B24

National Grid Cotswolds VIP

Ecological Impact Assessment

Bat Survey Report

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Contacts

CALLUM MOORES

Graduate ecologist

e callum.moores@arcadis.com

Arcadis Consulting (UK) Limited

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SAMUEL RADONICH

Consultant Ecologist

e samuel.radonich@arcadis.com

Arcadis Consulting (UK) Limited

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National Grid Cotswolds VIP

Bat Survey **Report**

Author	Samuel Radonich and Callum Moores
Checker	Sian Jones
Reviewer	Sian Jones
Approver	
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1 Introduction

1.1 Project Background

In 2014, National Grid commissioned a Landscape and Visual Impact Assessment to identify areas across the UK that would benefit from the Visual Impact Provision (VIP) project. The purpose of the Landscape and Visual Impact Assessment was to identify those sections of electricity transmission lines within England and Wales that have the most important impacts on the landscape and visual amenity of these designated landscapes.

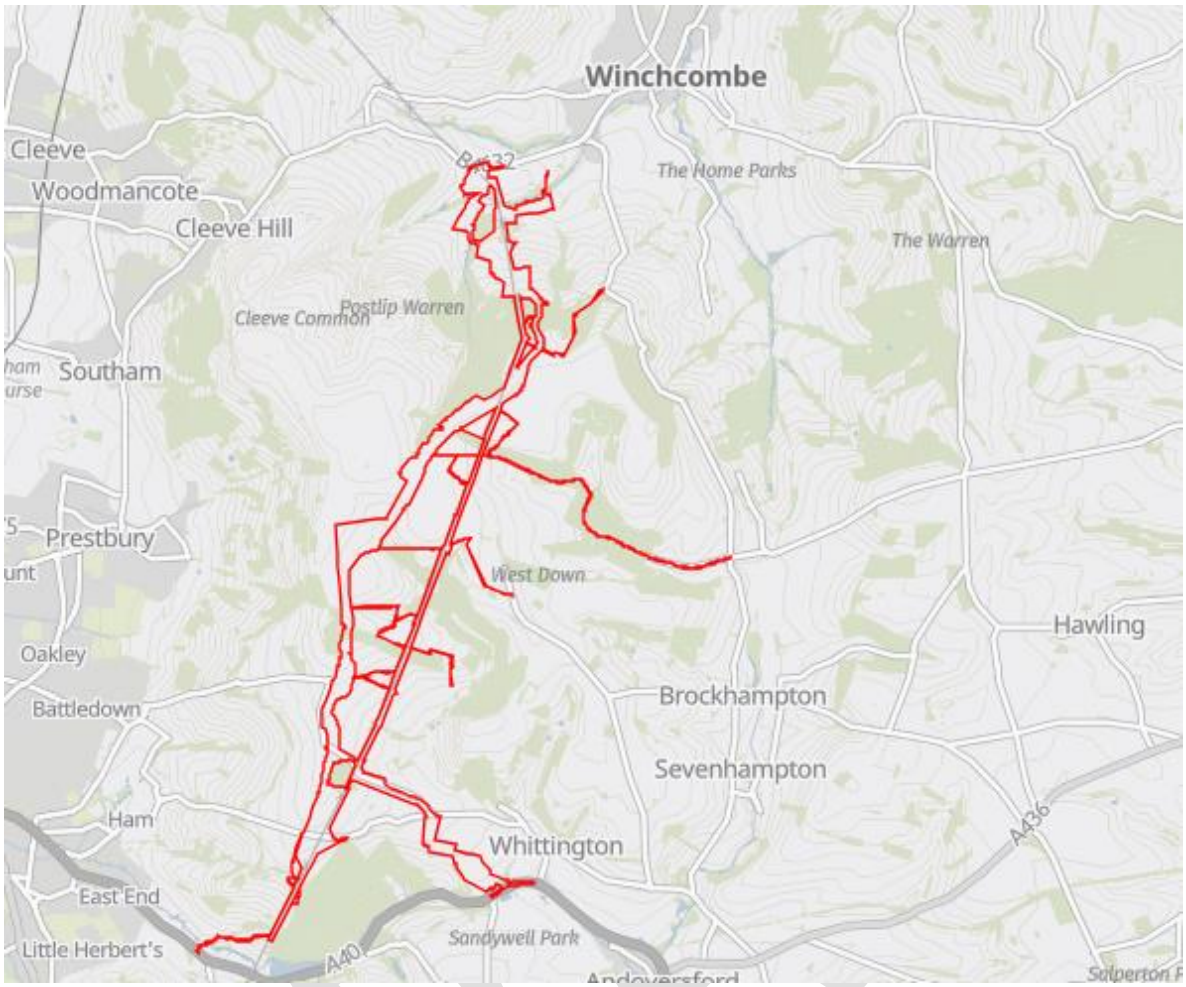
Arcadis Consulting (UK) Limited was commissioned by National Grid to provide an Ecological Impact Assessment in support of the undergrounding of the central section of National Grid's ZF.2 overhead line (OHL) route through the Cotswolds Natural Landscape (CNL) formally the Area of Outstanding National Beauty (AONB) as part of their VIP project.

In summary, the Proposed Project will involve the following works:

- Construction of two new Cable Sealing End Compounds (CSECs) and associated replacement terminal pylons where required at either end to connect the new underground cables to the remaining existing overhead line;
- Installation of approximately ~7 km of underground cabling (the construction swathe will extend up to 100m wide and narrow to 60m wide in areas of higher value habitat);
- Temporary removal of spoil to be bunded and replaced following cable installation;
- Permanent removal of the existing overhead line section including 18 pylons;
- Associated temporary works to facilitate the construction of the project including temporary/permanent access junctions and roads, construction compounds, material storage and welfare facilities;
- Installation ancillary off-site infrastructure (including installation of arcing horns and shunt reactor installation/connection);
- Temporary vegetation removal to be undertaken along the cabling route, permanent vegetation removal to be undertaken at the CSEC locations; and
- Habitat creation and enhancement proposed as part of BNG objectives.

1.2 Site Location and Setting

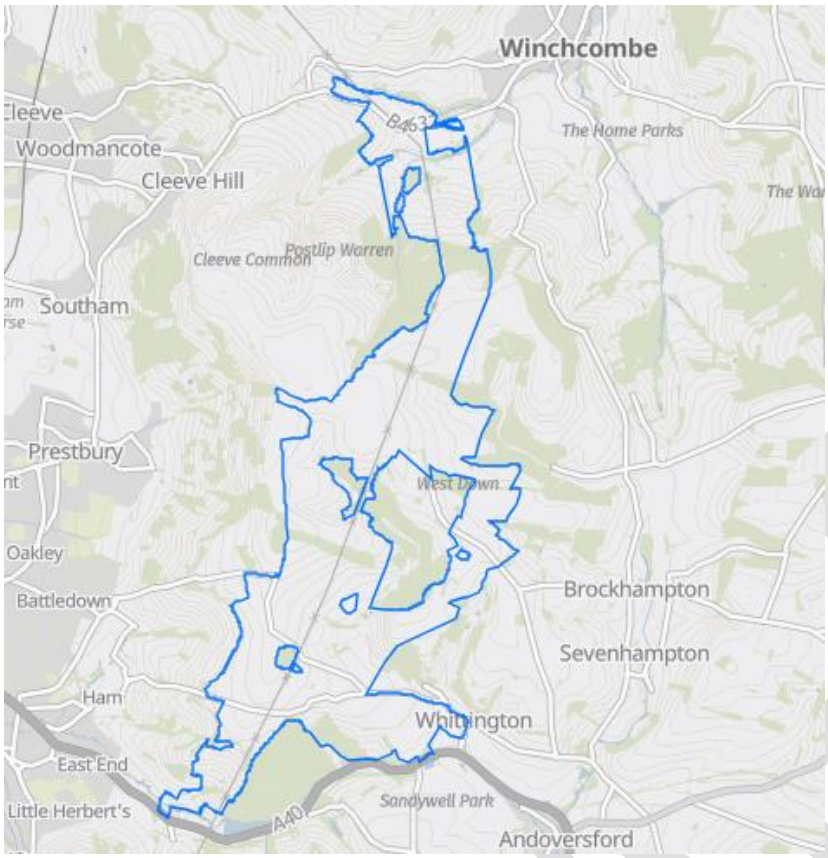
Figure 1 Redline boundary (The Site)



A section of the ZF.2 OHL is proposed to be removed and undergrounded. This section of OHL is approximately 7km long and starts immediately south of the B4632 (tower ZF306), in close proximity to Postlip/Postlip Mills. From Breakheart Plantation, the OHL runs in a southwesterly direction to the east of Cleeve Common Site of Special Scientific Interest (SSSI), past Wontley, Drypool and Wood Farms, and down towards Dowdeswell Wood (tower ZF325). There are a number of disused quarries either side of the OHL. The closest villages are Langley (north), Winchcombe (north-east), Cleeve Hill (west) and Charlton Kings to the south-west. The route crosses the three Local Authority administrations of Tewkesbury Borough Council, Cheltenham Borough Council and Cotswolds District Council.

The Survey Area as shown in Figure 2 was defined early in project design, prior to the red line boundary (shown in figure 1) being refined. In order to ensure sufficient ecology survey data was captured the wider Survey Area was used in scoping and so the finalised route could avoid sensitive ecological features. The Survey Area consists primarily of an agricultural open field setting with the existing OHL adjacent to the proposed underground route. The route is located within an CNL, and sections of the route are in close proximity to Ancient Woodland.

Figure 2 – Survey Area



1.3 Brief and Objectives

Arcadis Consulting (UK) Limited was commissioned by National Grid to provide an Ecological Impact Assessment in support of the undergrounding of the central section of National Grid's ZF.2 overhead line (OHL) route through the CNL as part of their VIP project. This report informs the Ecological Impact Assessment in relation to bats. Although the site needs a temporary corridor of 60 - 100m wide and 7km long the survey area (see figure 1) and scope of this report covers a much larger area (see figure 2) as the client (National Grid) desired to determine a route with the least ecological impact, whether it be temporary or permanent.

The following objectives were set:

- Establish the baseline through field and desk-based assessment work.
- Identify important ecological features that may be affected.
- Consider the potential legal and policy implication of the project and refer to the latest biodiversity guidance.
- Assess the potential impacts on important ecological features and the significance of the residual effects of the project.
- Incorporate methods to avoid, reduce and compensate negative ecological impacts and their effects and provide ecological enhancement measures.

The methods, results and assessment are provided in this report.

2 Legislation and Key Policy Requirements

This section provides an overview of the legislation applicable to bats, for further information the source legislation should be reviewed.

All bat species are afforded full protection under UK and European legislation, including the Wildlife and Countryside Act 1981 (as amended) (HMSO, 1981), the Countryside and Rights of Way Act (HMSO, 2000) and The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 (HMSO, 2019). Together, this legislation makes it illegal to recklessly, intentionally or deliberately:

- Take, kill or injure a bat;
- Damage, destroy, or obstruct access to, a bat roost; and,
- Disturb a bat occupying a roost.

A bat roost is defined in the legislation as “any structure or place which a bat uses for shelter or protection”.

Annexe II bats are those species listed on Annexe II of the Habitats Directive, which lists animal and plant species of Community interest whose conservation requires the designation of Special Areas of Conservation (SAC’s).

3 Methodology

3.1 Desk Study

A desk study was undertaken in July 2023 to identify any existing ecological information relating to the Survey Area and its surroundings. The desk study search buffers applied are provided in Table . The following resources were used:

- The Multi-Agency Geographical Information for the Countryside website (MAGIC, 2023) was used to search for statutory designated sites of nature conservation value, granted European Protected Species Mitigation (EPSM) licence applications within the last 10 years, ancient woodland and Habitats of Principal Importance in England (HPIE) listed under S41 of the NERC Act 2006 (HMSO, 2006).
- OS mapping and aerial photography (Google mapping) were studied to place habitats within the study area in the wider context; identify potential ecological features that may not be evident on the ground during the field survey; and identify potential barriers to animal movements (such as road networks, built development and major water courses).
- The Gloucestershire Centre for Environmental Records (GCER) was approached to provide ecological records of rare and notable species within a 1km search area and protected species within 2km. They also provided records of local sites within a 1km search area, national sites within 2km and international sites within 10km.
- S41 of the NERC Act 2006 (HMSO, 2006) lists of habitats and species. These are referred to as HPIEs and Species of Principal Importance in England (SPIEs).

The desk study search area for the survey area comprised various search areas as listed in Table 3. These are the Zones of Influence over which effects may arise. These distances are precautionary and were identified ahead of the field survey before the ecological features where known. Where hydrological links to the Site or mobile species have been identified the search area is large. Any variation is explained in the results section.

Table 1: Desk study search buffers

Policy / Guidance	Details
International or European statutory designated sites	10km
National statutory designated sites	5km
Non-statutory designated sites Protected and notable species Invasive, non-native species Granted EPSM licences	2km
Protected and notable habitat (including ancient woodland)	200m

3.2 Field Survey

The scope of the surveys was designed in accordance with the Bat Conservation Trust's (BCT) Bat surveys for professional ecologists: good practice guidelines 3rd edition (BCT, 2016). The survey scope was then adapted in design to reflect the expected guidance changes in the forthcoming 4th edition, (BCT, 2023)

Habitat Assessment

In order to inform the survey design, a habitat assessment was undertaken to identify habitats and areas likely to be of value for bats. The habitat assessment was undertaken alongside the extended Phase 1 Habitat Survey between March and May 2022 by Joanne Wilson MCIEEM. The extended Phase 1 Habitat Survey was presented as an appendix to a Preliminary Ecology Appraisal Report (RPS, 2022). During this survey, key habitat areas, including potential commuting routes, foraging areas and roosting locations were identified. These assessments were utilised to design and scope the bat surveys.

Preliminary Ground Level Roost Assessments

A preliminary assessment of trees within the proposed development site was undertaken between February and March 2023 to determine whether they offer potential features for roosting bats. The ground level tree assessments were led by Tim Buckland BSc MSc MCIEEM and Alex Burrows BSc MSc. Tim holds a Natural England level 2 class licence for bats (registration number: 2015-11006-CLS-CLS), is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and has over thirteen years' professional experience in conducting surveys for bats. Alex Burrows is an accredited agent under Tim's class licence for bats (registration number: 2015-11006-CLS-CLS), is a qualifying member of CIEEM and has over four years' experience in conducting ground level tree assessments. During the completion of the ground level tree assessments Tim and Alex were assisted by Agnes Rutter BSc MSc and Jack Hughes BSc. Agnes is a qualifying member of CIEEM and has over two years' experience undertaking ground level tree assessments, whereas Jack is a qualifying member of CIEEM and received training in undertaking this type of survey at the start of the 2023 survey season. These surveys were conducted following the Bat Conservation Trust Survey Guidelines (BCT, 2016).

An inspection of the trees was undertaken from ground level to compile information about the tree, identify features that bats could potentially use for roosting and record any evidence of bat roosting. The survey was carried out using binoculars and a Clulite (Clu-Briter). Where roosting features (cavities / fissures) were easily accessible from ground level, a closer inspection was undertaken using a RIDGID SeeSnake CA300 Inspection Camera to check for definitive signs of bat roosting.

Potential features that may be used by roosting bats in trees include:

- Woodpecker holes;
- rot holes;
- hazard beams;
- vertical or horizontal cracks and splits (such as frost cracks) in stems and branches;
- partially detached flaky bark;
- knot holes arising from naturally shed branches, or branches previously pruned back to the branch collar;
- man-made holes (e.g. cavities that have developed from flush cuts) or cavities created by branches tearing out from parent stems;
- cankers (caused by localised bark death) in which cavities have developed;
- other hollows or cavities, including butt rot;
- double leaders forming compression forks with included bark and potential cavities;
- gaps between overlapping stems or branches;
- partially detached Ivy (Hedera helix) with stem diameters in excess of 50 mm and/or dense Ivy that could potentially be hiding roosting features; and
- artificial bat, bird or dormouse nest boxes.

Trees were categorised based on the features' potential to support roosting bats, according to the descriptions provided in Table 2 below.

Table 2 Guidelines for assessing the potential suitability of structures or trees to support roosting bats based on the presence of features

Suitability	Description of Roosting Habitat
Negligible	Negligible habitat features on site likely to be used by roosting bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e., unlikely to be used for maternity or hibernation) A tree of sufficient size and age to contain potential roosting features but with none seen from the ground or features seen with only very limited roosting potential.
Moderate	A structure or tree with one or more potential roosting sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but are unlikely to support a roost of high conservation status.
High	A structure or tree with one or more potential roosting 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.

Building Inspection Surveys

The potential roost suitability of the buildings on site were assessed following best practice survey guidelines (BCT, 2016). The buildings were assessed from the ground for potential bat roosting features and suitability based on Table 2 above.

A building inspection of both buildings was undertaken on 27/04/2023 by licensed surveyors Tim Buckland and Jack Hughes (registration number: 2015-11006-CLS-CLS). An external survey of the building included examining outer surfaces for evidence of roosting, including droppings on walls, ledges, doors and sills. A high-powered lamp and binoculars were used to examine potential roosting features and access points. For the internal inspection, the licensed surveyor examined the internal spaces of the building searching for bats and signs of use by bats such as droppings and feeding remains. The location of the buildings surveyed are shown on Figure X, Appendix X.

Detailed Ground Tree Inspection Surveys

Fibrescope surveys from ground were undertaken on trees identified as offering Low, Moderate or High bat roosting suitability to further assess suitability, confirm presence / absence and inform further survey effort. Although 2016 guidance states that all "low" potential trees don't need survey, one survey of low potential trees was carried out on a precautionary basis, as we had the knowledge that the expected 2023 BCT guidance would require survey of trees with low potential. In line with the latest guidance if a tree was assessed to having High or moderate potential it was subject to three surveys if a tree was assessed as Low it was subject to one survey. The fibrescope survey information is presented in Appendix A in Table A1. The detailed tree inspection surveys were undertaken on trees within the survey area. The detailed tree inspections surveys were led by Steve Hancock CEnv MCIEEM and holds a level 2 class licence for bats (registration number: 2015-11662-CLS-CLS). Steve was assisted by Samuel Radonich BSc MRes a qualifying member of CIEEM and is an accredited agent under Henry Smith's level 2 class licence for bats (registration

number: 2018-37280-CLS-CLS) and Dan Howgego BSc (Hons) MSc ACIEEM and is an accredited agent under Hazel Robson's level 2 class licence for bats (registration number: 2015-10504-CLS-CLS).

The surveyors recorded the internal dimensions of features, internal conditions, and any evidence of bat roosting activity (presence/absence of bats/droppings, smoothing, feeding remains, smell, staining, bat fly *Nycteribiid* sp pupae and squeaking noises). Any bat droppings found were collected (where possible) and considered for DNA analysis to determine the species of bat using the tree. Where features could not be fully inspected with a fiberscope or safely climbed. emergence / re-entry surveys were recommended.

Tree Climbing Inspection Surveys

Tree climbing inspections were undertaken on trees identified as offering Low, Moderate or High bat roosting suitability that could not be fully assessed from ground level. The climbing inspection included assessment of the suitability of feature(s) from height, confirm presence / absence of bats and/or roosting features and inform further survey effort. As discussed above if a tree was assessed to having High or moderate potential it was subject to three surveys if a tree was assessed as Low it was subject to one survey (BCT, 2016 and 2023). The tree climbing inspections were undertaken by ecologists who were experienced tree climbers, bat licensed and NPTC CS38: Tree Climbing & Aerial Rescue qualified using rope and harness techniques. The tree climbing inspection surveys were undertaken on trees within the redline boundary.

Surveyors recorded the internal dimensions of features, internal conditions, and any evidence of bat roosting activity (presence/absence of bats/droppings, smoothing, feeding remains, smell, staining, bat fly *Nycteribiid* sp pupae and squeaking noises). Any bat droppings found were collected (where possible) and considered for DNA analysis to determine the species of bat using the tree. Where features could not be fully inspected with a fiberscope, emergence / re-entry surveys were recommended.

Dusk Emergence/Dawn Re-entry Surveys

Following the preliminary scoping surveys, all suitable buildings and trees were subjected to an appropriate number of dusk or dawn surveys with a sufficient number of surveyors to establish the presence or absence of bat roosts (see Appendix A for building locations and XXXX for tree locations). Dusk or dawn surveys were undertaken on trees identified as offering Moderate or High bat roosting suitability where tree climbing surveys were either not possible, features could not be fully inspected from height. The survey schedule was based on good practice guidelines (BCT, 2016) where the number of surveys was proportionate to their suitability as follows:

- Buildings with a 'low' level of suitability were subjected to at least one dusk or dawn survey.
- Buildings and trees with a 'moderate' level of suitability were subjected to at least two dusk or dawn surveys.
- Buildings and trees with a 'high' level of suitability were subjected to at least three dusk or dawn surveys.
- No further survey effort was completed on buildings with a 'negligible' level of suitability.
- No further survey effort was completed on trees with a 'negligible' level of suitability.

The number of surveys identified above is the number of surveys required to be confident that roosting bats are likely absent. In the event that bat roosts were discovered during the survey schedule, survey frequency or coverage at individual roosting sites was altered as necessary until sufficient information was available to accurately determine roosting status, assess impacts and design mitigation measures.

All dusk / dawn surveys involved experienced surveyors positioning themselves at strategic vantage points around the tree / building to obtain maximum coverage. The number of surveyors at each tree / building was informed by the number of vantage points considered necessary for suitable roosting features to receive adequate coverage. Each surveyor was equipped with an infrared camera focused on the feature in the knowledge that this would be a requirement on the release of the 4th edition (BCT, 2016 and 2023).

Since the two buildings were of ‘moderate’ suitability or above, they required more than one survey. Each vantage point was covered once by a dusk emergence survey and once by a dawn re-entry survey. The surveys on the two buildings were undertaken in July and September 2023 on the dates provided in Table XXX. The location of the buildings (which are adjacent to each other) is identified as "B1 And B2” on Figure XXXX in Appendix XXXX. Tree locations are identified on Figure XXXX in Appendix XXXX.

The surveys were carried out by ecologists Steve Hancock CEnv MCIEEM. Steve was assisted by Samuel Radonich BSc MRes and Dan Howgego BSc (Hons) MSc ACIEEM. George Parry BSc Mres a qualifying member of CIEEM with five years’ experience of bat ecology, Callum Moores Bsc MSc a qualifying member of CIEEM with a years experience in ecological consultancy, Tim Buckland BSc MSc MCIEEM and Alex Burrows BSc MSc.. During the completion of the ground level tree assessments Tim and Alex were assisted by Agnes Rutter BSc MSc and Jack Hughes BSc.

Surveyors recorded all bat activity, but particularly focussed their attention on whether bats emerged from or re-entered buildings or tree whilst documenting the time, bat species and behaviour.

Survey dates, surveyor details and weather conditions are detailed in table A3 in Appendix A. All dusk surveys commenced 15 minutes before sunset and continued for at least 1.5 hours afterwards. Dawn surveys commenced 1.5 hours before sunrise and continued for 15 minutes afterwards. Equipment included Infrared Camera and Bat logger M bat detectors.

Bat Activity Surveys

In apprehension of the upcoming changes in the new bat guidance (BCT, 2023) and based on similar linear projects a static and trapping based methodology was used to determine the foraging and commuting behaviour of bat species on site. This is a proven method for obtaining more accurate information around the foraging and commuting behaviour than traditional transect methods (BCT, 2023). This approach to surveys was presented to Natural England during a meeting on protected and notable species. Natural England subsequently assessed that they are satisfied with this methodology.

Bat Static Automated Surveys

The scope of static detector deployment was based upon the prescriptions and design recommendations present within the relevant Bat Survey Guidelines (Collins, J. 2016). The survey period was conducted between May and October 2023.

Static Detector Positioning

The number and positioning of static detectors was determined according to the parameters within the Bat Survey Guidelines (Collins, J. 2016). 12 SM4 static bat detectors were positioned at strategic locations within the survey area, with the number required being based upon the size of the survey area. These locations are shown in Table 1 below. A map showing the locations of the static detectors can be seen in Figure 1.

Table 3: Locations of static bat detectors.

Detector Number	W3W	Grid Reference
N3	shielding.rebel.scowls	SP 00627 26502
N4	cakes.vibrates.seeing	SP 00642 27144
N5	announced.derailed.charities	SP 01310 26017
N6	country.quench.gentlemen	SP 01265 26098

N7	food.spelled.scariest	SP 00696 26751
N8	risk.bonfires.books	SP 01150 27090
S3	mixed.vibes.kept	SO 99789 23847
S4a	slate.dragon.lows (May-June)	SO 99485 20981 (May-June)
S4b	sounds.policy.slams (July-October)	SO 99254 21535 (July-October)
S5	effort.actor.discouraged	SO 99903 22854
S6	fails.reckons.owls	SP 00318 22051
S7	active.fired.making	SO 99028 20510
S8	moon.muddy.apart	SP 01486 23517

The locations of the static detectors were determined according to a 'Judgemental' sampling protocol, as other, more randomised detector deployment strategies were not practicable. This was due to access limitations, risk of interference from the public and land usage (i.e. detectors had to be positioned where they would not interfere with industrial or farming uses of the site. The judgemental positioning employed the following assessment considerations:

- Distributed across the site to gain maximum area coverage;
- Positioned within or adjacent to a range of habitats present on and around the site, ensuring that all broad habitats received coverage from the detectors;
- A subset of the detectors were positioned on linear features and habitats considered likely to be of value for bats;
- Some detectors were positioned adjacent to inaccessible areas to record bats potentially emerging from these areas.

The detector microphones were positioned at 1 - 2m above the ground where possible, attached to landscape features (fence posts, trees, structures) with the microphones in a 45 degree downwards position. Where the microphones were positioned in linear features, the microphones were positioned at 90 degrees to the direction of the feature. The positioning of the microphones was selected to be in areas where vegetation or any other natural features would not interfere with the microphone.

Static Detector Programming

The detectors were programmed to commence recording 30 minutes prior to sunset and continue recording throughout the night until 30 minutes after sunrise, in line with BCT Good practice guidelines. Table 5 below outlines the deployment details for static detectors at each location.

Table 5: Details of the deployment dates at each static detector position

Month (2023)	Position	Start Date	End Date
May	N3-8	20/05/23	25/05/23
	S3-8	25/05/23	30/05/23
June	N3-8	02/06/23	07/06/23
	S3-8	07/06/23	12/06/23
July	N3-8	14/07/23	19/07/23
	S3-8	19/07/23	24/07/23
August	N3-8	23/08/23	29/08/23

	S3-8	18/08/23	23/08/23	
September	N3-8	20/09/23	25/09/23	Additional data collection on 29/09/23 and 30/09/23 for S3-8 to compensate for lack of September data
	S3-8	15/09/23	20/09/23	
October	N3-8	06/10/23	13/10/23	
	S3-8	01/10/23	06/10/23	

Static Detector Data Analysis Methodology

For each detector, five nights of surveys were analysed per month to inform the reporting. Due to the large amount of data to be analysed, it was assessed that an automated detector analysis protocol would be required. From extensive previous project experience it was concluded that the most reliable data analysis software available is Kaleidescope Pro.

All static detector data was analysed using the "Auto ID" feature of the Kaleidescope Pro software to automatically identify bat calls. The details of the settings for the Kaleidescope Pro parameters can be seen in Appendix XXX. Despite the high quality of automated data analysis, all detector software has a percentage of incorrect or uncertain identifications. To address this issue, a verification protocol was conducted, whereby 5% of calls, including calls recorded by Kaleidescope Pro's AutoID as "NoID" but excluding those recorded as "Noise" were also checked manually. In cases where the manual identification differed from the AutoID result, the AutoID result was overridden and the manually identified result was reported. All recordings reported as Noise and NoID after this process were removed from the dataset.

Subsequently, further analysis was implemented to ensure that our data set was robust. A comparison of the manually identified results to the AutoID result given from the same recordings were made. This additional analysis was performed in order to determine the confidence level for the AutoID software to accurately identify each bat species. This assessment did change how certain species identifications were handled – see below. Table 6 shows how the Auto ID verification changed how certain bats were recorded in the analysis.

Table 6: Bat Auto ID results data classification

Auto ID Category	Meaning of Category	Findings	Data handling
PIPPIP	Common Pipistrelle	>90% correct	Grouped with Soprano Pipistrelles in "Pipistrelles"
PIPPYG	Soprano Pipistrelle	86% correct to genus level	Grouped with Common Pipistrelles in "Pipistrelles"
MYODAU	Daubenton's Bat	>90% correct to genus level	Grouped with other Myotis Bats
RHIHIP	Lesser Horseshoe Bat	>90% correct	Retained
NYCNOC	Noctule	88% correct	Retained – Although having a slightly lower confidence threshold, these were retained to species level as the scope

			of mitigation for big bats (noctule, serotine and Leisler's) will be consistent.
EPTSER	Serotine	>90% correct	Retained
BARBAR	Barbastelle	>90% correct	Retained
PLEAUR	Brown Long-eared Bat	82% correct	Grouped with grey long-eared as "long-eared bats"
MYOMYS	Whiskered Bat	>90% correct to genus level	Grouped with other Myotis Bats
MYOBRA	Brandt's Bat	>90% correct to genus level	Grouped with other Myotis Bats
NYCLEI	Leisler's Bat	>90% correct	Retained
PLEAUS	Grey Long-eared Bat	>90% correct	Grouped with brown long eared as "long-eared bats"
MYONAT	Natterer's Bat	>90% correct to genus level	Grouped with other Myotis Bats
PIPNAT	Nathusius' Pipistrelle	>90% correct	Retained
RHIFER	Greater Horseshoe Bat	82% correct	Retained – Although a lower confidence threshold was found, this is a likely result of the small sample size of greater horseshoe calls. As they are known to be present on site (from trapping survey) this data is retained at species level.
MYOBEC	Bechstein's Bat	82% correct to genus level	Grouped with other Myotis Bats
MYOALC	Alcathoe Bat	100% correct to genus level	Grouped with other Myotis Bats

Following the stages of data validation outlined above, the following bat identification categories were used for analysis:

Table 7: Simplified identification categories utilised within the static detector result analysis.

Identification Category	Species within the category

Pipistrelles	Common Pipistrelle
	Soprano Pipistrelle
Myotis Sp.	Daubenton's Bat
	Whiskered Bat
	Brandt's Bat
	Natterer's Bat
	Bechstein's Bat
	Alcathoe Bat
Lesser Horseshoe Bat	Lesser Horseshoe Bat
Noctule	Noctule
Long-eared Bat	Grey Long-eared Bat
Greater Horseshoe Bat	Brown Long eared Bat
Serotine	Serotine
Barbastelle	Barbastelle
Leisler's Bat	Leisler's Bat
Likely Nathusius' Pipistrelle	Nathusius' Pipistrelle
Greater Horseshoe Bat	Greater Horseshoe Bat

Activity Normalisation

After each set of static data was analysed, the data was 'normalised' to allow activity levels between positions to be compared. This was conducted using a script in R Studio, whereby the number of calls recorded was divided by the number of hours that a detector was recording, giving the number of bat passes per hour at each location. This R script facilitated the production of various outputs such as tables and graphs shown in the static detector results section.

Trapping / Radio Tracking Surveys

The trapping and radio tracking surveys were based upon the advanced survey methodology present within good practice guidelines (BCT, 2016). The surveys were undertaken under Natural England project licence 2023-64937-SCI-SCI. The baseline report by Davidson-Watts Ecology is appended as Appendix XXX. Results from the report are summarised and interpreted in Section 3, whilst the discussion and evaluation are in Sections 4 and 5 respectively.

Trapping and radio tracking efforts were focused on Breakheart Plantation since this is the largest area of woodland to be impacted by the project and therefore there is potential for significant effects here. The new cable route passes from the northern edge of the woodland to the southern edge and could therefore result in potentially significant fragmentation effects and a loss of suitable foraging and roosting habitat for bats.

Two one-week sessions were undertaken since the use of a site can vary depending on the reproductive state of bats:

- 10-15 July 2023 (the night of 10th July abandoned due to heavy rain): mid-maternity period when adult females are expected to be rearing young; and
- 21-26 August 2023 (weather conditions were appropriate throughout): end of the maternity period when juvenile bats are expected to have weaned and become largely independent from their mothers.

Trapping Methods

Trapping surveys were undertaken by either one or two experienced surveyors acting as Authorised Persons under the above licence.

Up to two trapping areas within the site boundary were surveyed each night, with each trapping area monitored using 3 x 4 m^2 harp traps or 6-12 m mist nests placed within woodland or along tracks or rides where bat activity was expected to be greatest. Trap locations used across the two survey sessions are provided in Figure XX. Acoustic lures emitting synthesised or pre-recorded bat echolocation and/or social calls were used to improve catch efficiency in woodland (Hill and Greenaway 2005). The species, sex, age and breeding status of all captured bats was determined, and bats were immediately released at capture site. Handheld bat detectors (Pettersson 240x or Elekon Batlogger M) were used to assess bat activity in the area of the traps.

Tracking Methods

Target bats were fitted with lightweight radio-transmitter tags (Lotek Ltd, Wareham, Dorset, United Kingdom) weighing <5 % of the weight of the bat using medical adhesive. The following welfare precautions were taken at this stage:

- No female bats in advanced stages of pregnancy were tagged;
- Lactating bats were tagged if they met the target weight and were in good condition, although early lactating bats were not tagged;
- Bats were released within 30 minutes of capture; and
- Tagged bats were fitted with 2.9 mm or 4.2 mm aluminium rings (Porzana Ltd, Icklesham, East Sussex, United Kingdom) to allow identification of recaptured individuals and prevent repeated tagging.

Radio tracking was undertaken for a period of up to five nights following capture. Bats were located to roosts during the day and tracked for up to 4 hours following emergence to identify key commuting routes and foraging activity. Close approach and triangulation (the latter where access was not possible or close contact could not be maintained) methods of radio tracking were used.

Roost Emergence Methods

When tagged bats were tracked to accessible roost sites, subsequent roost emergence counts were undertaken using infrared cameras with infrared illuminators, and/or thermal cameras (Canon XA10/XA40, Infiray 640) to determine roost size and status (e.g. maternity roost). Roost attributes such as location, type of structure and other descriptors were recorded, where possible.

Evaluation

The assessment of the value of the bat population on site is based on the latest bat mitigation guidelines published by CIEEM in 2023 (Reason and Wray, 2023). Where not only the rarity of the species present is considered (Table 7) but also the importance of the roosts (Table 8), importance of commuting and foraging routes and the importance of the assemblage present (Table 9).

Table 7 Categorising bats by rarity in South-west England and south Wales.

Rarity	Species
Widespread all geographies	*Ppip* *Ppyg* *Paur*
Widespread in many geographies, but not abundant in all	*Mmys* *Mbra* *Mdau* *Mnat* *Nnyc*
Rarer or restricted distribution	*Rhip* *Eser* *Nlei* *Pnat*
Rarest Annex II species and very rare	*Rfer* *Mbec* *Bbar* *Paus*

Table 8 Assessing importance of roosts

Conservation status/ distribution	Feeding perches; night-roosts; Individual or very small occasional/ transitional/ opportunistic roosts	Non-breeding day roosts (small numbers of species)	Mating sites (excluding individual trees and larger swarming sites); small numbers of hibernating bats	Larger transitional roost	Hibernation sites	Autumn swarming sites [largely, vesper species which hibernate underground]	Maternity sites
Widespread all geographies	Site	Site	Site	Site/local	District/county Larger hibernation	District/County Very rare pipistrelle swarming	Unlikely to exceed district importance

					sites rare in the UK	sites appear uncommon in the UK	unless colonies
Widespread in many geographies but not as adbundant in all	Site	Site	Site, dependant on local distribution	District	District/county importance dependant on size and number of species	County/regional importance dependant on size importance increased for larger sites that serve larger number/species	Unlikely to exceed county importance unless colonies are atypically large: importance increased for assemblages
Rarer or restricted	Site (very well used night roosts may be of district importance for some species)	Site/local/District dependant on local distribution	Site/local/District dependant on local distribution	District	District/County importance dependant on size and local distribution Increased value for assemblages	County/regional importance on size and local distribution Increased value for assemblages	County/regional importance on size and local distribution increased value for assemblages
Rarest Annex II species and very rare	Site (very well used night roosts may be of District importance for some species)	Site/local/district dependant on local distribution	Site/local/district dependant on local distribution	District	County/Regional importance on size and local distribution Increased value for assemblages	County/Regional importance on size and local distribution Increased value for assemblages	County/Regional importance on size and local distribution Increased value for assemblages

Table 9 assessing the importance of bat assemblages.

Rarity Category (points/species)		South-west England and South Wales (Maximum Score)
Widespread all geographies Score 1	*Ppip* *Ppyg* *Paur*	*Score 3*
Widespread in many geographies but not as abundant in all Score 2	*Mmys* *Mbra* *Mdau* *Mnat* *Nnyc*	Score 10
Rarer or restricted distribution	*Rhip*	Score 12

Score 3	*Eser* *Nlei* *Pnat*	
Rarest Annex II species and very rare Score 4	*Rfer* *Mbec* *Bbar* *Paus*	Score 16
Thresholds	*Maximum possible*	*41*
County importance threshold 45%	*County*	*18*
Regional importance threshold 55%	*Regional*	*23*
National importance threshold 70%	*National*	*29*

3.3 Limitations

Due to technical error the audio data for the emergence survey of Tree 412 on 03/07/23 and of T429 on 27/07/23 were lost, thus the paper proforma could not be checked via sound analysis. However, the surveys were carried out by experienced bat ecologists and therefore the proformas can be relied upon to give an accurate picture of bat activity on those surveys.

Static detector 4 changed location after June (hence 4a being the original location and 4b being the updated location). This change was decided based on updates to the design meaning that data collected from the original location was of minimal value since it was far away from the site.

The data collected by static detectors in September was very low compared to other months, perhaps due to heavy rainfall during the time that the detectors were recording. This has been somewhat compensated for by setting up the detectors for an additional two days on 29th and 30th September. Five days of data was still collected and analysed for September period.

4 Results

4.1 Desk Study

Desk study information relating to bat species including designated sites is outlined below. A full breakdown of all ecological information returned from the desk study can be found in the Ecological Impact Assessment Report Number XXXX.

Statutory Designated Sites

No statutory designated sites returned by the desk study provide bats as a reason for their designation within their citations.

Table 10 – statutory sites within 5km

Site	Description	Location
Dixton Wood SAC	Broad-leaved deciduous woodland. Violet click beetle (*Limoniscus violaceus*) was discovered at Dixton Wood in 1998 and it has been found at the site on a single occasion subsequently. This species is listed as a species of importance in the Cotswolds (Cotswolds National Landscape, 2021). It is a small site with large number of ancient ash (*Fraxinus excelsior*) pollards and supports a rich fauna of scarce invertebrate species associated with decaying timber on ancient trees.	4.91 km Northeast
Cotswold Beechwoods SAC	The Cotswold Beechwoods represent the most westerly extensive blocks of beech (*Asperulo-Fagetum*) forests in the UK. The woods are floristically richer than the Chilterns, and rare plants include red helleborine (*Cephalanthera rubra*), stinking hellebore (*Helleborus foetidus*), narrow-lipped helleborine (*Epipactis leptochila*) and wood barley (*Hordelymus europaeus*). There is a rich mollusc fauna. The woods are structurally varied, including blocks of high forest and some areas of remnant beech coppice. Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco-Brometalia*) provide important habitats for orchids.	8.92 km Southeast
Lineover Wood SSSI	Notified as an outstanding example of ancient semi-natural coppice woodland, rich and varied in ground flora. It is also locally important for its association with traditional lime and hazel coppice management.	1.80 km South
Cleeve Common SSSI	A large area of unimproved limestone grassland. It is also the largest unenclosed “Wold” on the Cotswold escarpment, with over 400 hectares of open space. The site supports several orchid species and also provides suitable conditions for a wide range of invertebrates.	0.06 km West

Puckham Woods SSSI	An area of unimproved limestone grassland and species-rich, ancient semi-natural woodland, which are representative of vegetation types much reduced by recent changes in land use and management. The site also supports the nationally scarce bastard toadflax (*Thesium humifusum*).	1.10 km East
Leckhampton Hill and Charlton Kings Common SSSI	The site consists of a range of habitats including unimproved Jurassic limestone grassland, scrub, woodland, scree slopes and cliff faces. The site lies immediately south of Cheltenham and differs from many of the Cotswold Scarp grasslands in having a predominantly north-facing aspect. The grassland flora includes many plants which are scarce or local at a national or county level. These include Fly Orchid (*Ophrys insectifera*), Purple Milk-vetch (*Astragalus danicus*) and the nationally scarce Musk Orchid (*Herminium monorchis*).	3.45 km Southwest

Species Records

The desk study returned records of fifteen bat species within 2km of the survey area. Table X below presents a summary of the desk study data obtained from Gloucestershire Centre for Environmental Records.

The desk study identified seven granted EPS licence applications for bats within 2km of the survey area, these are presented below in Table X.

Table 11: Summary of desk study data

Species	Scientific name	Records (non-roost)	Records (roost)*	Number of roost locations**	Granted EPS licence application	Roost type
Common Pipistrelle	*Pipistrellus pipistrellus*	39	14	5	4	Day roost
Soprano Pipistrelle	*Pipistrellus pygmaeus*	48	3	2	1	Day roost
Brown Long-eared Bat	*Plecotus auritus*	25	12	0	3	Day Roost

Species	Scientific name	Records (non-roost)	Records (roost)*	Number of roost locations**	Granted EPS licence application	Roost type
Noctule	*Nyctalus noctula*	6	1	1	0	N/A
Leisler's	*Nyctalus leisleri*	3	0	0	0	N/A
Lesser Horseshoe Bat	*Rhinolophus hipposideros*	66	16	6	4	Hibernation, Day roost, Maternity
Greater Horseshoe Bat	*Rhinolophus ferrumequinum*	6	0	0	0	N/A
Serotine	*Eptesicus serotinus*	9	0	0	0	N/A
Natterer's Bat	*Myotis nattereri*	17	12	2	0	Day roost
Daubenton's Bat	*Myotis daubentonii*	24	1	1	0	N/A
Nathusius's Pipistrelle	*Pipistrellus nathusii*	1	0	0	0	N/A
Brandt's Bat	*Myotis brandtii*	6	0	0	1	N/A
Bechstein's Bat	*Myotis bechsteinii*	6	0	0	0	N/A
Whiskered Bat	*Myotis mystacinus*	20	2	1	1	N/A
Barbastelle	*Barbastella barbastellus*	3	1	1	0	N/A
Unidentified bat	Chiroptera	22	9	0	0	Summer roost
Myotis bat species	*Myotis* sp.	1	0	0	0	N/A
Long-eared Bat species	*Plecotus* sp.	4	1	1	0	N/A
Pipistrelle bat species	*Pipistrellus* sp	11	0	0	0	N/A

* N.B. Definitive records were not provided to determine ‘roost’ or ‘non-roost’. Those records recorded as roosts included within the description information which confirms or suggests that the record is a roost, for example the presence of droppings, recorded or probable emergence or a sighting of roosting bats.

** N.B. Number of roost locations is where the location provided is the same for multiple records and has therefore been combined and assumed as a single roost location.

4.2 Field Survey

4.3 Habitat Assessment

During the extended Phase 1 habitat survey, the following habitats were reported to be of potential value to bats:

- Mosaics of woodland edge, streams, standing water, hedgerows and grassland had high suitability for commuting and foraging bats
- Mature trees and buildings throughout the survey area provided potential roosting opportunities

74 trees were noted to be of high potential value to roosting bats, 9 of moderate potential value, and 5 trees of low potential value. These were incidental findings scattered throughout the survey area and a detailed survey of all trees was not undertaken at this stage. Further assessment of buildings was also not undertaken during Phase 1 survey.

Other habitats on site, notably the large areas of agricultural land dominated by arable and pasture farmland, are considered to be of lower value to foraging and commuting bats.Preliminary Ground Level Roost Assessments

The preliminary ground level roost assessment (GLTA) included trees within the survey area. The results of the preliminary ground level roost assessment are summarised in Table 12 below using the classification provided in Table 2, Section 3.2. The location and results of the preliminary assessment are shown as a colour coded dot (with tree number) in Figure 3.

Table 12: Summary of high, medium and low potential trees found during GLTA

Classification of bat trees	Number of trees within the survey area
Low potential	275
Moderate potential	208
High potential	25
Confirmed roost	2
Total	510

Further Tree Surveys

Further surveys were undertaken on trees with low, moderate or high suitability for use by roosting bats within the redline boundary. Due to the high density of trees with potential in Breakheart Plantation it was decided that using advanced survey techniques (tagging and radio tracking) would be a more effective method than

individual inspection of each feature/tree. Following this, the remaining 93 trees either underwent additional tree climbing or emergence survey/

Climbing/Ground Inspection Surveys

This section of the report presents the results of the fibrescope surveys from ground, ladder and tree climbing inspections of 93 trees conducted from May to September 2023. Potential roost feature details are presented in Appendix A table A1. In summary, two confirmed bat roosts were identified during the fibrescope / tree climbing surveys, one common pipistrelle in T501 and one natterer's bat in T219. Figure 2 presents the known roost locations and figure 3 shows suitability of trees within the survey area.

Dusk Emergence/Dawn Re-entry Surveys

This section of the report presents the results of the bat emergence surveys of 22 trees (18 identified during the GLTA and four trees deemed unsafe to climb) conducted in May – September 2023. Table 13 below summarises the roost category following the surveys. Proformas with details of the surveys including timings and weather data from the surveys are presented in Appendix A table A3. Tree roost feature information is presented in the Tree Roost Feature Assessment data in Appendix A table A1. In summary, a single common pipistrelle bat roost was found during the surveys in T344. The location of this roost is presented in Figure 2.

Table 13 Tree Suitability Following Emergence/Re-entry Surveys

Tree Number	Tree Suitability	Updated Tree Suitability Following Emergence/Re-entry Surveys
84	M	M
129	H	H
130	M	M
132	M	M
139	M	M
150	H	M
244	M	M
281	M	M
323	M	M
324	M	M
328	M	M

329	M	M
342	H	H
397	H	H
398	H	H
412	H	M
429	M	M
458	M	M
478	M	M
29	M	M
92	M	M
344	M	Confirmed roost (single Common pipistrelle)

Summary of Results

The collated results from all surveys are presented in Table 14 below and presented on Figure 3. Tree inspection raw data can be found in Appendix A table A1.

Table 14 Bat Roost Suitability of Trees within the Proposed Development Site Following All Surveys

Bat Roost Suitability	Number of Trees	Tree Number
Negligible	6	181, 207. 208, 287, 236, 271
Low	5	19, 221, 284, 358, 506
Moderate	83	100, 103, 112,113, 117, 179, 186, 187, 189, 198, 199, 227, 290, 310, 315, 325, 354, 355, 356, 367, 371, 372, 410, 413, 441, 459, 496, 498, 502, 191, 88, 110, 131, 16, 138, 140, 184, 226, 261, 276, 284, 313, 322, 326, 327, 336, 434, 476, 141, 147, 183, 185, 195, 196, 228, 232, 238, 246, 251, 258, 260, 262, 266, 275, 312, 357, 425, 84, 130, 132, 139, 244, 281, 323, 324, 328,

		329, 342, 397, 429, 458, 478, 29, 92
High	19	111, 116, 149, 220, 279, 330, 363, 375, 508, 176, 177, 237, 240, 306, 308, 129, 150, 398, 412
Confirmed Roost	3	219, 501, 344

Building Surveys

Bat Building Assessment Results

During the initial survey and site design, two buildings were highlighted for potential demolition as a result of works. Building 1 (B1 – Western Barn) was assessed as having moderate roosting potential and Building 2 (B2 – Eastern Barn) was assessed as having moderate roosting potential. Details of the locations of the buildings is presented in table 15 below. Full details of the assessments conducted, and the results are presented below in appendix B, Further photographs are presented in Appendix C.

Table 15: Results of the bat building assessment

Building Number	Building Type	Building Description	Assessment Date	Surrounding Habitat	Internal Inspection Conducted?	Building Features	Evidence of bats	Photograph	Summer Roost Potential (Initial Assessment)	Further Surveys Required	Does Building have Hibernation potential?
B1 – Eastern Barn	Large open agricultural barn	Metal girder construction with walls comprising breeze blocks and corrugated metal on north and south elevations and vertical timber cladding on the west and east elevations. The roof is lined with corrugated asbestos sheets.	27/04/2023	Surrounded by high quality foraging and commuting habitat comprising pastoral fields tree lined hedgerows, Dowdeswell woods to the east and large waterbody at Dowdeswell Nature Reserve to the south.	Yes	Limited roosting opportunities inside the barn. Restricted gaps between timber beams and asbestos panels and between asbestos panels and metal girders.	None		Moderate	Yes – at least two emergence / re-entry surveys	No
B2 – Western Barn	Large open agricultural barn	Timber beam construction with walls comprising breeze blocks and vertical timber cladding. Roof lined with corrugated asbestos and capped with corrugated metal panels.	27/04/2023	Same as B1.	Yes	Limited roosting opportunities inside the barn. Restricted gaps between timber beams and asbestos panels.	None		Moderate	Yes – at least two emergence / re-entry surveys	No

Bat Building Dusk Emergence/Dawn Re-entry Surveys

A single bat emergence survey was conducted in July 2023 followed by a single bat re-entry survey in September 2023. Tables 16 and 17 below summarise the results of the surveys. Photographs of the features are presented in Appendix C. Weather data and timings from the surveys are presented in Appendix B.

Table 16: Results of the dusk emergence survey

Building	Initial Roost Assessment	Survey Date(s)	Start Time/End Time	Weather Conditions	Roosts Found During Survey
B1 – Eastern Barn	Moderate	24/07/2023	20.42/ 22.50	Partly cloudy, dry, light wind, 15C	None
B2 – Western Barn	Moderate	24/07/2023	20.42/ 22.50	Partly cloudy, dry, light wind, 15C	None

Table 17: Results of the dawn re-entry survey

Building	Initial Roost Assessment	Survey Date(s)	Start Time/End Time	Weather Conditions	Roosts Found During Survey
B1 – Eastern Barn	Moderate	05/09/2023	04.56	Clear sky, dry, light wind, 11C	None
B2 – Western Barn	Not stated in assessment...	05/09/2023	06.41	Clear sky, dry, light wind, 11C	None

In summary, no roosts were found during the surveys. The details of surveyor positions and activity recorded is presented in Figure XX. Following survey and micrositing proposed works, these buildings will be retained as part of the project.

Bat Activity Surveys

Bat Static Automated Surveys

All Positions

During the survey period (May to October 2023), a total of 123,005 bat calls were identified. Of the 5 nights of data analysed, the calls recorded were largely pipistrelle bats (common and soprano pipistrelles combined), these formed 83% of the total calls. Due to their commonality, pipistrelle bats have been removed from more detailed analysis, allowing greater emphasis on rarer bat species. All four Annex II species (barbastelle, Bechstein's, greater horseshoe and lesser horseshoes bats) were identified on site.

Figure XXX: Proportion of calls attributable to each species / species group during static surveys (Pipistrelle bats removed).

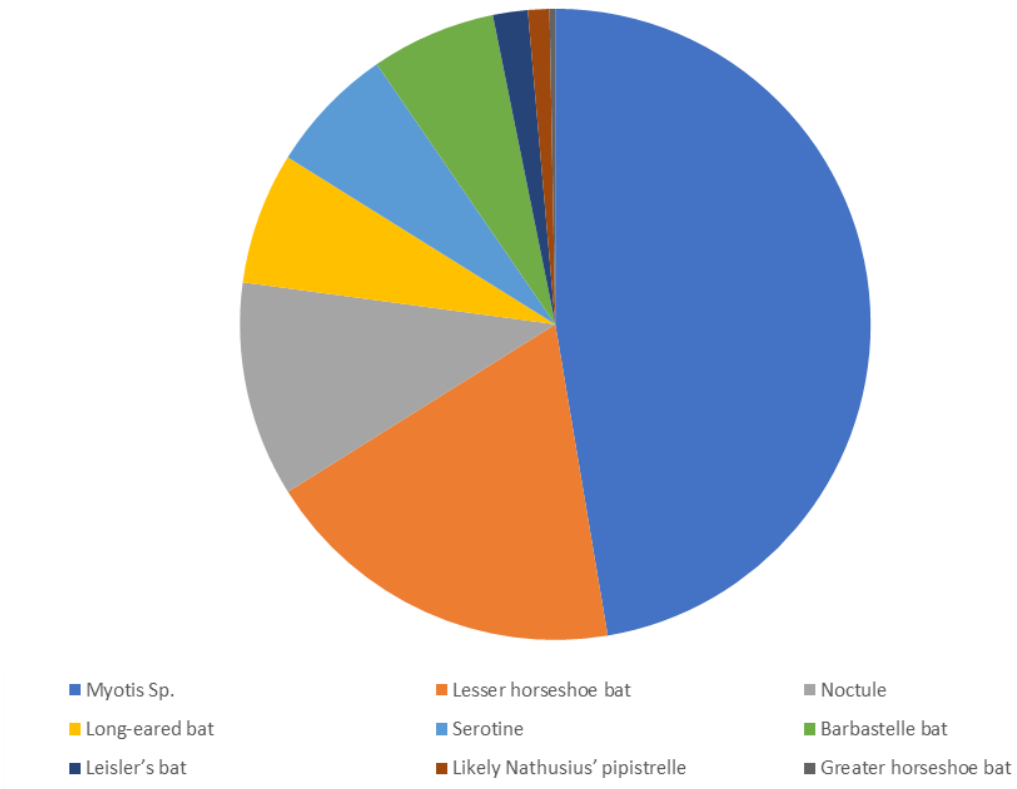


Table 18 below shows the number of bat passes at each static location and the percentage proportion of each species. Table 19 shows the normalised bat passes per hour during static detector surveys at each static detector position.

Table 18: Total bat passes recorded during static detector surveys at each static detector position.

SPECIES	N3	N4	N5	N6	N7	N8	S3	S4a	S4b	S5	S6	S7	S8	Total Count (No.)	Percentage of Total (%)
Pipistrelle bat	18,000	13,131	3,255	25,546	6,231	4,037	1,307	3,067	2,569	11,991	5,389	7,195	454	102,172	83.06
Myotis Sp.	843	849	200	939	866	865	199	46	258	785	3,163	687	163	9,863	8.02
Lesser horseshoe bat	368	227	79	212	850	532	271	28	407	40	318	62	514	3,908	3.18
Noctule	14	474	379	108	210	263	224	159	36	75	97	48	210	2,297	1.87
Long-eared bat	58	5	122	568	167	34	59	13	68	2	151	67	23	1,408	1.14
Serotine	6	43	19	38	328	59	1	28	64	2	140	622	13	1,363	1.11
Barbastelle bat	97	31	422	55	104	16	74	2	169	19	188	46	110	1,333	1.08
Leisler's bat		46	13	5	26	51	92	6	21	6	4	74	28	372	0.30
Likely Nathusius' pipistrelle	4	11	16	41	20	7	58	7	8	12	20	9	16	229	0.19
Greater horseshoe bat	15	3	9	2	5	2	14	1	1	1	6	1	1	61	0.05

Table 19: Normalised bat passes per hour during static detector surveys at each static detector position.

SPECIES	N3	N4	N5	N6	N7	N8	S3	S4a	S4b	S5	S6	S7	S8
Pipistrelle bat	49.06	27.43	10.23	89.26	17.87	12.50	2.53	30.35	7.42	11.83	19.37	32.87	1.69
Myotis Sp.	**2.26**	**1.70**	0.51	**1.58**	**1.88**	**2.52**	0.49	0.40	**1.30**	**1.23**	**7.00**	**3.36**	0.40
Lesser horseshoe bat	0.52	**0.75**	0.26	0.40	**3.42**	**0.77**	0.6	0.41	**2.7**	0.16	**0.61**	0.42	**1.4**
Noctule	0.13	0.90	1.07	0.13	0.62	0.76	0.67	1.62	0.16	0.40	0.33	0.25	0.33
Long-eared bat	0.38	0.45	0.60	**2.06**	**0.86**	0.22	0.34	0.26	0.52	0.19	0.61	**0.92**	0.26
Serotine	0.12	0.13	0.11	0.26	0.35	0.26	0.10	**0.68**	0.57	0.10	0.49	**2.01**	0.13
Barbastelle bat	0.20	0.13	0.30	0.20	0.31	0.15	0.25	0.13	**1.11**	0.21	0.62	0.29	0.35
Leisler's bat		0.23	0.12	0.08	0.12	0.22	0.34	0.26	0.11	0.16	0.12	0.49	0.16
Likely Nathusius' pipistrelle	0.13	0.11	0.13	0.20	0.20	0.20	0.27	0.47	0.11	0.09	0.14	0.13	0.13
Greater horseshoe bat	0.13	0.13	0.13	0.13	0.11	0.13	0.19	0.13	0.10	0.13	0.12	0.14	0.13

Areas with the highest levels of rarer bat activity are highlighted in bold.

Seasonal variation in call frequency

Activity levels across the site varied greatly for some species. Once the data was normalised (to a passes per hour value), clear variations across the seasons can be identified as can be seen in Table 20 below.

Table 20: Passes per hour for each bat species across all positions for each month.

SPECIES	May	Jun	Jul	Aug	Sep	Oct
Pipistrelle bat	185.14	211.70	213.41	184.96	22.02	36.44
Myotis Sp.	13.84	17.90	9.35	28.87	7.69	11.53
Lesser horseshoe bat	7.10	8.54	2.91	7.19	3.17	5.95
Noctule	5.95	8.23	2.68	4.52	1.54	1.11
Long-eared bat	0.58	0.81	1.18	3.24	1.91	1.82
Serotine	0.82	0.93	1.73	0.84	1.07	0.74
Barbastelle bat	2.20	3.08	2.22	2.23	0.84	0.88
Leisler's bat	0.44	0.67	0.26	0.40	0.70	0.40
Likely Nathusius' pipistrelle	0.25	1.00	0.39	0.26	0.22	0.08
Greater horseshoe bat	0.26	0.13	0.26	0.11	0.08	0.08

Overall, calls per hour peaked in June and declined thereafter. There was a notable reduction in calls per hour during September and October.

Trapping / Radio Tracking Surveys

Trapping

During the two trapping sessions, a total of 51 bats from eleven species were recorded. Whiskered bat (*Myotis mystacinus*) (n = 13 bats), common pipistrelle (*Pipistrellus pipistrellus*) (n = 10 bats), and brown long-eared bat (*Plecotus auritus*) (n = 8 bats) were the most frequently caught species.

In session 1 (July 2023), 12 bats of seven species (*B. barbastellus, M. brandtii, M. mystacinus, N. noctula, P. pipistrellus, P. auritus, R. hipposideros*) were captured.

In session 2 (August 2023), 39 bats of nine species (*M. bechsteinii, M. brandtii, M. daubentonii, M. mystacinus, M. nattereri, N. noctula, P. pipistrellus, P. auritus, R. ferrumequinum*) were captured.

Across both sessions the following Annex II species were trapped: a single adult male of each of *B. barbastellus, R. ferrumequinum* and *R. hipposideros*, and a single sub-adult male *M. bechsteinii.*

Radio Tracking and Bat Activity Patterns

A total of ten bats (five during the first session and five during the second session) of nine species were fitted with radio transmitters across the two survey sessions, including a male bat from each of the four target Annex II species: *B. barbastellus, M. bechsteinii , R. ferrumequinum* and *R. hipposideros*.

LH1 (an adult male Lesser horseshoe bat (*R. hipposideros*)) roosted in a roof void at Corndean Hall as part of a maternity colony of more than 60 other Lesser horseshoe bats. LH1 used the site for commuting and foraging and was heard commuting away from the site to the west, indicating additional foraging areas outside the site boundary.

BL2 (an adult male Brown long-eared bat (*P. auritus*)) was also found roosting at Corndean Hall in a different building to LH1. Access restrictions meant it was not possible to undertake a survey of this roost to confirm numbers present. BL2 commuted through the site and used woodland immediately south of Corndean Hall to forage. It commuted away from the site to the south, indicating it had additional foraging areas outside of the site boundary.

BR3 (a sub-adult male Brandt's bat (*M. Brandtii*)) was rarely heard on site after its release and was found roosting 1 km east of the site. Due to access restrictions, the precise location of the roost could not be confirmed but was estimated to be within one of the buildings at Wadfield Farm.

BB4 (an adult male Barbastelle bat (*B. Barbastellus*)) located to a day roost in a Corsican pine in Breakheart Plantation, 300m west of the site and an emergence survey confirmed this bat roosted alone. It was also found night-roosting in an ivy-clad silver birch on the western boundary of the site on repeated nights. BB4 foraged predominantly in Breakheart Plantation, just outside the western edge of the site boundary.

NN5 (an adult male Noctule bat (*N. noctula*)) was located in a day roost in an Ash tree 400m north-west of the Breakheart Plantation in woodland just outside the site boundary and an emergence survey confirmed this bat roosted alone. NN5 commuted through the site but was rarely heard after commuting out of range.

MM6 (a female post-lactating Whiskered bat (*M. Mystacinus*)) was not heard after release until it was located in a day roost 1.5km east of the site. The roost was considered to be in Newmeadow Farm, however the precise location was not determined due to access restrictions.

NN7 (a juvenile female Noctule bat (*N. noctula*)) did not forage on site and the only commuting fixes were recorded to the northeast of the site. No roost was found for NN7; it is assumed this bat roosted to the northeast of the site, based on evidence from commuting fixes.

MN8 (a juvenile female Natterer’s bat (*M. nattereri*)) was recorded foraging onsite and within 1km to the east and northeast of the site. It was found to roost at Sundely Castle, 2km northeast of the site.

BE9 (a sub-adult male Bechstein's bat (*M. bechsteinii*)) frequently foraged on the western boundary of the site. It was found roosting in a cherry tree on the edge of a small copse at Corndean Farm, ~20m south of the site, and an emergence survey confirmed it roosted alone.

GH10 (an adult male Greater horseshoe bat (*R. Ferrumequinum*)) roosted in Corndean Hall where LH1 and BL2 roosted in separate buildings. GH10 commuted through the site to the southwest each night but did not spend any significant time foraging within the site boundary.

5 Discussion

5.1 Summary of species status onsite

Pipistrelle bats

The desk study returned 87 records of pipistrelle bats within 2km of the survey area, 39 of which were common pipistrelles and 48 were soprano pipistrelles. 17 pipistrelle roosts were returned, 14 of which were common pipistrelle roosts and 3 were soprano pipistrelle roosts. 5 EPS licences were returned for pipistrelle bats, 4 of which were for common pipistrelles and 1 for soprano pipistrelles.

There were two confirmed common pipistrelle roosts found during the 2023 tree surveys. A single common pipistrelle was found in large hazard beam on a mature oak (T501 Grid Reference: SO 99568 21770) on 05/09/23 this was the third survey of this feature. Another common pipistrelle was observed emerging from a knot hole on a mature oak (T344 Grid Reference: SO 9847020175) on 23/08/23. This was the third emergence survey of this tree but the first recorded emergence. Using the latest bat mitigation guidelines (Reason and Wray 2023) both of these roosts are assessed as being of Site importance.

During the bat static surveys, pipistrelle bats. had the most total bat passes across the site, making up 83.06% of total calls. There were notably high levels of pipistrelle bat activity recorded at bat static N6 within Breakheart Plantation. Pipistrelle bat activity across the whole site was greatest during August (213.41 passes per hour).

Pipistrelle bats were trapped during the trapping survey but not radio tagged.

Myotis Sp.

The desk study returned 74 records of Myotis Sp. bats, broken down into 17 records of Natterer's bat, 24 Daubenton's bats, 6 Brandt's bats, 20 Whiskered bats and 1 Myotis Sp. 15 Myotis Sp. roosts were returned by the desk study, consisting of 12 Natterer's bat roosts, 1 Daubenton's bat roost and 2 Whiskered bat roosts. One EPS licence was returned for Brandt's bat and one for Whiskered bat.

There was one confirmed Natterer's bat (*Myotis nattereri*) roost found during the 2023 climbing surveys. This was found on 08/06/23 in a young sycamore tree (T219 grid reference: SO 99798 22870) in the plantation woodland off the Cotswolds way. Using the latest bat mitigation guidelines (Reason and Wray 2023) this roost is assessed as being of Site importance.

During the bat static surveys, Myotis Sp. had the second most total bat passes across the site, making up 8.02% of total calls. There were notably high levels of Myotis Sp. activity recorded at bat static S6 within Breakheart Plantation. Myotis Sp. activity across the whole site was greatest during August (28.87 passes per hour).

During the two trapping sessions, whiskered bats (*Myotis mystacinus*) were the most frequently trapped bat species, consisting of 13 of a total of 51 bats. Of the tagged bats the closest roost identified during survey was a sub-adult male Bechstein's bat (*M. bechsteinii*) (BE9) found roosting in a cherry tree on the edge of a small copse at Corndean Farm, 20m south of the site, and an emergence survey confirmed it roosted alone.

Lesser Horseshoe

Lesser horseshoe bats were the most common bat species returned from the desk study with 66 records within the study area. 16 records of lesser horseshoe roosts were received across 6 roost locations and 4 EPS licences were returned.

No lesser horseshoe bat roosts were recorded during climbing/ground inspection surveys or emergence/re-entry surveys.

During the bat static surveys, lesser horseshoe bats had the third most total bat passes across the site, making up 3.18% of total calls. There were notably high levels of lesser horseshoe bat activity recorded at bat statics N7 and S4b (3.42 and 2.70 passes per hour respectively). Lesser horseshoe bat activity across the whole site was greatest during June (8.54 passes per hour).

An adult male lesser horseshoe bat (LH1) was trapped and subsequently radio tracked. This individual was found to roost in a roof void at Corndean Hall, approximately 200m from the site, as part of a maternity colony of more than 60 other Lesser horseshoe bats. LH1 frequently used the site for commuting and foraging. As such, the site (particularly Breakheart Plantation) is likely to provide important foraging and commuting habitat for this colony.

Noctule

The desk study returned 6 records of noctule and one noctule roost within 2km of the survey area.

No noctule roosts were recorded during climbing/ground inspection surveys or emergence/re-entry surveys.

Noctules made up 1.87% of total calls recorded during the bat static activity survey. The highest levels of noctule activity was recorded at bat statics N5 and S4a (1.07 and 1.62 passes per hour respectively). Noctule activity across the whole site was greatest during June (8.23 passes per hour).

An adult male Noctule (*N. noctula*) (NN5) was located roosting alone in an Ash tree 20m west of the site. NN5 commuted through the site but was rarely heard after commuting out of range. Furthermore, a juvenile female Noctule (*N. noctula*) (NN7) was radio tracked but did not forage on site and the only commuting fixes were recorded to the northeast of the site.

Long-eared bat

The desk study returned 29 records of long-eared bats within 2km of the survey area, 25 of which were brown-long-eared bats and 4 were “long-eared bat species”. 13 long-eared bat roosts were returned by the study EPS licences were retured for brown long-eared bats.

No long-eared bat roosts were recorded during climbing/ground inspection surveys or emergence/re-entry surveys.

Long-eared bats made up 1.14% of total calls recorded during the bat static activity survey. The highest levels of long-eared bat activity was recorded at bat statics N6 and S7 (2.06 and 0.92 passes per hour respectively). Long-eared bat activity across the whole site was greatest during August (3.24 passes per hour).

An adult male Brown long-eared bat (*P. auritus*) (BL2) was found radio tracked and subsequently found to be roosting at Corndean Hall adjacent to Breakheart Planation. BL2 commuted through the site and used woodland immediately south of Corndean Hall to forage.

Serotine

The desk study returned 9 records of serotine within 2km of the survey area. No roosts or EPS licences were returned by the desk study for serotine.

No serotine roosts were recorded during climbing/ground inspection surveys or emergence/re-entry surveys.

Serotine bats made up 1.11% of total calls recorded during the bat static activity survey. The highest levels of serotine activity was recorded at bat statics S7 (2.01 passes per hour). Serotine activity across the whole site was greatest during July (1.73 passes per hour).

No serotine bats were trapped or tracking during the radiotracking surveys.

Barbastelle

The desk study returned 3 records of barbastelle and 1 barbastelle roost within 2km of the survey area. No EPS licences for barbastelle were returned by the desk study.

No barbastelle roosts were recorded during climbing/ground inspection surveys or emergence/re-entry surveys.

Barbastelle bats made up 1.08% of total calls recorded during the bat static activity survey. The highest levels of barbastelle bat activity was recorded at bat statics S4b (1.11 passes per hour). Barbastelle bat activity across the whole site was greatest during June (3.08 passes per hour).

An adult male barbastelle bat (*B. Barbastellus*) (BB4) was radio tracked to a day roost in a Corsican pine in Breakheart Plantation, 300m west of the survey area where it roosted alone. Furthermore, BB4 was found night-roosting in an ivy-clad silver birch on the western boundary of the survey area on repeated nights. BB4 foraged predominantly in Breakheart Plantation.

Leisler's bat

The desk study returned 3 records of Leisler's bat within 2km of the survey area but no but no records of roosts or EPS Licences were found.

Climbed inspection of 93 trees and emergence/re-entry surveys of 22 trees within the site boundary found no roosting Leisler's bat. Furthermore, there were no confirmed Leisler's bat roosts as a result of the building inspection and emergence/re-entry survey.

Leisler's bats made up 0.30% of bat passes (*n* = 372). Location S7 had the greatest number of Leisler's bat passes per hour (0.49) and location N3 had no identified Leisler's bat passes. September had the greatest number of Leisler's bat calls identified, despite the notable decline from other species recorded within that month.

No Leisler's bats were trapped or tracked during the radiotracking surveys.

Likely Nathusius' pipistrelle

The desk study returned one record of a Nathusius pipistrelle within 2km of the survey area but no records of roosts or EPS Licences were found.

No Nathusius pipistrelle roosts were identified during tree climbing or emergence/re-entry surveys.

Nathusius pipistrelle had been identified for a total of 229 bat passes, this was one of the lowest bat pass rate (0.19% of the total calls) out of nine species/groups identified. Activity at location S4a was greatest for Nathusius pipistrelles at 0.47 bat passes per hour and the month of June with 1.00 bat passes per hour. The month of June has been identified as having a calls per hour peak and declined thereafter.

A total of 51 bats from eleven species were found when undertaking the radiotracking surveys, of these none were Nathusius pipistrelle.

Greater Horseshoe

The desk study returned 6 records of greater horseshoe bats within 2km of the survey area but no records of roosts or EPS Licences were found.

No confirmed greater horseshoe roosts were identified during the tree climbing or emergence/re-entry surveys.

Greater horseshoe had the lowest total bat passes with 61 passes recorded, making up to 0.05% of the total calls. It was found that activity for greater horseshoe was greatest at location S3 (*n* = 0.19 bat passes per hour) and within the months of May and July (*n* = 0.26).

The trapping in session 2 (August 2023), captured a single adult male greater horseshoe bat (*R. Ferrumequinum*) (GH10) which was subsequently tagged, released and tracked. It was found that GH10 roosted in Corndean Hall and commuted through the site to the southwest each night but did not spend any significant time foraging within the site boundary.

5.2 Importance of species assemblage

The importance of the bat species assemblage recorded within the entire survey area was assessed using the "Assessing the importance of a bat assemblage" table in the UK Bat Mitigation Guidelines (CIEEM, 2023). The species assemblage recorded within our survey area scored 41 out of 41 points for locations within the south-west region since all species listed were recorded during surveys and the assemblage within our survey area is therefore of **National importance**.

As part of the trapping and radio tracking report, the same process was applied to determine the importance of species assemblage within Breakheart Plantation. Trapping data provided an assemblage score of 27 (66%) of a maximum possible 41. As such, Breakheart Plantation is considered to be of **Regional importance** with respect to the assemblage of bats present and the value of the supporting habitats present.

It should be noted that although all species listed in the table were detected during surveys, some of these were recorded in very low numbers. For example, less than 100 Greater horseshoe bat passes were recorded during surveys. Furthermore, this table does not consider the extent of the survey effort. Due to the length of the cable route, the survey area was very large and therefore there was a greater chance of detecting more species than using the same survey methodology on a smaller site.

6 Impact Assessment

6.1 Overview

The sections below discuss potential impacts, mitigation and enhancement opportunities for bats.

6.2 Potential Impacts

This section outlines the potential impacts in the absence of mitigation.

The potential impacts for the construction and operational phases are detailed in Table 21 below.

Table 21: Construction and operational phase impacts

Construction Phase Impacts	
Impact	**Description**
• Direct Habitat Loss	• Temporary habitat loss – reduction of available roosting sites • Temporary habitat loss – reduction foraging resources for bats • Potential for fragmentation effects impacting commuting bats which could impact breeding success of nearby maternity roosts • Short-term impacts will particularly affect species associated with farmland and woodland.
• Direct Mortality of Species	• Roosting bats are vulnerable to works occurring in close proximity that may damage or destroy a roost site.
• Disturbance	• Bats are vulnerable to disturbance from changes in lighting, vibration and noise.
Operational Phase Impacts	
Impact	**Description**

• Disturbance	• Bats are vulnerable to disturbance from changes in lighting, vibration and noise resulting from upkeep and maintenance of underground cables.

6.2.1 Roosting bats

The roosts on site or immediately adjacent to the site are considered of site importance only, supporting individual bats. As part of site design and micrositing, all roosts will be retained as part of proposals. There remains potential for disturbance during construction and operational phases of development of retained roosts as a result of a short term increase in noise and vibration. Changes in light levels also has potential to cause disturbance to roosting bats.

6.2.2 Foraging and commuting bats

The bat assemblage on site is considered of national importance given the diversity of species recorded during the suite of bats surveys.

The works will cause the temporary loss of areas of suitable bat habitat. This may result in reduced foraging provisions and temporary isolation and fragmentation effects on bats. This fragmentation will potentially limit access to foraging resources and fragment core sustenance zones for rare species such as lesser horseshoe bat. A lack of safe passage to key foraging areas may result in a reduction in breeding success at offsite roosts and potentially impact the favourable conservation status of rarer species locally present.

There is potential for significant disturbance within Breakheart Plantation since this area of woodland has a high level of bat activity. Clearing a 60m wide swathe through this area could result in fragmentation and barrier effects which will impede bat movement and dispersal into other areas of Breakheart Plantation. Although it should be noted that an existing gap, approx. 50m wide is present in the woodland (along the overhead line) and does not seem to impede bat movement, with radio tracking data showing both natterers and Bechstein's tagged bats repeated tracking fixes in this location during August survey. It is considered likely that the scrub and woodland edge habitat in this location provides an excellent foraging resource for bats.

These effects have the potential to reduce the size of bat populations in the surrounding area and this is considered significant at a national level.

6.3 Mitigation

6.3.1 Construction Environmental Management Plan (CEMP)

The CEMP will be required to be approved by the Local Planning Authority (LPA) prior to commencement of works and will outline the standard environmental control measures that will be implemented during the construction phase to ensure that habitats and species are protected. The CEMP will ensure that retained on and offsite habitats are protected from dust, airborne pollutants and sediment laden surface water runoff through standard pollution protection measures. All retained habitats and retained known roosts (including the root protection areas of trees and hedgerow) will be protected using fencing, where necessary, during construction to ensure no accidental damage from machinery and personnel.

The Landscape and Ecological Management Plan (LEMP) (REF) identifies ecological protection measures.

6.3.2 Landscape and Ecological Management Plan (LEMP)

The LEMP outlines the mitigation measures required with regard to legal compliance. This was completed with reference to the proposed construction programme and will be incorporated into the CEMP.

There is an element of embedded mitigation built into the programme and layout such as initial design discussions to place the cable route in areas that primarily avoid key important habitat. The requirement for toolbox talks is identified in the LEMP, with the specific details to be confirmed once a contractor is appointed, and the enabling works programme is finalised.

The cable route was microsited during the design phase to avoid and retain any known bat roosts and as much habitat of value to bats as possible such as woodland and hedgerows.

For the duration of the works, a working Method Statement (MS), Construction Environmental Management Plan (CEMP) and Landscape and Ecological Management Plan (LEMP) will be followed, including (and not limited to) the following avoidance measures to ensure the works comply with relevant legislation and prevent disturbance, injury and/or killing to bats:

- The provision of toolbox talks for on-site contractors and staff, informing them of the legal protection afforded to bats;
- Lighting design will be undertaken in accordance with best practice guidelines (Reason and Wray 2023) and no works will occur during the night (between dusk and dawn), preventing any light spill after dark;
- Appropriate measures to control dust and other emissions that could affect air quality (detailed in the CEMP).

6.3.3 Temporary bat flyways

In order to maintain connectivity across Breakheart Plantation during the construction period, temporary bat flyways consisting of Heras fencing woven with natural materials will be utilised. The temporary bat flyways will be erected to cross the construction swathe at the end of each working day and taken down each morning before any works continue. Due to the high levels of bat activity within Breakheart Plantation, three flyways will be used; one at either end of the woodland and one in the centre.

Temporary bat flyways of the same nature will also be utilised at other locations on site where there are moderate to high levels of Annex II bat activity and there is the potential for habitat fragmentation. One will be installed approximately 0.2km east of static N8 across the access road that intersects a strip of woodland. One will be installed where the hedgerow along the southern edge of the field containing the Northern Sealing End Compound will be temporarily removed. This will ensure that any Bechstein's bats in the nearby (offsite) roost will not be isolated from Breakheart Plantation and its adjoining woodland. Another will be installed to temporarily replace the hedgerow adjoining to the north of the small area of woodland in which static S3 is located. This will ensure that bats potentially roosting in any buildings at Upper Hill Farm are not isolated from the woodland to their southeast. A flyway will be installed next to static N7 across the access road to the west of Corndean Cottages to prevent fragmentation between Breakheart Plantation and its connected woodland to the north. A flyway will be installed next to static S7 adjacent to a path that runs under the existing OHL. This will prevent any bats potentially roosting in Middle Colgate Farm from being isolated from Dowdeswell Wood. The final flyway will be installed adjacent to static S4b. The locations of all temporary bat flyways to be installed are shown in Figure XXX. The number of temporary bat flyways to be installed may be reduced should the scope of vegetation removal be reduced at certain locations.

All impacts on bats will be temporary since any suitable habitats will be replaced or enhanced post-construction as part of the BNG strategy outlined in the Biodiversity Net Gain Report (REF). The new cable route through Breakheart Plantation has a curved design which will provide more sheltered foraging for bats than the existing straight line underneath the existing OHL. The area above the cable route will be replanted with shallow rooting species to create a mosaic of scrub and grassland habitats. Additionally, hedgerows at both ends of the woodland and either side of a central track will be planted to provide commuting routes across this section of woodland which will maintain connectivity post-construction. This additional structural

diversity will provide good habitats for invertebrates which will in turn improve the quality of foraging for bats within the woodland. The area underneath the existing OHL within Breakheart Plantation will be replanted with native tree species post-construction.

It is recommended that monitoring of the temporary bat flyways is undertaken to provide a better understanding of their efficacy and to inform future bat mitigation measures. Where flyways are used near the location of a previous SM4 static detector, SM4s should subsequently be deployed in the same location throughout the construction period and data from pre and during construction should be analysed and compared.

6.3.4 New roosting provision

Bat boxes will be erected in retained woodland in a range of locations. Bat boxes should be suitable for day roosting, maternity and hibernation purposes and for a range of species. Consideration should also be given to appropriate woodland management to encourage the veteranisation of tree features, in turn providing new roosting opportunities for bats.

6.4 Enhancement measures and BNG

Opportunities to enhance the scheme for biodiversity, in line with national and local planning policy have been identified and are detailed in the Biodiversity Net Gain report (Ref XX).

Habitat creation and enhancement measures within Breakheart Plantation under the existing overhead line and at either end of the scheme within the sealing end compound areas will provide a benefit to bats in the medium to long term. Habitat would be created / reinstated on a like for like or of a higher quality basis. Habitat creation would include woodland and hedgerow screening as well as species-rich grassland planting that would benefit a number of species. Erection of bat boxes within retained woodland will also be considered.

6.5 Residual Effects

Implementation of the design and mitigation measures (as described above and in the EcIA and BNG report) including the creation of woodland, hedgerow and grassland habitat as well as new roosting opportunities, will offset the adverse effects of temporary and permanent habitat loss over time as newly created habitats establish and become more suitable for use by bats. The use of a diverse range of native plant species of local provenance will also provide optimal foraging habitat for bats post-construction.

There will be a long-term positive residual effect that is not significant due to the enhancement of woodland, scrub and hedgerow habitats and the potential for linking previously isolated areas of woodland allowing greater connectivity for bats across the site.

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Figure 1 – Static Locations and habitat types

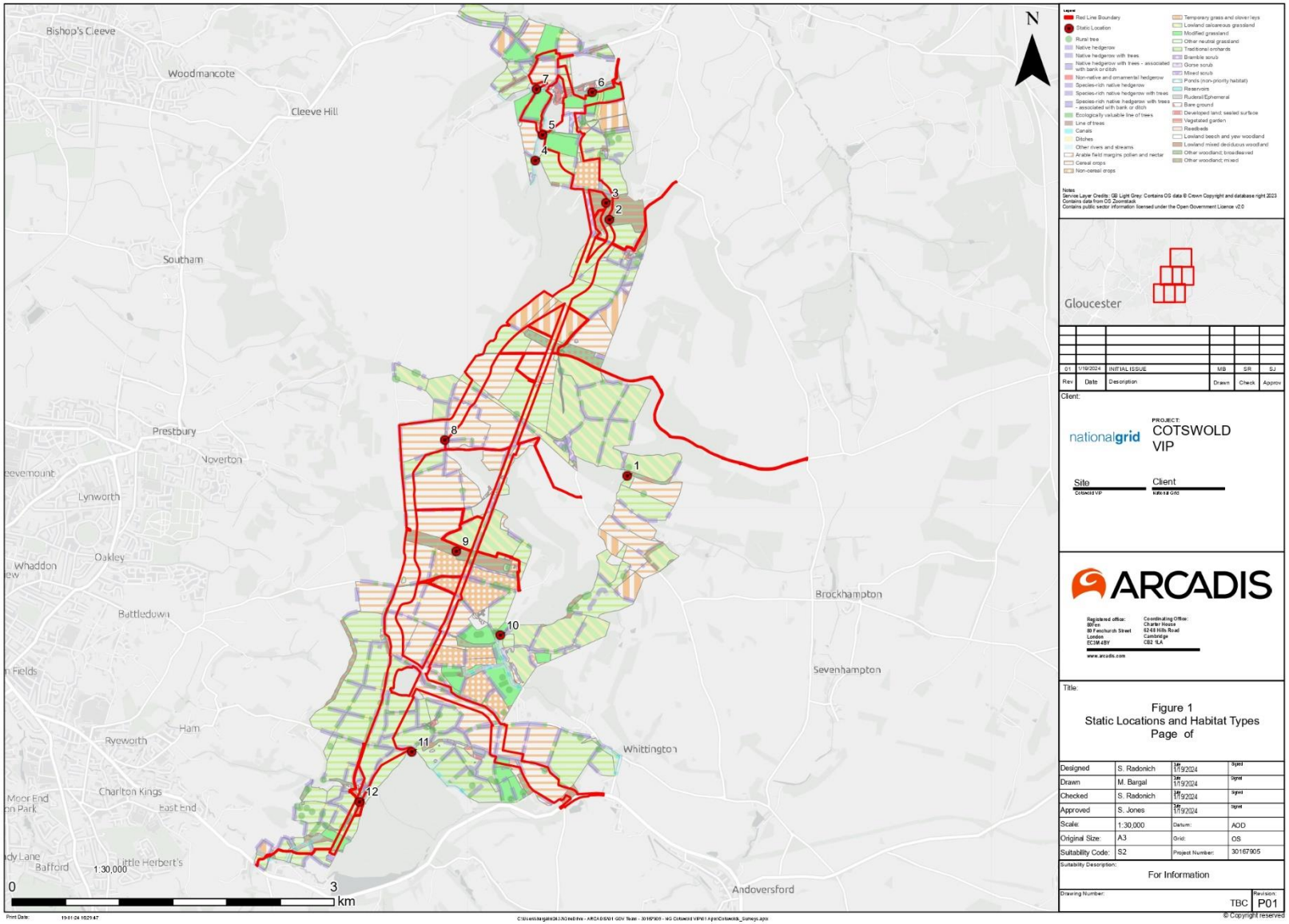


Figure 2 – Known roosts

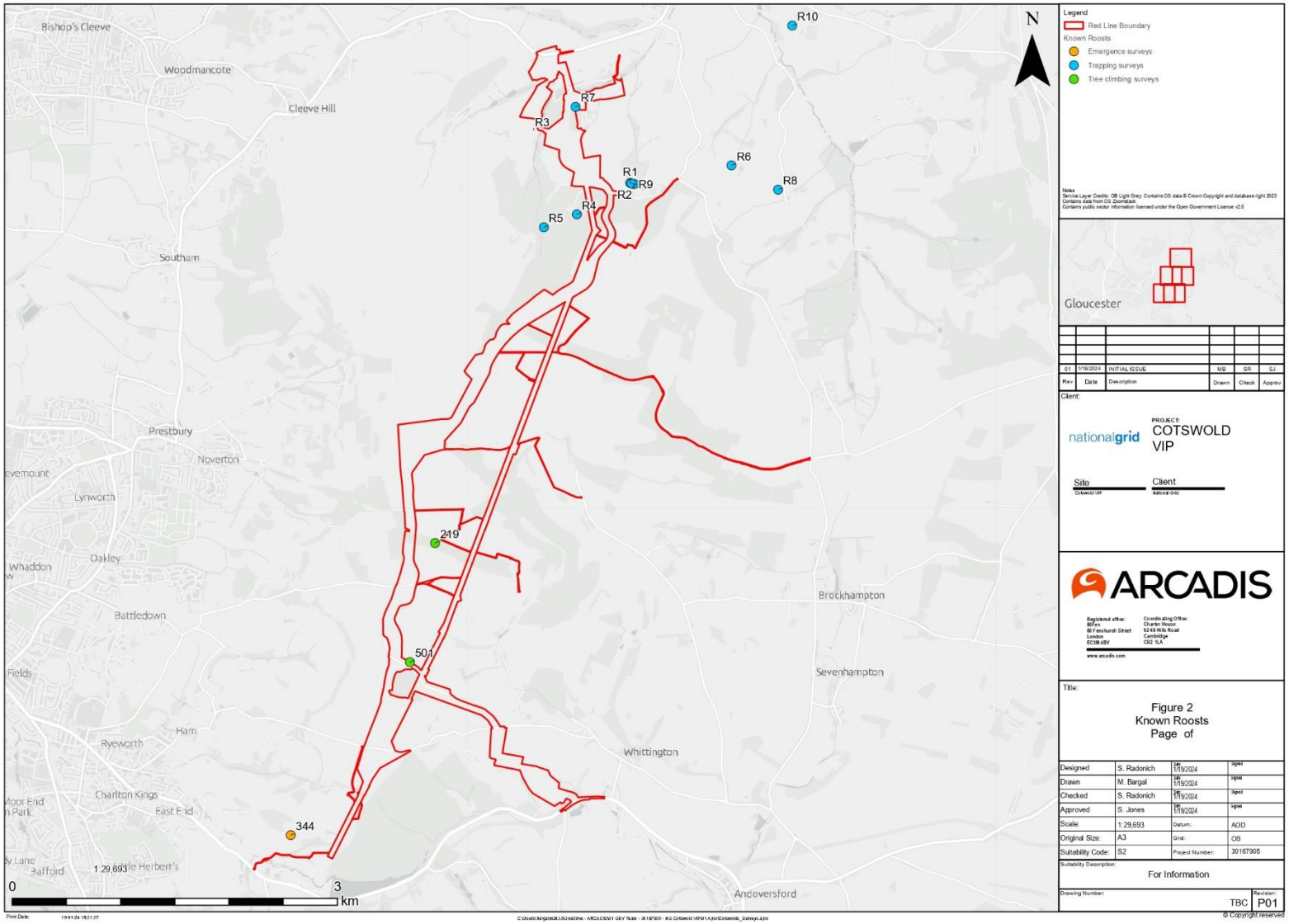
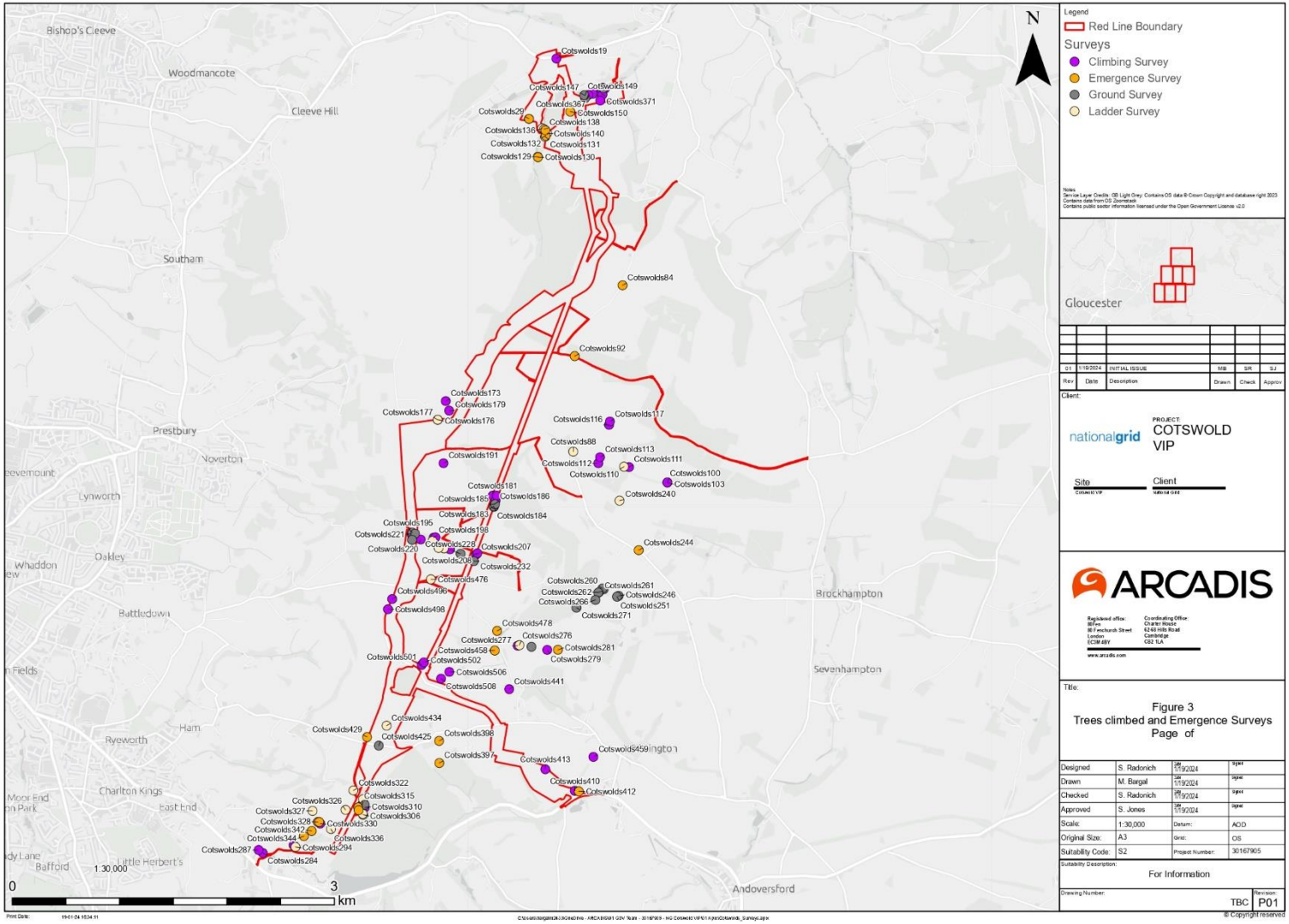


Figure 3 – Tree climbing and emergence surveys



Appendix A

Bat Survey Information

Table A1 Climbed / Ground Inspection Survey information

Tree Number	Tree Species	PRF number	Feature type	Height	Aspect	Grid Reference	Preliminary PRF Suitability Classification High (H), Mod (M) or Low (L)	Preliminary Tree Suitability Classification High (H), Moderate (M) or Low (L)	Survey Dates	Updated PRF Suitability Following Climbing / Ground Inspection Surveys High (H), Moderate (M), Low (L) or Negligible (N)	Updated Tree Suitability Following Climbing / Ground Inspection Surveys High (H), Moderate (M), Low (L) or Negligible (N)
19	Norway Maple	1	Knothole	2	E	SP 00822 27419	M	M	13/06/23 N/A N/A	L	L
100	Beech	1	Knothole	5.5	SE	SP 01856 23470	M	M	16/06/23 06/07/23 27/07/23	M	M
103	Beech	1	Knothole	3.5	N	SP 01856 23470	L	M	16/06/23 06/07/23 27/07/23	H	M
		2	Tear out	4.5	NE		M			L	

111	Oak	1	Desiccated stem	5	N	SP 01499 23613	H	H	09/06/23 06/07/23 27/07/23	H M M	H
		2	Woodpecker hole	6	All		M				
		3	Desiccated limb	7	N		L				
112	Oak	1	Knothole	4	E	SP 01213 23649	M	M	09/06/23 06/07/23 27/07/23	M L	M
		2	Hazard Beam	6.5	E,W		L				
113	Oak	1	Butt rot	0 -1	SW	SP 01229 23705	M	M	09/06/23 06/07/23 27/07/23	M M N M	M
		2	Hazard Beam	5	N,S		M				
		3	Upward facing tearout	4	N		M				
		4	Knothole	3	E		M				
116	Beech	1	Knothole	4	NW	SP 01313 24007	L	H	09/06/23 06/07/23 27/07/23	N L H N	H
		2	Wound at union	4.5	W, E		L				
		3	Cavity	3	N		H				
		4	Tear out	7	W		L				
117	Oak	1	Knothole	3	SE		M	M	09/06/23	N	M

		2	Hazard Beam	5	N	SP 01321 24038	M		06/07/23 27/07/23	M		
		3	5 x Knotholes	3.5-7.5	W		H			L		
149	Sycamore	1	Knothole	11	E	SP 01088 27074	H	M	12/06/23 03/07/23 25/07/23	H	H	
		2	Wound	10.5	S		H			H		
		3	Knothole	9	S		M			M		
173	Beech	1	Wound	5	N	SO 99792 24228	M	L	08/06/23 05/07/23 25/07/23	L	L	
179	Beech	1	Knothole	2.5	W	SO 99823 24139	L	M	08/06/23 05/07/23 25/07/23	M	M	
181	Sycamore	1	Longitudinal Split	6	W	SP 00229 23347	M	M	07/06/23 N/A N/A	N	N	
		2	Wound	1.5	E		L			N		
186	Beech	1	Weld	7	S	SP 00249 23272	M	M	07/06/23 26/06/23 28/07/23	M	M	

187	Standing deadwood	1	Wound	1	S	SP 00256 23301	M	M	07/06/23 26/06/23 28/07/23	M	M
189	Beech	1	Wound	1	E	SP 00267 23347	M	M	07/06/23 26/06/23 28/07/23	M	M
198	Beech	1	Wound	7.5	S	SO 99679 22956	M	M	06/06/23 27/06/23 24/07/23	M	M
199	Beech	1	Wound	7.5	N	SO 99696 22959	M	M	06/06/23 N/A N/A	N	N
207	Beech	1	Wound	7.5	S	SP 00075 22799	M	M	07/06/23 N/A N/A	N	N
208	Sycamore	1	Longitudinal Split	6 – 10	N	SP 00086 22810	M	M	07/06/23 N/A N/A	N	N
219	Beech	1	Longitudinal split	2-3	E	SO 99798 22870	M	M	08/06/23 27/06/23	M	Confirmed Roost (single Natterer's bat)
		2	Wound	8	W		M		24/07/23	CR	

		3	Longitudinal split	6	E		M			M	
220	Beech	1	Wound	4	E	SO 99559 22938	M	M	06/06/23 27/06/23 24/07/23	M	M
221	Beech	1	3 x Wounds	9	S	SO 99474 22988	L	L	06/06/23 27/06/23 24/07/23	L	L
277	Oak	1	Butt rot	0	SE	SP 00462 21949	M	M	08/06/23 27/07/23 24/08/23	M	M
		2	Tear out	6	N		M			M	
		3	Knothole	7	NW		M			M	
227	Beech	1	Wound	10	N	SO 99831 22847	M	M	29/06/23 27/07/23 24/08/23	M	M
279	Oak	1	Tear out	7	SE	SP 00737 21910	H	M	29/06/23 27/07/23 24/08/23	H	H
		2	Woodpecker hole	6	E		L			L	
284`	Oak	1	Wound	4	W	SO 98088 20018	L	M	15/06/23 N/A N/A	L	L
		2	Callous roll	14	NE		L			L	

287	Alder	1	Woodpecker hole	5	SE	SO 98049 20046	H	H	15/06/23 N/A	N	N
		2	Weld	4	SE		M		N/A	N	
290	Ash	1	Large knothole	5	W	SO 98375 20091	M	M	14/06/23 04/07/23 26/07/23	M	M
		2`	Wound	5	E		L			M	
		3	Tear out	3	S		H			M	
310	Sycamore	6	Wounds	6	W	SO 99038 20442	M	M	14/06/23 04/07/23 26/07/23	M	M
315	Willow	1	Woodpecker hole	8	E	SO 99007 20462	M	M	14/06/23 04/07/23	L	L
		2	Lifting bark	9	E		L		26/07/23	L	
325	Sycamore	1	Wound	7	E	SO 99012 20460	M	M	14/06/23 04/07/23 26/07/23	M	M
330	Ash	1	Tear out	4	N	SO 98623 20292	H	H	14/06/23 04/07/23 26/07/23	M	M
		2	Split limb	4	N		M			M	
		3	Squirrel hole	2	W		L			L	
		4	Open wound	2	S		L			L	

354	Sycamore	1	Wound	6	NE	SP 01274 27139	M	M	13/06/23 03/07/23 25/07/23	M	M
355	Sycamore	1	Wound	6	S	SP 01255 27146	M	M	13/06/23 N/A N/A	M	N
356	Sycamore	1	Wound	8	S	SP 01253 27140	M	M	13/06/23 03/07/23 25/07/23	M	M
358	Willow	1	Cavities in dead limb	5	N,S	SP 01241 27127	L	M	13/06/23 N/A N/A	L	L
363	Sycamore	1	Wound	7	S	SP 01163 27091	M	M	12/06/23 03/07/23 26/07/23	M	H
		2	Wound	6	W		H			H	
367	Sycamore	1	Wound	6	E	SP 01120 27080	M	L	13/06/23 03/07/23 26/07/23	M	M
		2	Wound	9	SW		L			L	
371	Yew	1	Tear out	2	E	SP 01240 27092	M	M	14/06/23 03/07/23 26/07/23	M	M
		2	Wound	5	S		L			N	

372	Oak	1	Severe tear out	4	W	SP 01251 27083	M	M	14/06/23 03/07/23 26/07/23	N M	M
		2	Butt rot	4	S		M			M	
		3	Split in desiccated limb	6	E		M			M	
		4	Impact shatter	4.5	E		L			L	
375	Oak	1	Woodpecker	7	NW	SP 01231 27028	M	M	12/06/23 03/07/23 26/07/23	M L L	M
		2	Wound	12	W		M				
		3	Knot hole	6.5	N		M				
410	Oak	1	Woodpecker hole	7	NW	SP 00994 20597	M	M	07/06/23 05/07/23 27/07/23	M M	M
		2	Woodpecker holes x 4	9	W		M				
413	Oak	1	Spilt in desiccated limb	4-7	NW	SP 00719 20798	M	M	15/06/23 05/07/23 Unable to survey due to presence of Barn Owl	M M L	M
		2	Tear out	12	W		M				
		3	Dissication fissure	10	W		L				
441	Pendnculate oak	1	Knot hole	3	N	SP 00383 21544	M	M	14/06/23 29/06/23	M	M

									26/07/23		
459	Field maple	1	Split limb	4	E	SP 01167 20913	M	M	14/06/23 05/07/23 04/09/23	M	m
496	Beech	1	Wound	6.2	S	SO 99293 22384	M	M	28/06/23	M	M
		2	Knot hole	5.5	W		M		24/07/23 04/09/23	M	
498	Beech	1	Tear out	5.4	S	SO 99254 22289	M	M	28/06/23	M	M
		2	Wound	6.8	E		L		24/07/23 04/09/23	L	
501	Pendunclate oak	1	Subsidence split	5.5	SW	SO 99568 21770	M	M	06/05/23 28/06/23 05/09/23 Confirmed Roost (single common pipistrelle)	M	Confirmed roost
502	Pendunclate oak	1	Knot hole	6	S	SO 99588 21794	M	M	06/05/23 28/06/23	M	M
		2	Tear out	10	E		M		05/09/23	M	
		3	Wound	6.2	E		M			M	

506	Pendunculate oak	1	Wound	11	NE	SO 99825 21705	M	M	06/05/23 28/06/23	M	M
		2	Knot hole	4	S		L		05/09/23	L	
		3	Knot hole	4	SW		L			L	
508	Pendunclate oak	1	Lightening strike	0 -6.2	W/S	SO 99748 21642	H	H	06/05/23 28/06/23 05/09/23	M	M
191	Ash	1	Longditudinal split	1.5-5	E	SO 99771 23649	M	M	06/05/23 28/06/23	M	M
		2	Wound leading to cavity	5	W		M		27/07/23	M	
88	Elder	1	Wound leading to cavity	1.5	W	SP 00979 23757	M	M	01/06/23 29/06/23 20/07/23	M	M
110	Ash	1	Cavity	4	SE	SP 01452 23617	M	M	01/06/23 29/06/23	M	M
		2	Wound leading to cavity	4	NE		M		20/07/23	M	
131	Dead stump	1	Splits	1-3	All	SP 00717 26690	M	M	31/05/23 18/07/23 30/08/23	M	M

136	Standing deadwood	1	Woodpecker holes	5	W	SP 00690 26769	M	M	31/05/23 18/07/23 30/08/23	M	M
138	Oak	1	Tear out	2	NE	SP 00708 26760	M	M	31/05/23 18/07/23 30/08/23	M	M
140	Oak	1	Split in stem	8	E	SP 00735 26722	M	M	31/05/23 18/07/23 30/08/23	M	M
176	Ash (dead)	1	Wound leading to cavity	1.6	SW	SO 99717 24054	H	H	01/06/23 05/07/23 25/07/23	H	H
177	Ash (dead)	1	Wound leading to cavity	1.3`	SW	SO 99717 24054	H	H	01/06/23 05/07/23 25/07/23	N	N
184	Beech	1	Wound leading to cavity	1.5	NW	SP 00240 23243	M	M	02/06/23 26/06/23 19/07/23	m	M
		2	Wound leading to cavity	2.5	SE		M			M	
226	Beech	1	Wound	2.5	W	SO 99668 22925	M	M	02/06/23 26/06/23	M	M

									19/07/23		
236	Beech	1	Wound leading to cavity	2.5	S	SO 99775 22856	M	M	02/06/23 27/06/23 19/07.23	M	M
237	Sycamore	1	Wound leading to cavity	0.7	S	SO 99725 22860	M	Confirmed transitional roost	02/06/23 27/06/23 19/07.23	M	M
		2	Wound	1.6	N		L			L	
240	Ash	1	Lightning strike	0-3	SE	SP 01410 23300	H	H	01/06/23 20/07/23 31/08/23	H	H
		2	Knot hole	6.5	W		H			H	
		3	Canker	8	W		M			M	
		4	Knot hole	9	S		H			M	
		5	Hollow llimb	8	SW		L			L	
		6	Woodpecker hole	9	W		M			M	
		7	Tear out	7	SW`		M			M	
261	Elder	1	Knot hole	3	S	SP 01218 22446	M	M	01/06/23 29/06/23 20/07/23	M	M
276	Ash	1	Helical shearing crack	0-4	All	SP 00478 21954	M	M	03/06/23 N/A	L	L

									N/A		
294	Ash	1	Subsidence crack	3	NE	SO 9839 220074	M	M	31/05/23 04/07/23	M	M
		2	Large knothole	4	S		L		24/07/23	L	
		3	Wound	2	N		L			L	
		4	Split in dessicated limb	5	E		L			L	
306	Silver Birch	1	Knothole	4	E	SO 99022 20374	H	H	31/05/23 04/07/23 24/07/23	H	H
308	Ash	1	Tear out	5	E	SO 99019 20383	H	H	31/05/23	H	H
		2	Split limb	5	W		L		04/07/23 24/07/23	L	
313	Ash	1	Wound	2	SE	SO 99022 20519	M	M	31/05/23 04/07/23 24/07/23	M	M
322	Ash	1	Knothole	4	N	SO 98932 20601	M	M	14/06/23	M	M
		2	Spilt in limb	4	S		M		04/07/23	M	
		3	Knot hole	6	N		L		26/07/23	L	

326	Ash	1	Large cavity	2	All	SO 98859 20420	M	M	31/05/23 04/07/23 26/07/23	M	M
327	Ash	1	Large cavity	2	N	SO 98551 20410	M	M	31/05/23 N/A N/A	L	L
336	Ash	1	Multiple crevices in butt rot	2	N	SO 98723 20241	M	M	31/05/23 04/07/23 26/07/23	M	M
		2	Tear out	6	E		L			L	
434	Ash	1	Butt rot/ frost crack	1	S	SO 99241 21204	M	M	02/06/23 18/07/23 31/08/23	M	M
476	1	Large wound	4.8	N	SO 99653 22568	M		M	02/06/23 19/07/23	M	M
	2	2 x tear out	3.5	S		L			31/08/23	L	
141	Sycamore	1	Tear out	0 -0.5	S	SP 01090 27051	M	M	31/05/23 03/07/23 18/07/23	M	M
147	Sycamore	1	Butt rot	0 -1	N,E,S	SP 01082 27078	M	M	31/05/23 03/07/23	M	M

									18/07/23		
183	Sycamore	1	Wound leading to cavity	2	E	SP 00238 23247	Confirmed Transitional Roost	Confirmed Transitional Roost	31/05/23 03/07/23 18/07/23	H	Confirmed Transitional Roost
		2	Wound leading ot cavity	2.2	SW		M			M	
185	Beech	1	Wound leading to cavity	1	S	SP 00250 23267	M	M	02/06/23 27/06/23 19/07/23	M	M
195	Beech	1	Woudn	1-1.7	N	SO 99480 23003	M	M	02/06/23 27/06/23 19/07/23	M	M
196	Beech	1	Woudn	02-1	S	SO 99506 22993	M	M	02/06/23 27/06/23 19/07/23	M	M
228	Beech	1	Butt rot	1	NW	SO 99930 22805	M	M	02/06/23 27/06/23 19/07/23	M	M
232	Beech	1	Butt rot	1	S	SP 00053 22737	M	M	02/06/23 27/06/23 19/07/23	M	M

238	Beech	1	Butt rot	1	S	SO 99478 22935	M	M	02/06/23 27/06/23 19/07/23	M	M
246	Elder	1	Frost crack	0-2	N-E	SP 01402 22414	M	M	01/06/23 29/06/23 20/07/23	M	M
251	Elder	1	Hollow limb	2	NE	SP 01387 22406	M	M	01/06/23 29/06/23 20/07/23	M	M
		2	Hollow limb	1	E		M			M	
258	Elder	1	Hollow limb	2	SW	SP 01264 22476	M	M	01/06/23 29/06/23 20/07/23	M	M
		2	Hollow limb	1	E		L			L	
260	Elder	1	Hollow limb	2	NE	SP 01252 22482	L	M	01/06/23 29/06/23 20/07/23	L	M
		2	Hollow limb	1	NE		L			L	
		3	Hollow limb	2.5	N		M			M	
262	Elder	1	Tear out	1	E	SP 01213 22444	M	M	01/06/23 29/06/23 20/07/23	M	M
266	Elder	1	Hollow limb	1	SE		M	M	01/06/23	M	M

		2	4 x woodpecker holes	7	NE	SP 01186 22375	M		29/06/23 20/07/23	M		
		3	Woodpecker hole	8	W		M			M		
		4	Knot hole	10	SE		M			M		
		5	Knot hole	9	N		M			M		
271	Malus	1	Butt rot	0.5	E	SP 01009 22303	M	M	01/06/23	M	M	
		2	Tear out	6	E		L		29/06/23	L		
		3	Tear out	9	W		M		20/07/23	M		
275	Elder	1	Hollow limb	1	S	SP 00590 21939	M	M	01/06/23 29/06/23 20/07/23	M	M	
312	Ash	1	Wound	0.5	N	SO 99037 20467	M	M	31/05/23	M	M	
		2	Lifting bark	3	SE		M		04/07/23 26/07/23	M		
357	Sycamore	1	Wound	2	N	SP 01260 27143	M	M	31/05/23 03/07/23 18/07/23	M	M	
425	Whitebeam	1	Hollow stem	1	NW,S	SO 99168 21018	M	M	02/06/23 18/07/23 31/08/23	M	M	

Table A1 Summary of Emergence and Re-entry Surveys Undertaken - Buildings

2023 Date	Survey Details	Personnel	Timings	Weather Conditions
24/07/23	Dusk emergence on Buildings B1 and B2	Sian Jones Vicky Handby Callum Moores Charlotte Beale Lindsey Partington Tyler Meaden	Sunset: 21.13 Start: 20.48 End: 22.50	Air temp: 15°C Wind start: 3 Wind end: 3 Cloud: partly cloudly Precipitation: None
05/09/23	Dawn re-entry on Buildings B1 and B2	Vicky Handby Callum Moores Anna Davies Alexandra Carson Lindsey Partington Tyler Meaden	Sunrise: 06.26am Start: End:	Air temp: 15°C Wind start: 1 Wind end: 2 Cloud: 0 Precipitation: None

Figure XXX: Location of buildings B1 and B2

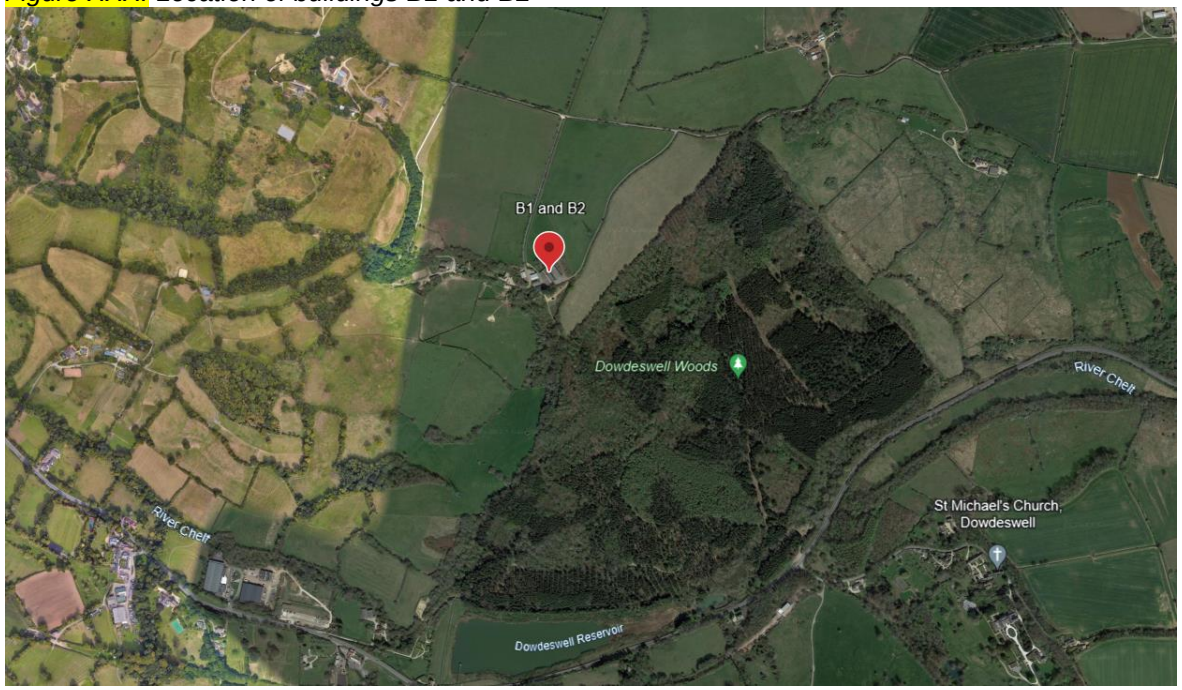


Table A3 Summary of Emergence and Re-entry Surveys Undertaken - Trees

Tree Number	Survey Date	Surveyors	Timings	Survey Conditions (Wind speed (beaufort) / Precipitation / Cloud cover (okta) / Temperature)
84	13/06/23	Steve Hancock and Samuel Radonich	Start: 21:13 End 22:57	Air temp: 20°C Wind start: 2

				Wind end: 3 Cloud: 2 Precipitation: None
	05/07/23	Steve Hancock and Adam Munshi	Start: 21:02 End 22:49	Air temp: 18°C Wind start: 2 Wind end: 1 Cloud: 1 Precipitation: None
	24/07/23	Steve Hancock and Tom Stuart	Start 20:55 End 22:40	Air temp: 16°C Wind start: 2 Wind end: 2 Cloud: 4 Precipitation: None
129	13/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:13 End 22:58	Air temp: 17°C Wind start: 1 Wind end: 0 Cloud: 4 Precipitation: None
	27/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:16 End 23:01	Air temp: 19°C Wind start: 1 Wind end: 1

	11/07/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:10 End 22:55	Cloud: 8 Precipitation: None Air temp: 14°C Wind start: 1 Wind end: 1 Cloud: 8 Precipitation: None
130	13/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:13 End 22:58	Air temp: 17°C Wind start: 1 Wind end: 0 Cloud: 4 Precipitation: None
	27/07/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:16 End 23:01	Air temp: 19°C Wind start: 1 Wind end: 1 Cloud: 8 Precipitation: None
	11/07/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:10 End 22:55	Air temp: 14°C Wind start: 1 Wind end: 1 Cloud: 8 Precipitation: None

132	13/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:13 End 22:58	Air temp: 17°C Wind start: 1 Wind end: 0 Cloud: 4 Precipitation: None
	27/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:16 End 23:01	Air temp: 19°C Wind start: 1 Wind end: 1 Cloud: 8 Precipitation: None
	11/07/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:10 End 22:55	Air temp: 14°C Wind start: 1 Wind end: 1 Cloud: 8 Precipitation: None
139	12/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:12 End 22:57	Air temp: 21°C Wind start: 1 Wind end: 1 Cloud: 2 Precipitation: None
	26/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:16 End 23:01	Air temp: 18°C Wind start: 1 Wind end: 1

	10/07/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:11 End 22:56	Cloud: 4 Precipitation: None Air temp: 19°C Wind start: 1 Wind end: 1 Cloud: 8 Precipitation: 2
150	12/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:12 End 22:57	Air temp: 21°C Wind start: 1 Wind end: 1 Cloud: 2 Precipitation: None
	26/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:16 End 23:01	Air temp: 18°C Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: None
	10/07/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:11 End 22:56	Air temp: 19°C Wind start: 1 Wind end: 1 Cloud: 8 Precipitation: 2

244	06/06/23 Tree fell over so further surveys not possible	Steve Hancock and Samuel Radonich	Start 21:07 End 22:52	Air temp: 11°C Wind start: 3 Wind end: 3 Cloud: 8 Precipitation: 1
281	14/06/23	Steve Hancock and Samuel Radonich	Start 21:13 End 22:57	Air temp: 18°C Wind start: 1 Wind end: 1 Cloud: 1 Precipitation: 1
	18/07/23	Samuel Radonich and George Cope	Start 21:00 End 22:45	Air temp: 15°C Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 1
	29/08/23	Samuel Radonich and Phil Nielson	Start 19:45 End 21:30	Air temp: 18°C Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 0
323	15/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:14 End 22:59	Air temp: 18°C Wind start: 1

				Wind end: 1 Cloud: 1 Precipitation: 1
	29/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:16 End 23:01	Air temp: 15°C Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 1
	13/07/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:08 End 22:35	Air temp: 18°C Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 0
324	15/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:14 End 22:59	Air temp: 18°C Wind start: 1 Wind end: 1 Cloud: 1 Precipitation: 1
	29/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:16 End 23:01	Air temp: 15°C Wind start: 1 Wind end: 1

				Cloud: 4 Precipitation: 1
	13/07/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:08 End 22:353	Air temp: 18°C Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 0
328	15/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:14 End 22:59	Air temp: 18°C Wind start: 1 Wind end: 1 Cloud: 1 Precipitation: 1
	29/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:16 End 23:01	Air temp: 15°C Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 1
	13/07/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:08 End 22:353	Air temp: 18°C Wind start: 1 Wind end: 1

				Cloud: 4 Precipitation: 0
329	15/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:14 End 22:59	Air temp: 18°C Wind start: 1 Wind end: 1 Cloud: 1 Precipitation: 1
	29/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:16 End 23:01	Air temp: 15°C Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 1
	13/07/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:08 End 22:353	Air temp: 18°C Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 0
342	15/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:14 End 22:59	Air temp: 18°C Wind start: 1 Wind end: 1 Cloud: 1

				Precipitation: 1
	29/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:16 End 23:01	Air temp: 15°C Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 1
	13/07/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:08 End 22:353	Air temp: 18°C Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 0
397	14/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:13 End 22:57	Air temp: 18°C Wind start: 1 Wind end: 1 Cloud: 1 Precipitation: 1
	28/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:00 End 22:45	Air temp: 15°C Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 1 Air temp: 18°C

	12/07/23	Tim Buckland, Jack Huges and Alex Burrows	Start 19:45 End 21:30	Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 0
398	14/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:13 End 22:57	Air temp: 18°C Wind start: 1 Wind end: 1 Cloud: 1 Precipitation: 1
	28/06/23	Tim Buckland, Jack Huges and Alex Burrows	Start 21:00 End 22:45	Air temp: 15°C Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 1
	12/07/23	Tim Buckland, Jack Huges and Alex Burrows	Start 19:45 End 21:30	Air temp: 18°C Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 0
412	07/06/23	Steve Hancock and Samuel Radonich	Start 21:08 End 22:53	Air temp: 16°C Wind start: 1 Wind end: 1

				Cloud: 1 Precipitation: 0
	03/07/23	Daniel Hogego and Adam Munshi	Start 21:00 End 22:45	Air temp: 15°C Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 1
	25/07/23	George Parry and Lindsey Partington	Start 19:45 End 21:30	Air temp: 18°C Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 0
429	05/07/23	Adam Regan-griffiths and Kacie Henson	Start 21:15 End 23:05	Air temp: 13°C Wind start: 2 Wind end: 1 Cloud: 1 Precipitation: 0
	27/07/23	Steve Hancock and Tom Stuart	Start 21:16	Air temp: 19°C Wind start: 1

			End 23:01	Wind end: 1 Cloud: 8 Precipitation: 0
	21/08/23	Daniel Hogego and Callum Moores	Start 19:58 End 21:43	Air temp: 18°C Wind start: 2 Wind end: 3 Cloud: 3 Precipitation: 0
458	03/07/23	Adam Regan-Griffiths and Kacie Henson	Start 21:15 End 23:05	Air temp: 13°C Wind start: 2 Wind end: 1 Cloud: 1 Precipitation: 0
	27/07/23	Daniel Hogego and Samuel Radonich	Start 20:52 End 22:37	Air temp: 18°C Wind start: 0 Wind end: 0 Cloud: 3 Precipitation: 0
	22/08/23		Start 19:45 End 21:30	Air temp: 18°C

		Daniel Hogego and Callum Moores		Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 0
478	07/07/23	Steve Hancock and Samuel Radonich	Start 21:14 End 22:59	Air temp: 15°C Wind start: 1 Wind end: 1 Cloud: 2 Precipitation: 0
	27/07/23	George Parry and Lindsey Partington	Start 20:51 End 22:36	Air temp: 19°C Wind start: 1 Wind end: 1 Cloud: 6 Precipitation: 0
	22/08/23	George Parry and Charlotte Beale	Start 19:45 End 21:30	Air temp: 18°C Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 0

29	06/07/23	Adam Regan-Griffiths and Kacie Henson	Start 21:13 End 22:58	Air temp: 15°C Wind start: 1 Wind end: 1 Cloud: 2 Precipitation: 0
	25/07/23	Steve Hancock and Tom Stuart	Start 20:54 End 22:39	Air temp: 15°C Wind start: 3 Wind end: 2 Cloud: 3 Precipitation: 0
	23/08/23	Daniel Hogego and Callum Moores	Start 20:05 End 21:58	Air temp: 18°C Wind start: 1 Wind end: 1 Cloud: 4 Precipitation: 0
92	03/07/23	Adam Regan-Griffiths and Kacie Henson	Start 21:15 End 23:00	Air temp: 13°C Wind start: 4 Wind end: 4 Cloud: 7 Precipitation: 0

	17/07/23	Samuel Radonich and George Cope	Start 21:04 End 22:49	Air temp: 15°C Wind start: 2 Wind end: 2 Cloud: 7 Precipitation: 0
	24/08/23	Daniel Howgego and Callum Moores	Start 20:00 End 21:45	Air temp: 18°C Wind start: 1 Wind end: 1 Cloud: 2 Precipitation: 0
344	06/07/23	Dan Howgego and Adam Munshi	Start 21:28 End 22:58	Air temp: 17°C Wind start: 4 Wind end: 3 Cloud: 7 Precipitation: 0
	31/07/23	George Parry and Daniel Howgego	Start 20:45 End 22:30	Air temp: 16°C Wind start: 1 Wind end: 2

			Cloud: 8 Precipitation: 1
23/08/23	George Parry and Charlotte Beale	Start 20:01 End 21:46	Air temp: 19°C Wind start: 0 Wind end: 0 Cloud: 4 Precipitation: 0

Appendix B

Trapping / Radio Tracking Survey Baseline Report

Appendix C

Photographs

B1 – Eastern Barn	
	
	
	
	

B2 – Western Barn	
	
	
	
	

Arcadis Consulting (UK) Limited

1st floor, Suite 1a,

4 Piccadilly,

Manchester

M1 3BN
United Kingdom

T: +44 161 245 8700

arcadis.com