lact	Forearm (mm)	Bat weight (g)	ID features, damage, parasites photos and samples collected
08/06/2022	1	22:15	5c	P.pip	F	Ad		Preg			Released at trap
08/06/2022	2	22:15	5c	P.aur	M	Ad	1				Released at trap
08/06/2022	3	22:45	5c	P.pyg	M	Ad	1				Released at trap
08/06/2022	4	00:15	5a	M.nat	M	Ad	1				Released at trap
08/06/2022	5	00:15	5a	M.nat	F	Ad		NP			Released at trap
08/06/2022	6	00:30	5d	M.alc	M	Ad	1		32.8	4.7	No droppings
08/06/2022	7	00:45	5a	P.pip	M	Ad	1				Released at trap
08/06/2022	8	00:45	5c	P.pyg	F	Ad		NP			Released at trap
07/06/2022	9	22:30	6c	P.aur	M	Ad	1				Released at trap
07/06/2022	10	01:00	6c	P.aur	F	Ad		Par			Released at trap
07/06/2022	11	21:30	2b	P.pip							Escaped from trap
07/06/2022	12	22:35	2a	M.alc	F	Ad		Preg	32	4.73	Short tragus, pale at base
07/06/2022	13	23:30	2b	P.pyg	M	Ad	2				Released at trap
07/06/2022	14	23:30	2b	P.aur	M	Ad	1				Released at trap
07/06/2022	15	00:30	2b	M.dau	F	Ad		NP			Released at trap
07/06/2022	16	01:45	2a	M.bec	M	Ad					Bat escaped from bag
07/06/2022	17	02:05	2b	M.mys	F	Ad		Preg			Advanced pregnancy, released
06/06/2022	18	23:00	1a	P.pyg	M	Ad	1				Released at trap
06/06/2022	19	23:15	1a	P.pyg	M	Ad	1				Released at trap
06/06/2022	20	23:45	1a	P.pyg	F	Ad		NP			Released at trap

Date	Bat No.	Time (24hr)	Trap	Species	M/F	Juv/ Imm/ Ad	Testes size 0-2	Par / NP / Preg / Lact	Forearm (mm)	Bat weight (g)	ID features, damage, parasites photos and samples collected
06/06/2022	21	01:45	1a	P.pyg	F	Ad		NP			Released at trap
06/06/2022	22	02:30	1b	M.mys	M	Ad	1				Released at trap.
06/06/2022	23	02:45	1c	M.mys	M	Ad	1				Released at trap
06/06/2022	24	02:45	1c	P.pip	M	Ad	1				Released at trap
06/06/2022	25	00:00	3a	M.bec	M	Imm			40.05	8	Bat #1 tagged, frequency 173.0425, ring J3719
06/06/2022	26	01:30	3a	P.pip							Released at trap
06/06/2022	27	02:35	3a	M.mys	M	Ad			36.3		Measurements taken to confirm species including hand lens check of teeth, penis morphology, tragus length above notch, colour at base of tragus, nostril shape, and colour of face
08/06/2022	28	22:15	2a	P.pip	F	Ad		NP			Released at trap
08/06/2022	29	23:20	2a	P.pip	M	Ad					Released at trap
08/06/2022	30	23:20	2b	P.pip	F	Ad		NP			Released at trap
01/08/2022	31	21:25	1a	P.pip	M						Released at trap

Date	Bat No.	Time (24hr)	Trap	Species	M/F	Juv/ Imm/ Ad	Testes size 0-2	Par / NP / Preg / Lact	Forearm (mm)	Bat weight (g)	ID features, damage, parasites photos and samples collected
01/08/2022	32	01:40	1b	M.mys	M				33		Released at trap. Measurements taken to confirm species including hand lens check of teeth, penis morphology, tragus length above notch, colour at base of tragus, nostril shape, and colour of face
01/08/2022	33	01:40	1b	M.bec	M	Juv	0		42.6	9	Bat #2 tagged, frequency 173.1021, ring number J3722 (left wing)
01/08/2022	34	02:10	1c	P.pip	F	Juv		NP			Released at trap
01/08/2022	35	21:45	3b	P.aur	M	Ad	0				Released at trap
01/08/2022	36	21:45	3b	M.nat	F	Ad		NP		6.58	Mites and wing holes
01/08/2022	37	22:35	3e	M.mys	M	Juv	1		34	4.72	5th finger >42mm, dark face and tragus
02/08/2022	38	20:55	6c	P.pyg	F	Ad		NP			Released at trap
02/08/2022	39	21:55	6b	P.aur	F	Ad		NP			Released at trap
02/08/2022	40	22:35	6c	P.pyg	M	Juv	0				Released at trap
02/08/2022	41	23:30	6c	M.alc	M	Ad			32.2	5	Dark face and tragus / sample taken and

Date	Bat No.	Time (24hr)	Trap	Species	M/F	Juv/ Imm/ Ad	Testes size 0-2	Par / NP / Preg / Lact	Forearm (mm)	Bat weight (g)	ID features, damage, parasites photos and samples collected
											confirmed as Alcaho
02/08/2022	42	01:30	6b	P.aur	F	Ad		Par			Released at trap
02/08/2022	43	02:00	6a	M.alc	F	Ad		Par	32.1	4.5	Dark face and tragus / not post lact this year / tragus below notch
02/08/2022	44	09:36	2b	M.bra	M	Ad	0		33		ID'd using penis shape and tragus
03/08/2022	45	21:10	5b	M.nat	M	Ad	1		37.4	6.5	Released at trap
03/08/2022	46	23:00	5d	P.pip	M	Ad	1				Released at trap
03/08/2022	47	03:05	5d	M.nat	F	Juv		NP			Released at trap
03/08/2022	48	02:40	5b	P.pip	M	Juv					Released at trap
03/08/2022	49	23:30	4c	M.mys/alc	M	Juv			32.5	4	Impossible to differentiate this individual on biometrics alone and no droppings were obtained. Bat released to limit exposure as per IUCN guidelines.
03/08/2022	50	23:30	4c	M.mys/alc	M	Juv			32.6	4.2	Impossible to differentiate this individual on

Date	Bat No.	Time (24hr)	Trap	Species	M/F	Juv/ Imm/ Ad	Testes size 0-2	Par / NP / Preg / Lact	Forearm (mm)	Bat weight (g)	ID features, damage, parasites photos and samples collected
											biometrics alone and no droppings were obtained. Bat released to limit exposure as per IUCN guidelines.
22/09/2022	51	20:10	1c	P.aur	M	Ad					Released at trap
22/09/2022	52	22:45	1c	P.aur	M	Ad					Released at trap
22/09/2022	53	19:50	3c	P.aur	F	Juv		NP			
22/09/2022	54	20:35	3b	M.nat	F	Ad		NP			
22/09/2022	55	20:40	3c	P.pyg	M	Ad	1				
22/09/2022	56	20:45	3a	M.nat	M	Ad	1		39.6		
22/09/2022	57	22:55	3c	M.mys	M	Ad	1		34.9	5.15	Straight penis, forearm outside Alcatraz range
22/09/2022	58	23:00	3a	M.mys	F	Ad		Post lactating	34.1	4.39	Sample taken but no protocone visible, confirmed as whiskered bat from DNA analysis.
23/09/2022	59	20:45	6b	M.nat	M	Ad	1			6	
23/09/2022	60	20:45	6b	M.nat	F	Juv		NP	37.1	7.5	
23/09/2022	61	22:15	6a	M.bec	M	Juv	0		36.8	8	Bat #3 frequency 173.2420, ring number J3723

Date	Bat No.	Time (24hr)	Trap	Species	M/F	Juv/ Imm/ Ad	Testes size 0-2	Par / NP / Preg / Lact	Forearm (mm)	Bat weight (g)	ID features, damage, parasites photos and samples collected
24/09/2022	62	21:15	4d	P.aur	F	Ad		Parous			
24/09/2022	63	20:00	5a	M.nat	F	Imm		NP	39.7	7	Mite on wing
24/09/2022	64	20:00	5a	B.bar	M	Juv	0		39.2	8	Bat #4 frequency 173.1605, ring number J3747
24/09/2022	65	20:35	5b	P.pip	M	Ad	1				
24/09/2022	66	21:00	5b	M.mys	F	Ad		Post lactating	33.5	4	Measurements taken to confirm species incl. hand lens check of teeth, tragus length above notch, colour at base of tragus, nostril shape, and colour of face
24/09/2022	67	21:05	5a	M.mys	F	Ad		NP	32.8	5	Measurements taken to confirm species incl. hand lens check of teeth, tragus length above notch, colour at base of tragus, nostril shape, and colour of face



9 September 22

Re: Identification Results for Milla Timms, The Temple Group

Job number 18785, received 30 August 2022

Sample labelled: POP002707 Ansty Aug Rm

PCR amplification successful. DNA sequence:

ATGACCAACATTGAAAAATCCCACCCTTTAATAAAAATCATTAACTCATTATTGA
C

Phylogenetic analysis identification: *Myotis alcathoe*

Confirmed by maximum likelihood, maximum parsimony, bootstrap 100%.

Best regards,

Professor Robin Allaby

The results and conclusions in this report are based on an investigation of mtDNA sequence analysis. The results obtained have been reported with accuracy. The interpretation represents the most probable conclusion for the DNA sequence obtained rather than the sample provided given current levels of species data. It should be borne in mind that different circumstances might produce different results. Therefore, care must be taken with interpretation of the results especially if they are used as the basis for commercial recommendations.

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18 October 22

Re: Identification Results for Milla Timms, The Temple Group

Job number 19042, received 06 October 2022

Sample labelled: Ansty T7026

PCR amplification successful. DNA sequence:

ATGACCAACATTTCGAAATCCCACCCCTTAGTAAAAATTATTAATAGCTCATTTATCGAC
CTTCCTGCCCCATCAAATATCTCATCTTGATGAAATTT

Phylogenetic analysis identification: *Myotis mystacinus*

Confirmed by maximum likelihood, maximum parsimony, bootstrap 100%.

Best regards,

Professor Robin Allaby

The results and conclusions in this report are based on an investigation of mtDNA sequence analysis. The results obtained have been reported with accuracy. The interpretation represents the most probable conclusion for the DNA sequence obtained rather than the sample provided given current levels of species data. It should be borne in mind that different circumstances might produce different results. Therefore, care must be taken with interpretation of the results especially if they are used as the basis for commercial recommendations.

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Appendix 3: Legislation

Important Notice: This section contains details of legislation applicable in England and Wales only (i.e. not including Scotland, the Isle of Man, Northern Ireland, the Republic of Ireland or the Channel Islands) and is provided for general guidance only. While every effort has been made to represent the current (at the time of writing) situation with respect to the UK's position outside of the EU and to ensure accuracy throughout, this section should not be relied upon as a definitive statement of the law.

Over the past few years, three important bills have been published which are intended to shape how growing pressures on the environment post-Brexit (post-transition period) are tackled. Both the Agriculture Bill and Fisheries Bill gained Royal Assent in November 2020 and are now the Agriculture Act 2020 and Fisheries Act 2020 respectively; and, more recently, the Environment Bill was passed into law in November 2021, becoming the Environment Act 2021. *N.B. as environment policy is a devolved matter, most of this Act applies to England only.*

A LEGISLATION AFFORDED TO SPECIES

The objective of the EC Habitats Directive² is to conserve the various species of plant and animal which are considered rare across Europe. The Directive is transposed into UK law by **The Conservation of Habitats and Species Regulations 2017 (as amended)** and **The 'Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended)**.

Various amendments to the 2017 Regulations in England and Wales have been made through the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. These changes came into effect on the 1 January 2021 following the UK's departure from the EU and the end of the Transition Period. The changes are largely limited to 'operability changes' that will ensure the Regulations can continue to have the same working effect as before.

² Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora

The Wildlife and Countryside Act 1981 (as amended) is a key piece of national legislation which implements the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and implements the species protection obligations of Council Directive 2009/147/EC (formerly 79/409/EEC) on the Conservation of Wild Birds (EC Birds Directive) in Great Britain.

Since the passing of the Wildlife & Countryside Act 1981, various amendments have been made, details of which can be found on www.opsi.gov.uk. Key amendments have been made through the Countryside and Rights of Way (CRoW) Act (2000).

As well as delivering long-term targets to reduce waste and improve resource efficiency and improve air and water quality targets, the **Environment Act 2021** aims to halt the decline of nature by 2030, mandates Biodiversity Net Gain for developments in England and amends the Wildlife and Countryside Act 1981 (as amended) to introduce an additional purpose for granting a protected species licence in relation to development which is ‘for reasons of overriding public interest’. The Act also introduces the Office for Environmental Protection (OEP), which will be a new public body intended to hold government and public authorities to account, although the government will be able to issue guidance to the OEP on how it enforces policies and legislation.

Some of the key biodiversity elements in the Act that will have a bearing on species protection in the UK include:

- A strengthened biodiversity duty on Local Planning Authorities;
- Biodiversity net gain to ensure developments, including Nationally Significant Infrastructure Projects (NSIP), deliver at least 10% increase in biodiversity;
- Local Nature Recovery Strategies to support a Nature Recovery Network;
- Duty upon Local Authorities to consult on street tree felling;
- Strengthen woodland protection enforcement measures;
- Conservation Covenants;
- Protected Site Strategies and Species Conservation Strategies to support the design and delivery of strategic approaches to deliver better outcomes for nature;

- Introduces the power for the Habitats Regulations to be amended or ‘refocused’ to ‘to deliver creative public policy thinking that delivers results’.

This section does not provide further detail on the Environment Act 2021 as, at the time of writing (November 2021), the Act, in its final form, has not been published and it remains to be seen how and when the various elements will be enacted at a national and local level.

Other legislative Acts affording protection to wildlife and their habitats include:

- Salmon and Freshwater Fisheries Act 1975;
- Deer Act 1991;
- Protection of Badgers Act 1992;
- Wild Mammals (Protection) Act 1996;
- Countryside and Rights of Way (CROW) Act 2000;
- Natural Environment & Rural Communities (NERC) Act 2006;
- The Eels (England and Wales) Regulations 2009; and
- Environment (Wales) Act 2016.

Species and species groups that are protected or otherwise regulated under the aforementioned legislation, and that are most likely to be affected by development activities, include herpetofauna (amphibians and reptiles), badger, bats, birds, dormouse, invasive species, otter, plants, red squirrel, water vole and white clawed crayfish.

Explanatory notes relating to species protected under The Conservation of Habitats and Species Regulations 2017 (as amended), which includes smooth snake, sand lizard, great crested newt, natterjack toad, all bat species, otter, dormouse and some plant, invertebrate and fish species, are given below. **These should be read in conjunction with the relevant species sections that follow.**

- In the Habitats Directive, the term ‘deliberate’ is interpreted as being somewhat wider than intentional and may be thought of as including an element of recklessness.
- The Conservation of Habitats and Species Regulations 2017 (as amended) does not define the act of ‘migration’ and therefore, as a precaution, it is recommended that

short distance movement of animals for e.g. foraging, breeding or dispersal purposes are also considered where relevant.

- In order to obtain a mitigation licence for species protected under the Conservation of Habitats and Species Regulations 2017 (as amended), the application must demonstrate that it meets all of the following three 'tests': i) the action(s) are necessary for the purpose of preserving public health or safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequence of primary importance for the environment; ii) that there is no satisfactory alternative and iii) that the action authorised will not be detrimental to the maintenance of the species concerned at a favorable conservation status in their natural range.

BATS

All species of bat are fully protected under The Conservation of Habitats and Species Regulations 2017 (as amended) through their inclusion on Schedule 2. Regulation 41 prohibits:

- Deliberate killing, injuring or capturing of Schedule 2 species (e.g. all bats);
- Deliberate disturbance of bat species as:
 - a) to impair their ability:
 - to survive, breed, or reproduce, or to rear or nurture young; or
 - to hibernate or migrate.
 - b) to affect significantly the local distribution or abundance of the species.
- Damage or destruction of a breeding site or resting place; and
- Keeping, transporting, selling, exchanging or offering for sale whether live or dead or of any part thereof.

Bats are also protected under the Wildlife and Countryside Act 1981 (as amended) in respect to sub-sections 9 (4) (b) and (c) and 9 (5) through their inclusion on Schedule 5. Under this Act, they are additionally protected from:

- Intentional or reckless disturbance while in their place of shelter (at any level)
- Intentional or reckless obstruction of access to any place of shelter or protection

- Selling, offering or exposing for sale, possession or transporting for purpose of sale.

How is the legislation pertaining to bats liable to affect development works?

The appropriate licence issued by the relevant countryside agency (e.g. Natural England, Natural Resources Wales) will be required for works liable to affect a bat roost or for operations likely to result in a level of disturbance which might impair their ability to undertake those activities mentioned above (e.g. survive, breed, rear young and hibernate). The licence is to derogate from the relevant legislation but also to enable appropriate mitigation measures to be put in place and their efficacy to be monitored.

Though there is no case law to date, the legislation may also be interpreted such that, in certain circumstances, important foraging areas and/or commuting routes can be regarded as being afforded protection, for example, where it can be proven that the continued usage of such areas is crucial to maintaining the integrity and long-term viability of a bat roost³.

³ Garland and Markham (2008) Is important bat foraging and commuting habitat legally protected? Mammal News, No. **150**. The Mammal Society, Southampton.

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Appendix G3: Beechy Bottom Parkland Reserve EcIA

Ecological Impact Assessment (EcIA)				
Beechy Bottom Parkland Reserve Ansty Mid-Sussex RH17 6JB				
Planning Reference:		Report Reference:	220918 rev01	
Client:	Fairfax Acquisitions Ltd.			
Architect/Agent:	N/A			
Survey Date/s:	2022: February, April & October 2023: April – October			
Report Date:	October 2023	OS Grid Ref:	TQ 292 246	
Report Author:	Dominic Sheldon BSc PGCert ACIEEM TechArbor A			
Approved By:	Andrew Charles BSc (Hons), MSc, MCIEEM			
Surveyor & Licence N°:	Dominic Sheldon	Dormouse: 2015-18348-CLS (WML-CL10a) Bats: 2016-20473-CLS-CLS (WML-A34) Badger: 067 (CL35) & (Scottish Class License) Ecologist All Operations - Licence 182943		
	Andrew Charles	Bats: 2015-13738-CLS-CLS (Level 2) Dormouse: 2016-21680-CLS-CLS Great Crested Newt: 2016-20368-CLS-CLS		
Additional surveyor/s:	Aby Sampson, Paul Lott, Lee Knight, Erin Reardon			

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DISCLAIMER

It should be noted that this report is context-specific. If any changes are made to the brief and/or the development proposal Ecologic Consultant Ecologists LLP must be informed, as amendments may be required. The information provided in this report must be reviewed and updated in the time following twelve months from the date of survey. This report (including any enclosures and attachments) has been prepared for the exclusive use and benefit of the addressee(s) and solely for the purpose for which it is provided. Unless we provide express prior written consent, no part of this report should be reproduced, distributed or communicated to any third party. Ecologic Consultant Ecologists LLP do not accept any liability if this report is used for an alternative purpose from which it is intended, nor to any third party in respect of this report.

1.1 Introduction

It is proposed to develop the existing site (currently known as Cuckfield Park) site into 'Beechy Bottom Parkland Reserve', a site with enhanced public access and associated infrastructure together with large areas set aside for a non-deterministic approach to habitat and species restoration as a goal, which the author has termed "constrained rewilding" (non-equilibrium ecology and conservation – see Section 5.1).

The site comprised of bracken g1c, other neutral grassland g3c, *Lolium-Cynosurus* neutral grassland g3c6, modified grassland g4 (also designated as wood-pasture and parkland w(26)), lowland mixed deciduous woodland w1f (also designated and Semi-natural Ancient Woodland SNAW), other broadleaved woodland w1g, dense scrub h3, ponds r1, developed land, sealed surface u1b, artificial unvegetated unsealed surface u1c and other rivers and streams r2b. Linear habitats also recorded included native hedgerow h2a6 and species-rich native hedgerow with trees h2a5 (1) (see Figure 1). The site was approximately 109.53 ha.

1.2 Study Purpose

An Ecological Impact Assessment (EcIA), including a Preliminary Ecological Appraisal (PEA) comprising a UKHabs survey, as well as a suite of baseline ecological receptor and protected species surveys, were undertaken to assess the perceived ecological impacts associated with this proposal, including any perceived impacts to: legally protected species or species of conservation concern; legally protected habitats or habitat of conservation concern; any statutory or non-statutory sites of conservation interest; and opportunities to provide biodiversity enhancement(s).

1.3 Site Ecology

The site has potential for/supports:

- Amphibians – the scrub, woodland, ponds and hedgerow bases provide suitable terrestrial and aquatic breeding habitat for common & widespread amphibian species with moderate numbers of toad *Bufo bufo*, smooth newt *Lissotriton vulgaris* as well as great crested newt *Triturus cristatus*, which were all recorded as present on site;
- Badger *Meles meles* – the site supports a number of setts (including a main sett) utilised by a badger social group as well as foraging and dispersal;

- Bats:
 - Foraging & dispersal: the site supports moderate levels of foraging and dispersal activity for a high diversity of bat species;
 - Roosting: eight trees on the site included potential bat roosting features (PRF).
- Birds – the site supports a wide range of bird species which have been recorded as breeding on site, with habitats providing nesting and foraging opportunities for a wide range of woodland and open habitat bird species;
- Dormouse – the scrub, woodland and hedgerow provide habitat for dormouse;
- Hedgehog *Erinaceus europaeus* – the site is likely to provide foraging and dispersal habitat for hedgehog;
- Reptiles – the site supports a ‘good’ breeding population of slow worm *Anguis fragilis* and a ‘good’ breeding population of grass snake *Natrix helvetica*;
- Invertebrates – the site supports a range of aquatic invertebrate species and also provides habitat for common and widespread terrestrial invertebrate species; and,
- Non-native botanical species – a series of non-native invasive plants such as *Rhododendron ponticum* and least duckweed *Lemna minuta* both listed on Schedule 9 of the Wildlife & Countryside Act 1981 and the invasive non-native winter heliotrope, are present on site.

1.4 Key Impacts

Proposed plans indicate that the site will include the retention of the formal sports pitches, dedicated areas for dog walking, enhanced public access (with associated infrastructure), including a series of new woodland rides and glades, a cycle trail, the construction of an observation tower allowing views towards the South Downs, public parking provision and a large area of the site set aside for a non-deterministic approach to habitat and species restoration termed “constrained rewilding”.

Accordingly, ecological impacts are considered as follows:

- The removal of areas of modified grassland (g4) within the site to make way for a series of pedestrian and cycle paths;
- The construction of a series of rides and glades within the other broadleaved woodland w1g, located on the western part of the site; and,
- The construction of a viewing platform within an area of wood pasture and parkland.

1.5 Mitigation & Compensation Measures

Key mitigation measures are to include:

- Precautions required to allow removal of modified grassland (g4), other broadleaved woodland w1g and hedgerow vegetation, to be informed by a Construction Ecological Management Plan (CEMP), including:
 - Reptiles: A reptile habitat manipulation program will be required prior to path construction works, encouraging reptile species (& amphibians) into “constrained rewilding” area;
 - Birds: avoidance of tree and hedgerow management or removal during the bird nesting season, or following nesting bird check/s;
 - Protection of retained boundary hedgebanks, habitats and trees, including mature, veteran & ancient parkland trees; and,
- Removal of the Schedule 9 species *Rhododendron ponticum* from the woodland, and the least duckweed *Lemna minuta* from Ponds 1 & 4. The invasive non-native winter heliotrope *Petasites fragrans*, recorded in the south-west corner of the site should also be removed from site by experienced professionals.

Compensation measures, should include:

- Habitat creation: following the Habitat & Ecological Restoration Management Plan (Tadorna Consulting, 2023) to include the creation of 60 parkland trees, woody scrub, pond restoration as well as the introduction of cattle and pigs as stock to help manage the park;
- Installation of six tree mounted bat boxes/towers (capable of maternity and hibernation roosting) as well as 20 bird boxes onto suitable trees within the site (Appendices 6 & 7);
- Creation of three reptile hibernacula, consisting of logs, brash and/or turf 2 m², within relatively undisturbed south-facing/non-shaded areas of the site (Appendix 8);
- Veteranisation of a proportion of the semi-mature poplar trees located within the other broadleaved woodland w1g, located on the western part of the site;
- The planting of 60 parkland trees within the wood-pasture and parkland located on site;
- The introduction of low numbers of pigs *Sus domestica* and rare breed cattle *Bos taurus* to the site, allowing access to grassland and woodland habitats;
- The electro-fishing of the existing carp ponds on site, creating two ponds to be retained for their wildlife interest;

- The removal of carp from these two ponds will result in a reduction in water pollution in terms of sediment loading and nitrates into the River Adur, located to the south of the site;
- The management of habitat for reptiles, amphibians (including great crested and smooth newt), birds, mammals (including dormouse, bat species and hedgehog) and invertebrate species
- Future management of retained and created habitats on and/or off-site, to be informed by the Habitat & Ecological Restoration Management Plan (Tadorna Consulting, 2023)

1.6 Conclusions

Without mitigation, the proposed development represents a minor negative ecological impact, through removal of a limited extent of habitat for amphibians, badger, bats, birds, hedgehog, and reptiles.

Compliance with 20% Biodiversity Net Gain in relation to separate development and implementation of ecology mitigation, compensation and enhancement measures, and the Habitat & Ecological Restoration Management Plan (Tadorna Consulting, 2023) is considered to represent a major gain for biodiversity overall.

Local Planning Authority Check List & Biodiversity Budget

Habitat, Species & Feature	Impact	Specific further survey:		Precautionary recommendations, avoidance, mitigation, compensation &/or enhancement	Biodiversity Budget: + or –
		Required	Complete		
Habitats	Removal of: Modified grassland and very small sections of hedgerow	No	N/A	It will be required to formulate a landscape strategy including sufficient habitat creation/enhancement to provide a measurable 20% net gain within the Biodiversity Metric 3.1. Development scheme to include restoration/habitat creation of wildlife habitats, including hedgerow, species-diverse grassland, scrub development and ponds. Retained, enhanced & created habitats, to be informed by Habitat & Ecological Restoration Management Plan The retained trees are to be protected with tree protective measures during construction Future management of retained and created habitats to be informed by the Habitat & Ecological Restoration Management Plan	Positive
Amphibians	Removal of a proportion of the modified grassland habitat Potential for injury or death of amphibians during clearance of modified grassland	Yes	Yes	Habitat creation and habitat restoration strategy to provide opportunities for amphibians Habitat pile/s to be created in relatively undisturbed locations within the site (in combination with reptiles) Pond restoration to take place on Ponds 1 & 4 as well as the carp ponds Retained, enhanced & created habitats, to be informed by Habitat & Ecological Restoration Management Plan	Positive
Bats	Foraging & Dispersal: Development will not remove habitat for foraging bat species	No	Yes	Development scheme to include restoration/habitat creation of wildlife habitats, including hedgerow, species-diverse grassland, scrub development and ponds, which provide greatly increased foraging opportunities within the site. Retained, enhanced & created habitats, to be informed by Habitat & Ecological Restoration Management Plan	Positive
	Roosting: Eight trees with potential bat roosting features (PRF) were identified on site. Many more trees with roosting features considered likely.	No	N/A	It is understood that trees with PRF's are to be retained. Six tree mounted bat boxes/towers with maternity and hibernation potential to be installed. A number of bat roosts to be created within veteranized trees located on site.	Positive

Habitat, Species & Feature	Impact	Specific further survey:		Precautionary recommendations, avoidance, mitigation, compensation &/or enhancement	Biodiversity Budget: + or –
		Required	Complete		
Badgers	Development works will remove extremely limited foraging and dispersal habitat for badger. Potential issue with location of a single hole outlier sett located in proximity to the proposed footpath located on site.	No	N/A	Retained, enhanced & created habitats, to be informed by Habitat & Ecological Restoration Management Plan Development scheme to include restoration/habitat creation of wildlife habitats, including hedgerow, species-diverse grassland, scrub development and ponds, which provide greatly increased foraging opportunities within the site. Avoidance of single-hole outlier sett recommended. If this cannot be achieved, the closure of this sett under licence is recommended.	Positive
Birds	Development will remove extremely limited general nesting & foraging habitat for birds species.	No	Yes	Retained, enhanced & created habitats, to be informed by Habitat & Ecological Restoration Management Plan Development scheme to include restoration/habitat creation of wildlife habitats, including hedgerow, species-diverse grassland, scrub development and ponds, which provide greatly increased foraging and nesting opportunities within the site. A large number of species specific bird nesting provisions to be created within veteranized trees located on site. 20 tree mounted open fronted bird boxes to be installed on suitable trees within the SNAW woodland located on site.	Positive
Hedgehog	Removal of foraging limited area habitat. Fragmentation of habitat.	No	N/A	Retained, enhanced & created habitats, to be informed by Habitat & Ecological Restoration Management Plan Any excavations or pipework, which are to remain open overnight, should be fenced or covered to prevent potential access by wildlife species Development scheme to include restoration/habitat creation of wildlife habitats, including hedgerow, species-diverse grassland, scrub development and ponds, which provide greatly increased foraging, nesting and hibernation opportunities within the site.	Positive

Habitat, Species & Feature	Impact	Specific further survey:		Precautionary recommendations, avoidance, mitigation, compensation &/or enhancement	Biodiversity Budget: + or –
		Required	Complete		
Invertebrates	Very limited loss of foraging resources and shelter through habitat removal. Temporary disturbance of Ponds 1 & 4 through dredging and re-profiling.	No	Yes	Retained, enhanced & created habitats, to be informed by Habitat & Ecological Restoration Management Plan Development scheme to include restoration/habitat creation of wildlife habitats, including hedgerow, species-diverse grassland, scrub development and ponds, which provide greatly increased habitat opportunities within the site. Habitat pile/s to be created in relatively undisturbed locations within the site (in combination with reptiles)	Positive
Reptiles	Removal of a proportion of the modified grassland habitat located in close proximity to reptile species recorded on site Potential for injury or death of amphibians during clearance of modified grassland	Yes	Yes	The site supports a 'good' population of slow worm and barred grass snake, which will require habitat manipulation in order to encourage reptile species away from the working areas. Development scheme to include restoration/habitat creation of wildlife habitats, including hedgerow, species-diverse grassland, scrub development and ponds, which provide greatly increased foraging, basking and hibernation opportunities within the site. Habitat pile/s to be created in relatively undisturbed locations within the site (in combination with reptiles)	Positive

2.1 Background & Survey Objective

The site is approximately 109.53ha (see Figure 2.1) and is comprised of a former historic deer park (de-parked in 1618). The site is currently comprised of areas of dense bracken g1c, other neutral grassland g3c, Lolium-Cynosurus neutral grassland g3c6, modified grassland g4, wood-pasture and parkland w(26), lowland mixed deciduous woodland (also designated and Semi-natural Ancient Woodland SNAW), w1f, other broadleaved woodland w1g, dense scrub h3, ponds r1, developed land, sealed surface u1b, artificial unvegetated unsealed surface u1c and other rivers and streams r2b. Linear habitats also recorded included ecologically viable line of trees w1 (34), native hedgerow h2a6 and species-rich native hedgerow with trees h2a5 (1) (see Appendix 1).

It is proposed to develop the site to into 'Beechy Bottom Parkland Reserve'. This will involve the retention of the formal sports pitches, dedicated areas for dog walking, enhanced public access (with associated infrastructure), including a series of new woodland rides and glades, a cycle trail, an observation tower allowing views towards the South Downs, public parking provision and a large area of the site set aside for a non-deterministic approach to habitat and species restoration termed "constrained rewilding".

An Ecological Impact Assessment (EclA), including a Preliminary Ecological Appraisal (PEA), National Vegetation Communities (NVC) survey and a series of protected species surveys, including bat activity survey (manual transects and automated recording), breeding bird, great crested newt (HSI & eDNA), reptile, otter, water vole, and dormouse surveys. In addition to these protected species surveys, a number of general wildlife surveys were also undertaken as part of the baseline monitoring for the site, including: butterfly transects, moth trapping, terrestrial invertebrate, bryophyte and freshwater invertebrate surveys being undertaken.

These surveys were undertaken to assess the perceived ecological impacts associated with this proposal, including:

- Legally protected species or species of conservation concern;
- Legally protected habitats or habitat of conservation concern;
- Any statutory or non-statutory sites of conservation interest; and,
- Opportunities to provide biodiversity enhancement/s.

2.2 Site Description

The site is located approximately 550m to the west of the village of Cuckfield, Mid-Sussex. The site was originally a deer park serving the Tudor Cuckfield Park House, located a short distance to the east of the site.

The site is surrounded to the north, west and south of the site by a series of both pasture and arable farmland interspersed by a series of native and non-native woodlands.



3.1 Preliminary Ecological Appraisal

3.1.1 Scope of the Assessment

The zone of influence covers the extent of the site, the site boundaries, and areas directly adjacent to the site. The assessment considers designated sites, habitats, and species of importance for biodiversity conservation and protected species.

3.1.2 Desk Study

A desk-based review was undertaken for records of protected species and for statutory and non-statutory sites (e.g. Special Areas of Conservation (SAC), Sites of Special Scientific Interest (SSSIs), and non-statutory sites (e.g. Country Wildlife Sites (CWS)) designated for wildlife conservation) within 2 km of the site.

The Government's mapping website MAGIC (www.magic.gov.uk) was also searched for Priority Habitats within 1 km of the site, statutory sites designated for nature conservation value within a 1 km radius and European designated Natura 2000 sites within 10 km.

A search was made of MAGIC for European Protected Species (EPS) licenses issued by Natural England in the surrounding area since 2009.

3.1.3 Field Survey

The field survey comprised of a walkover assessment of the areas of the site using UK Habitat Classification System methodology (UKHab 2022). This is a standard technique designed for classifying and mapping British habitats in a consistent and unified way. Each habitat was assigned the appropriate alphanumeric code followed by any relevant secondary codes in accordance with UKHab Category Definitions V1-1 (2020).

The site survey was undertaken on 6th and 7th July 2023 by Domnic Sheldon. All areas were surveyed and assessed for indicators of ecological value, including the presence of, or field signs for any protected or rare habitats and species.

3.1.4 Badger Survey

A badger survey was undertaken on the 17 October 2022 and on the 6th and 7th July 2023 by Dominic Sheldon BSc (Hons) PgCert ACIEEM TechArborA (Badger class licence holder CL36/067).

The survey involved a thorough search of the Site for evidence of badger activity based on the methodology outlined by Harris, Creswell and Jefferies (1991). A search was made for:

- Setts, including earth mounds/ spoil, evidence of bedding and runways between setts;
- Latrines, often located close to setts, at territory boundaries or adjacent to favoured feeding areas;
- Prints and paths;
- Hairs within sett entrance or caught on nearby fencing; and,
- Other evidence including snuffle holes, feeding and playing areas and scratching posts.

Where setts were observed, their status and the level of activity were noted. Sett status can be broadly classified as:

Main sett – A sett within a badger territory that appears to be the largest (usually with at least five holes) and the most well-used, with much activity in the vicinity, is categorised as the main sett. Main setts always have active badger runs leading away from them and are normally marked by latrines. Social groups have one main sett, which is the most important sett in the territory. It is used throughout the year and is the main breeding sett.

Annexe sett – Setts are categorised as annexe setts where they are assumed to form part of the main sett area but where the sett is unlikely to be directly linked by an underground passage to the main sett either due to a barrier (e.g. separated by a watercourse or ditch) or by distance. Annexe setts are normally linked to the main sett by a well-used path and lie within 150 m of a main sett entrance.

Subsidiary sett – Setts that offer an alternative sett complex to the main sett are categorised as subsidiary setts. Subsidiary setts are normally, at least, 50 m from the main sett and are not always obviously linked by a well-used path to the main sett (unlike annexe setts). Subsidiary setts often exhibit moderate levels of activity, are

larger than outlier setts but smaller than main setts. Subsidiary setts are often marked by latrines.

Outlier sett – These setts often comprise just one or two entrances. They are used infrequently and can be found at the boundaries of a badger social group's territory.

When found, activity levels at individual sett entrances were categorised using the following typology:

- **Category A:** sett entrances comprising a number of well-used sett entrances (with one or more of the following features: well-worn entrance, freshly excavated soil and bedding material);
- **Category B:** setts with partially used holes (leaves or twigs in entrance and/or mosses and other plants growing in or around the entrance); and,
- **Category C:** an apparently disused sett entrance (partially or completely blocked, with a considerable amount of excavation required for reoccupation).

Where access allowed, adjacent habitats and properties were also searched in order to assess possible impacts of the proposal in a wider context.

The survey aims were to:

- Locate all setts and badger activity within the site;
- Provide an evaluation of the likely impact of the proposed works on the badger social group and associated setts.

3.1.5 Preliminary Bat Roost Tree Inspection

The trees within the site were inspected for features that could potentially support roosting bats, consisting of natural holes, woodpecker holes, cracks/ splits, broken limbs, loose bark, hollows/cavities, and dense epicormic growth. The survey was undertaken by Dominic Sheldon on the 17th October 2022 with the trees assessed from the ground with the aid of close-focusing binoculars and a digital camera.

Trees identified with potential bat roost features were classified in accordance with the Bat Conservation Trust's *Bat Surveys for Professional Ecologists Good Practice Guidelines* 3rd Edition (Collins, 2016) as following:

- **Confirmed bat roost:** Trees with bat roosting features with the presence or further evidence of roosting bat/s;
- **High:** A tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for

longer periods of time due to their size, shelter, protection, conditions and surrounding habitat;

- Moderate: A tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status;
- Low: A tree of sufficient size and age to contain potential roost features but with none seen from the ground or features are seen with only very limited roosting potential; and,
- Negligible: A tree with negligible habitat features that may be used by roosting bats.

3.1.6 Baseline Evaluation and Impact Assessment

Determining the importance of ecological features was undertaken in accordance with the Chartered Institute of Ecology and Environmental Management's Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM 2018). An assessment was then made of possible ecological impacts of the proposed development on each feature within the development's likely 'Zone of Influence' (ZoI). Where uncertainty exists, a precautionary approach has been adopted.

3.1.7 Limitations

Care has been taken to ensure that balanced advice is provided on the information available and collected during the study period (s), and within the resources available for the project. However, the possibility of important ecological features being missed due to survey timings, absence during surveys or the year of survey cannot be ruled out. In addition, the lack of evidence or records of protected species on Site does not preclude their presence.

3.2 Phase 2 Species Surveys

3.2.1 Amphibians – Great Crested Newt HIS & eDNA Survey

Habitat Suitability Index

A review of OS maps and aerial imagery identified seven water bodies within 500m of the site boundary; comprising three off-site ponds.

An assessment of each water body's suitability to support a breeding population of great crested newts (GCN) was made according to the criteria of the Habitat Suitability

Index (HSI) (Oldham *et al.*, 2000) following the methodology described in the ARG UK Guidance Note 5 (ARG UK 2010). The scores translate into a breeding suitability as shown in Table 1.

Table 1: Scoring system for GCN breeding suitability using HSI

HSI Score	Suitability for breeding GCN
<0.5	Poor
0.5 – 0.59	Below average
0.6 – 0.69	Average
0.7 – 0.79	Good
> 0.8	Excellent

Environmental DNA (eDNA) Survey

Ponds identified as suitable for water collection during the HSI assessment were sampled for eDNA. This method involved taking water samples from each water body within Natural England's accepted sampling period of 15th April to 30th June following the methodology described in the Defra Report WC1067 (Biggs *et al.* 2014a) and the subsequent Technical Advice Note (Biggs *et al.* 2014b).

Twenty 30 ml water samples were taken from four of the six ponds on 28th June by Dominic Sheldon using sterile field equipment supplied by SureScreen Scientifics (for locations of ponds see Appendix 1). Sample locations were selected based on accessibility and suitable GCN egg laying and displaying areas, with as much of the margin being sampled as possible. The surveyor wore sterile gloves whilst taking the sample and did not enter the water. The water column was mixed gently before taking the sample, with care taken not to disturb the sediment at the bottom of the pond. The samples from each pond were mixed and 15 ml added to six sterile tubes containing 35 ml ethanol. Ponds containing less than 5 cm depth of water were not sampled.

Samples were stored overnight in a refrigerator and then sent to SureScreen Scientifics for analysis. The methodology for laboratory analysis can be provided by SureScreen Scientifics on request.

3.2.2 Bat Activity

The bat activity survey was undertaken in combined accordance with guidance provided by the Bat Conservation Trust's *Bat Surveys for Professional Ecologists Good Practice Guidelines* 3rd Edition (Collins, 2016).

This guidance requires that the bat activity survey consists of:

- Three manually-walked transects – one dusk transect each season (Spring, Summer, Autumn); and,
- Three periods of static automated bat detector recording with four detectors positioned for 5 consecutive nights each season (Spring, Summer, Autumn) (totaling 60 nights of recording).

Manual Bat Activity Transect Survey

The manual bat activity survey comprised of three walked transects, including:

- Dusk transects on:
 - 17th April 2023;
 - 20th June 2023; and,
 - 23th September 2023.

Each dusk transect was walked from 15 minutes prior to sunset, until at least 2 hours after sunset. The transects were walked during relatively warm (minimum temperature: 8-15°C) and still (Beaufort Scale 0-4) weather conditions considered suitable to promote bat activity.

The transect route was prior identified during daylight hours to encompass the site, site boundaries and any features which may be utilised by dispersing or feeding bats. The transect route and results are illustrated on Appendix 2.

The transect route was continuously walked throughout the survey visits, with static positions held for at least 3 minutes when a bat was encountered to obtain behavioural information such as, whether the bat was feeding, dispersing, interacting with other bats, etc. The transect routes were walked in a counter direction for sequential survey visits.

All bat activity was recorded using a Peersonic RPA 3 bat detector (full spectrum bat detector) with internal recording capability or EM Touch (full spectrum bat detector) connected to a digital recorder. To aid species identification all recordings were analysed using Kaleidoscope Viewer (version 4.5.5) and/or, AnalookW (version 4) computer software.

Static Automated Bat Activity Survey

One automated bat detector was deployed for three recording periods, with each period consisting of five consecutive nights, as follows:

- 17th to 27th April 2023;
- 20th to 26th June 2023; and,
- 13th to 17th – September 2023.

The automated bat detector deployed was either a SongMeter2 or a SongMeter Mini (serial number: 009663 and 011401) programmed to commence recording 30 minutes prior to sunset until 30 minutes after sunrise.

The positions for the static automated bat detectors consisted of:

- Position 1: within a grove of veteran & ancient sweet chestnut trees located in the south-eastern corner of the site;
- Position 2: located on the edge of the SNAW woodland located to the west of the site;
- Position 3: located on the southern edge of the connecting plantation woodland located at the northern edge of grassland parcel G5; and,
- Position 4: Located on at the north-eastern edge of grassland parcel G4.

See Appendix 2 for illustrated positions for the static automated bat detector.

All subsequent ultrasound recordings were analysed using Kaleidoscope Viewer (version 3.1.1) and/or AnalookW (version 4) computer software.

3.2.3 Breeding Bird Survey

A breeding bird survey was undertaken in spring and summer 2023 according to an adapted British Trust for Ornithology (BTO) Breeding Bird Survey methodology (Bibby *et al*, 2000; Gilbert *et al*, 1998), consisting of a walked transect route encompassing the entire site, in suitable weather conditions (avoiding cold, windy and wet days, although showery days make acceptable survey weather). Survey dates and weather conditions are summarised in Table 2.

Table 2: Dates, times and weather conditions for breeding bird survey

Visit	Date	Surveyor	Time	Weather
1	29 th April 2023	AC & PL	06:00-08:30	14-16c, F2-3, 35-40% cc
2	13 th May 2023	ALS	05:53-08:21	10-11c, F1-3, 70-25% cc,
3	26 th May 2023	ALS	07:00-0950	10-14c, F1-3, 70-25% cc
4	21 st June 2023	ALS	08:00-10:00	17-18c, F1-3, 25-50% cc

ALS = Aby Sampson BSc ACIEEM; AC = Andrew Charles BSc (Hons) MSc MCIEEM, PL = Paul Lott

All bird species were recorded during the breeding bird survey but particular attention was paid to the presence of WCA 1981 Schedule 1 species, birds listed on the UK Red-list of Birds of Conservation Concern (BoCC; Eaton *et al.*, 2015), species listed in Section 41 of the NERC Act 2006 and Local BAP species. During the survey, information on species, their locations and behaviour was mapped and recorded.

3.2.4 Dormouse Survey

The dormouse *Muscardinus avellanarius* survey was undertaken in accord with Natural England's *Dormouse Conservation Handbook 2nd edition* (Natural England 2006). The survey was undertaken to identify whether the scrub and hedged boundaries within the proposed development area support dormice.

The dormouse survey consisted of a dormouse nesting tube survey and an autumn search for dormouse feeding remains.

A total of 100 nest tubes were installed on the 17th April 2023 at 10 m intervals within the site woodland edge habitats (see Appendix 3). The tubes were subsequently checked monthly May to September 2023 inclusive.

3.2.5 Reptile Survey

An artificial and natural refugia survey was undertaken where refugia were distributed within the site on the 26th April 2023. The refugia were subsequently checked for the presence of basking or sheltering reptiles. The artificial refugia comprised of 200 bitumen sheets, approximately 500 mm x 500 mm in size. Refugia were laid in locations deemed to have high potential for basking reptiles (see Appendix 4). Where present, any natural refugia, such as logs, stones etc, were also inspected during the survey visits for the presence of reptiles.

Once laid, the refugia were allowed to 'bed in' for a period of at least seven days, thus allowing any reptiles within the site to become accustomed to using them. Following this period, 7 survey visits were undertaken between May and July 2023 inclusive, during suitable weather conditions as detailed by Gent & Gibson (1998). The ideal weather conditions are summarised in Table 3.

Table 3: Guidelines for Reptile Surveys (Gent & Gibson 1998)

Parameter	Value
Time of year	April – September
Time of day	9:00 – 11:00*; 16:00 – 19:00*
Temperature	10 - 17°C
Sunshine	Intermittent or hazy
Wind	Little or none

* Typical timings – these may vary depending on the temperature window

3.2.6 Otter & Water Vole Survey

The survey involved a walkover of the watercourse and a survey of both river banks where accessible for a length of approximately 100 m up- and downstream of the site.

The water vole survey was undertaken in accordance with the methodology set out in the Water Vole Conservation Handbook (3rd Ed.) (Strachan, Moorhouse and Gelling, 2011) and as modified by The Water Vole Mitigation Handbook (Dean et al., 2016) and Water Vole Field Signs and Habitat Assessment (Dean, 2016).

A detailed search was made along the river following current best practice methodologies (NRA 1994, Highways Agency 1999 and Strachan *et al.* 2011) for evidence of:

- Otter, including footprints, spraints, holts, runs, slides and feeding remains; and,
- Water vole, including sightings, burrows, latrines, feeding stations, lawns, nests, footprints and runways.

The survey included both sides of the riverbank, any emergent fringe vegetation and overhanging trees/ exposed tree roots close to the water surface. During the survey, the main habitat type of each section of bank was recorded, and the locations of any evidence marked on a map and GPS device.

Table 4. Timings and environmental conditions relating to the water vole survey

Date	Temp (°C)	Wind Speed (Beaufort Scale)	Cloud Cover %	Precipitation	Humidity %
25 th June 2023	20	1	20	0	55
29 th July 2023	26	1	10	0	40
Constraints on the survey: The vegetation was particularly dense in places, meaning that full access to the back side was not possible during the July survey.					

3.2.7 Freshwater Invertebrates

The survey followed the PSYM (Predictive SYstem for Multimetrics) method (Biggs *et al.* 2000; Environment Agency and Pond Action, 2002; Williams *et al.* 1996; 1998), derived from the method developed by Pond Action (now the Freshwater Habitats Trust) for the National Pond Survey of the 1990s (Biggs *et al.* 1998), which is used by the national environmental agencies to monitor ponds and canals.

Sampling of the aquatic flora and fauna within the ponds was carried out on 12th July 2023, during a period of warm sunny weather.

First a sketch map of each pond was drawn including the positions of any inflows/outflows, vegetation and other key features. Within the outer edge (defined as the first change in bank profile along the margins) of the ponds all wetland plant species were recorded, using a combination of walking/wading the pond edge and a grapnel to sample the deeper water for possible submerged species.

Whilst undertaking the floral survey meso-habitats present within the lake were identified for invertebrate sampling. Meso-habitats can include differing areas of substrate (e.g. shallow areas of gravel or silt); vegetation cover, not necessarily each plant species present but more the type of habitat and structure they provide, e.g. floating leaved plants, tall emergent, marginal macrophytes and beds of fully submerged plants; as well as other meso-habitats such as submerged tree roots and areas of shallow marginal water grading into marsh. As a rough guide an average pond might contain three to eight meso-habitats, depending on its size and complexity (Environment Agency & Pond Action, 2002).

4.1 Desk Study

4.1.1 Statutory Designated Sites

Internationally Designated Sites

There are no internationally designated (Natura 2000) sites for nature conservation within 10 km of the Site boundary.

Nationally Designated Sites

One statutory designated site lies within 1 km of the Site boundary. A summary is provided in **Table 5**.

Non-statutory Designated Sites

There is one non-statutory site and an area of woodland identified as an Ancient Woodland Inventory (AWI) within the Site boundary for its semi-natural ancient woodland interest.

4.1.2 Non-statutory Designated Sites

Two non-designated sites for nature conversation lie within 1 km of the Site. A summary is provided in **Table 5**.

An Ancient Woodland Inventory and Ghyll Woodland were also returned from within 1 km of the Site. These are not designated sites *per se*, but are considered areas of Sussex countryside which support higher than average concentrations of existing wildlife habitats such as native woodlands, flower-rich grasslands, bogs and heathland (many of these habitats will have an international, national or local designation).

Table 5: Designated sites records within 1 km of Site boundary

Site Name	Location	Description
Statutory Designated Sites		
High Weald Area of Outstanding Natural Beauty (AONB)	Forms part of the southern site boundary	Designated as 'Weald' and given to the area between the North and South Downs which are the outer chalk rims of the ancient Wealden anticline. The sandstones and clays of the exposed centre of the dome, the 'High Weald' give rise to a hilly, broken and remote country of ridges and valleys covered by a patchwork of fields, woods and shaws. In contrast, open areas of the AONB include Ashdown Forest and, to the east, the river valleys of the Rother, Brede and Tillingham. The AONB meets the coast at Hastings. The character of the High Weald was established by the 14th century and has survived major historical events and social and technological changes. As a result the High Weald is considered to be one of the best surviving, coherent medieval landscapes in Northern Europe.
Non-statutory Sites		
The Hanger Local Wildlife Site (LWS)	Located approximately 900 m to the west	Designated for its two types of woodland that are present within a gill woodland. Alder occurs along the streams and extends up the lower slopes in parts, with oak, hazel and ash on the upper slopes and the flat ground above. The wood supports a wide range of woodland plants, mosses and liverworts, a good bird community and a number of uncommon butterflies.
Whitemans Green, Cuckfield Local geological site	Located approximately 155 m to the east of the site	Designated for its historical geological interest
Ancient Woodland Inventory Site (AWI)		
Walks Wood Ancient Woodland Inventory (AWI)	Located within the site boundary	Designated for its ancient woodland habitats
Walks Wood Ghyll Woodland	Located within the site boundary	Designated for the highly species-rich woodland, even at the small scale, support distinctive assemblages of cryptogamic plants, and are unique to south-east England.

4.1.3 EPS Mitigation Licences

No EPS mitigation licences have been granted within 1 km of the site boundary.

4.1.4 Great Crested Newt Data

Great Crested Newt Class Survey Licence Returns

No Great Crested Newt Class Survey Licence Returns have been granted within 1 km of the site boundary.

Great Crested Newt Pond Surveys 2017-2019

No ponds within 1 km of the site boundary were shown to support great crested newt from between 2017-2019.

4.1.5 Priority Habitats

The site supported a series of habitats of principal importance (HPI) or Biodiversity Action Plan (BAP) habitats. These were areas of ancient replanted woodland, ancient and semi-natural woodland and areas of the BAP habitat - wood pasture and parkland.

4.1.6 Geology & Soils

The underlying geology is very varied over the site with the following geology types being recorded:

- Ardingly Sandstone Member - Sandstone. Sedimentary bedrock formed between 139.4 and 133.9 million years ago during the Cretaceous period;
- Lower Grinstead Clay - Mudstone. Sedimentary bedrock formed between 139.4 and 133.9 million years ago during the Cretaceous period;
- Upper Grinstead Clay - Mudstone. Sedimentary bedrock formed between 139.4 and 133.9 million years ago during the Cretaceous period;
- Lower Tunbridge Wells Sand - Sandstone, siltstone and mudstone. Sedimentary bedrock formed between 139.4 and 133.9 million years ago during the Cretaceous period;
- Cuckfield Stone Bed - Sandstone, calcareous. Sedimentary bedrock formed between 139.4 and 133.9 million years ago during the Cretaceous period; and,
- Wadhurst Clay Formation - Mudstone. Sedimentary bedrock formed between 139.4 and 133.9 million years ago during the Cretaceous period.

4.2 Field Survey (UKHab and NVC).

Table 6. Environmental conditions during the field survey visits

Survey Date	Temperature (°C)	Wind Speed (Beaufort Scale)	Cloud cover (%)	Precipitation	Sunset time
17 th Oct 2022	18	3	65	0	N/A
6 th July 2023	21	2	0	0	N/A
7 th July 2023	28	2	0	0	N/A

Constraints on the survey:

The initial survey was undertaken in autumn, which may preclude spring and summer annual botanical species. However botanical diversity was considered sufficient to classify and assess the habitats present.

4.2.1 UK Habitat Classification Survey (UKHab)

The site measures approximately 109.53ha (see Appendix 2) and is located approximately 500 m to the west of the village of Cuckfield, Sussex. The site is comprised of a former historic deer park (de-parked in 1618).

The site is currently comprised of areas of dense bracken g1c, other neutral grassland g3c, *Lolium-Cynosurus* neutral grassland g3c6, modified grassland g4, wood-pasture and parkland w(26), lowland mixed deciduous woodland (also designated and Semi-natural Ancient Woodland SNAW) w1f, other broadleaved woodland w1g, dense scrub h3, ponds r1, developed land; sealed surface u1b, artificial unvegetated unsealed surface u1c and other rivers and streams r2b. Linear habitats also recorded included ecologically viable line of trees w1 (34), native hedgerow h2a6 and species-rich native hedgerow with trees h2a5 (1). A UKHab plan is provided in Appendix 1).

Modified Grassland (g4)

This habitat formed the vast majority of the grassland habitats present on site (see Figures 2-6 and Appendix 1).

This habitat was recorded in parcels G1, G1, G3, G4, G5 and G6 (refer to Appendix 2 for parcel numbers).

Species recorded included sweet vernal grass *Anthoxanthum odoratum*, perennial rye grass *Lolium perenne* being dominant with some Yorkshire fog *Holcus lanatus* and common bent *Agrostis capillaris*. Forb species recorded included rare creeping buttercup *Ranunculus repens*, thyme-leaved speedwell *Veronica serpyllifolia*, common

ragwort, broad-leaved dock *Rumex obtusifolius*, black medick *Medicago lupulina*, common field speedwell *Veronica persica*, dove's-foot cranesbill *Geranium molle*, white clover *Trifolium repens* and curled dock *Rumex crispus*, selfheal *Prunella vulgaris*, curled dock *Rumex crispus*, dove's-foot cranesbill and common hogweed *Heracleum sphondylium*.

Overall species diversity was below 8sp per m² and a such was classified as G4.

Secondary codes recorded within this habitat type included cattle grazed (101), mown and collected (107).

Secondary codes relating to the wood pasture and parkland (26), scattered trees (32), ancient tree (205) and mature tree (203) – are discussed in more detail below.



Figure 2: View of the grassland sports pitches, located within grassland Parcel G2 (see Appendix 1).



Figure 3: View of the improved grassland located within grassland Parcel G2.



Figure 4: View of the improved grassland located within grassland Parcel G3



Figure 5: View of the improved grassland located within grassland Parcel G4, located to the south of the site within the former parkland.



Figure 6: View of the improved grassland located within grassland Parcel G5, located to the south of the site within the former parkland.

Wood pasture and Parkland (26), scattered trees (32), mature tree (203) and ancient tree (205)

Being a parkland habitat, a series of parkland trees are located within the site. The older mature and over-mature specimens were pedunculate oak. A number of these were located to the north and west of grassland Parcel G4 and west of grassland Parcel G5 (see Figures 7-12). A number of these supported features that had a high potential to support roosting bats (see section 4.5.1).

Veteran & Ancient Trees

The site supported a small number of veteran trees. This included a veteran oak located within the plantation woodland located along the centre of the site (see Appendix 1 & 6). A veteran beech located along the southern edge of grassland Parcel G5 (see Figure 14) and two clumps of veteran (and ancient) sweet chestnuts located within grassland Parcel G5 (see Figures 14-19, Appendix 1 & 6).

The veteran sweet chestnuts were of particular note and were considered to be outstanding examples of their type supporting all of the classic veteran features including, rot holes, tear-outs, snags, delaminated wood on branches, fallen deadwood accumulations, standing deadwood, woodpecker holes, fungal bodies, basal cavities, cracks, splits and crown borne deadwood. In some cases, these trees included vigorous epicormic growth. As such these trees can be considered to be both veteran and ancient trees. These trees had been planted in clumps of six and (further to the east) a clump of three.



Figure 7: View of the parkland tree located to the north of grassland Parcel G4.



Figure 8: View of a parkland tree located to the west of grassland Parcel G4.



Figure 9: View of a parkland tree located within grassland Parcel G5.



Figure 10: View of the dense bracken located on the northern edge of grassland Parcel G3



Figure 11: View of a mature parkland beech tree located within grassland Parcel G5



Figure 12: View of a clump of mature parkland trees located within grassland Parcel G5



Figure 13: View of the veteran pedunculate oak located within the central woodland.



Figure 14: View of the veteran beech located towards the south of the site complete with tear-out feature.



Figure 15: View of clump of veteran and ancient sweet chestnut trees located within grassland Parcel G5



Figure 16: View of one of the sweet chestnut stems located at grassland Parcel G5 showing some epicormic growth.



Figure 17: View of a deadwood accumulation within the clump located at grassland Parcel G5



Figure 18: View of one of the outstanding veteran and ancient sweet chestnut trees located within grassland Parcel G5



Figure 19: View of the same tree with human for scale showing a multitude of veteran and faunal features.

Other Neutral Grassland g3c

This habitat was confined to the modified grassland verges and small areas located to the south-west of Parcel G5 (see Figure 20). Species recorded included common bent, Yorkshire fog and cock's foot. Forb species included common sorrel *Rumex acetosa*, common field speedwell *Veronica persica*, soft rush *Juncus effusus*, meadow cranesbill *Geranium pratense*, tufted vetch *Vicia cracca*, white clover, field horsetail *Equisetum arvense*, broad-leaved dock, creeping buttercup and dandelion *Taraxacum officinale* agg.



Figure 20: View of the semi-improved grassland (interspersed with developing woody scrub 10) located adjacent to grassland Parcel G5.

Overall species diversity was above 8 spp. per m² and along with the species composition the habitat was classified as G3c.

Secondary codes recorded within this habitat type included scattered scrub (10), unmanaged (512), tall or tussocky sward (128), abandoned (519) and for the field margins – neglected (518).

Lolium-Cynosurus Neutral grassland g3c6

To the far south of the site, within grassland Parcel G6 lay an area dominated by *Lolium-Cynosurus* Neutral grassland (see Figure 21). Species recorded included sweet vernal grass, Yorkshire fog, common bent, perennial rye grass, and cock's foot. Forb species recorded included white clover, creeping buttercup, meadow buttercup

Ranunculus acris, common sorrel, creeping thistle *Cirsium arvense*, bird's-foot trefoil *Lotus corniculatus*, meadow cranesbill *Geranium pratense* and common ragwort.

Overall species diversity was above 8sp per m² and along with the species and forb cover/composition the habitat was classified as G3c6.

Secondary codes recorded within this habitat type included unmanaged (512), tall or tussocky sward (128) at the time of survey.



Figure 21: View of the semi-improved grassland located within Parcel G6.

Lowland Mixed Deciduous Woodland w1f

This habitat was located along the western part of the site (see Figures 22 & 23). The woodland itself was fairly diverse with pedunculate oak, ash (with advanced ADB), field maple *Acer campestre*, hazel *Corylus avellana* dominated understorey subject to some planting with beech (some of which has been previously coppiced), sycamore *Acer pseudoplatanus*, sweet chestnut, horse chestnut *Aesculus hippocastanum* and spindle *Euonymus europaeus*. The ground flora comprised occasional hard fern *Blechnum spicant*, wood sorrel *Oxalis acetosella*, pendulous sedge *Carex pendula*, thin-spiked wood sedge *Carex strigosa*, stinging iris *Iris foetidissima*, betony *Betonica officinalis*, ivy *Hedra helix*, dog rose *Rosa canina*, sanicle *Sanicula europaea*, bramble *Rubus fruticosus* agg, bush vetch *Vicia sepium*, wood sage *Teucrium scorodonia*, hemp

agrimony *Eupatorium cannabinum*, tormentil *Potentilla erecta*, water mint *Mentha aquatica*, tufted hairgrass *Deschampsia cespitosa* and bracken *Pteridium aquilinum*.

Throughout the southern part of the woodland, in close proximity to the established pathways there are extensive blocks of the invasive species *Rhododendron ponticum* (as listed on Schedule 9 of the wildlife and Countryside Act 1981). This has been subject to some form of management over the previous 10 years. The woodland was subject to relatively high browsing and grazing pressure from deer, predominantly fallow *Dama dama*, which was recorded during the site visit.



Figure 22: View of the semi-natural woodland showing the relatively open ground layer subject to deer grazing and browsing pressure.



Figure 23: View of the invasive *Rhododendron ponticum* recorded throughout the woodland.

Other Cereal Crops C1c7

This habitat can be confined to an area contained by grassland Parcel G4 (see Figure 24 & Appendix 1). The arable comprised *Sorghum* sp with some *Triticale* sp. The crop has been sown to provide cover and a drive location for pheasants *Phasianus colchicus* being raised within the woodland located directly to the south. The secondary code for this habitat is 609 – cover crop.



Figure 24: View of the arable habitat located on site.

Other Broadleaved Woodland w1g

This habitat was located along the majority of the western, central and part of the southern site boundaries (see Appendix 1). From studying historical aerial photographs, the western and central broadleaved plantation woodland was of more recent origin being planted in the late 1990s, while the plantation woodland located along part of the southern site boundary was probably planted in the late 1970/80s. All these areas were comprised of grassland prior to these plantings taking place. These are discussed in more detail below.

Western Plantation Woodland

This semi-mature woodland has been planted on a grid pattern from pedunculate oak *Quercus robur*, sweet chestnut *Castanea sativa*, ash *Fraxinus excelsior*, silver birch *Betula pendula*, willow *Salix* sp, cherry *Prunus avium*, a single specimen of *Cotoneaster* sp. and a proportion of poplar *Populus* sp (see Figure 25). The ground flora was generally sparse, species-poor and denuded with ground ivy *Glechoma hederacea*, pendulous sedge, common nettle, male fern, light scattered bramble, occasional dog's mercury *Mercurialis perennis* and ground elder *Aegopodium podagraria* with large amounts of bare ground. A large number of earthball fungi *Scleroderma citrinum*, sulphur tuft *Hypholoma fasciculare* and patches of common haircap *Polytrichum commune* were recorded within this woodland.

The woodland also supported a number of rides (see Figure 26), presumably to provide vehicular access. These rides supported an identical species composition to the rest of the plantation woodland ground flora located within this area, with the addition of marsh thistle *Cirsium palustre*, creeping buttercup *Ranunculus repens*, lesser celandine *Ficaria verna*, thin-spiked wood sedge *Carex strigosa* and common bent *Agrostis capillaris*.



Figure 25: View of the broadleaved plantation woodland



Figure 26: View of one of the rides located within the plantation woodland

Southern Plantation Woodland

This woodland was comprised of ash with some Poplar species and a limited understorey of scattered hazel (see Figure 27 below). The ground flora was more varied with pendulous sedge, false brome *Brachypodium sylvaticum*, bramble, dense ivy, male fern *Dryopteris filix-mas* and common nettle. The vast majority of the ash had or was in the process of dying from ash die back *Hymenoscyphus fraxineus*. Some self-sown alder *Alnus glutinosa* was located along the watercourse.



Figure 27: View of the southern plantation woodland showing advanced ash die back related death of trees.

Central Plantation Woodland

This woodland was comprised of predominantly turkey oak *Quercus cerris* with silver birch, ash, pedunculate oak, poplar sp.

Dense Scrub h3

This habitat was confined to small areas located within grassland Parcel G5 (see Figure 28). Species recorded included bramble *Rubus fruticosus*, blackthorn *Prunus spinosa* and hawthorn *Crataegus monogyna*.



Figure 28: View of the dense scrub located within grassland Parcel G5.

Dense bracken g1c

This habitat was confined to the grassland edges and located on the northern edge of field parcel G4 and in small areas throughout grassland parcels G2, G4 & G5 (see Figures 29-32 Appendix 1). Species recorded included dominant bracken *Pteridium aquilinum*.

Ponds r1

Six ponds are located within the site. Two of these are former quarry sites of some antiquity located within the semi-natural ancient woodland component of the site (see Figure 33 for northernmost pond). Both of these ponds receive large leaf fall from surrounding trees and are generally heavily shaded. Floating species are restricted to duck weed *Lemna minor* and a few marginal species such as soft rush.

The next two ponds are located within grassland Parcel G5. Both of these ponds were fenced off from the surrounding grassland and surrounded by dense woody scrub and semi-mature trees (see Figures 34 & 35 respectively).



Figure 29: View of the dense bracken located to the north of grassland Parcel G2



Figure 30: View of the dense bracken located to the centre of grassland Parcel G4.



Figure 31: View of the dense bracken located to the centre of grassland Parcel G5



Figure 32: View of the dense bracken located on the northern edge of grassland Parcel G6



Figure 33: View of the northernmost pond surrounded by dense woodland.



Figure 34: View of the pond located within the SNAW.



Figure 35: View of the other pond located within grassland Parcel G5.

The final two ponds are associated with a coarse fishing club located towards the south-western part of the site. Due to presence of presumed carp, the water quality within these ponds is very poor with significant turbidity and a lack of general floating plant species bar a single specimen of white water lily *Nymphaea alba* (see Figures 36 & 37 respectively).

These ponds are fed by a natural spring located just to the north of the two ponds, while a piped outflow taking excess water flows to the south underneath the south-western access track directly into a watercourse that flows from the west to the east through the southernmost part of the site. This causes significant water clarity issues relating to suspended sediment and presumably nitrate impacts to the watercourse (see Section 5.3.4).



Figure 36: View of one of the coarse fishing ponds

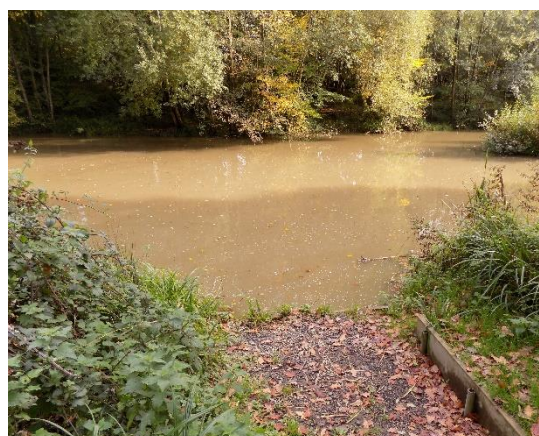


Figure 37: View of the other coarse fishing pond showing high levels of sediment loading.