



“Providing Common Sense Solutions for Sustainable Development”

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Rakeway Farm

Bat and Bird Presence/Absence Survey Report – August 2022



Bat and Bird Presence/Absence Survey

Bat and Bird Presence/Absence Survey

At

Rakeway Farm,
Rakeway road,
Cheadle,
Staffordshire

For

Alcock Estate Beneficiary

Bat and Bird Presence/Absence Survey

0. Executive Summary

0.1 Report rationale

This report has been prepared at the request of the Alcock Estate Beneficiary. This is in relation to the identification and location of protected bats and bird species at the Rakeway Farm, Rakeway Road, Cheadle, Staffordshire (grid reference: SK 02060 42057).

The 'Preliminary Roost Appraisal (PRA) Survey' (daytime inspection survey) and the bat activity surveys (dusk/dawn) were undertaken by Evolution Ecology Ltd on the following dates;

- 9th of August 2022 (PRA survey).
- 10th of August 2022 (dawn bat activity survey).
- 24th of August 2022 (dusk bat activity survey).
- 1st of September 2022 (dusk bat activity survey).

0.2 Background

Under the current proposals, the farmhouse and barns are to be redeveloped.

Bat and Bird Ecology

Bats - It can be concluded from the above survey results that Brown long-eared, and Common Pipistrelle bats are roosting in the south elevation of the breezeblock wall (hollow) inside the 'Modern Prefabricated Barn'.

No bats were seen emerging or entering the farmhouse or the traditional barns' roof spaces.

Birds – Swallows and wrens are nesting inside the traditional barns and the farmhouse (livestock section).

Please see Figures 2 and 3 for further information on the roost locations and Appendix B for additional photographic records.

0.3 Ecological Provisions

Please see 'Section 5 – Ecological Provisions' for an outline of the proposed ecological provisions for the works at the site.

Bat and Bird Presence/Absence Survey

Contents

0	Executive summary	3
1	Introduction	5
1.1	Site Description	
1.2	Proposed Works	
1.3	Aims of survey	
2	Survey Methodology	8
2.1	Summary of survey methods	
2.2	Pre-survey data search	
2.3	Surveyors information	
2.4	Field surveys	
2.4.1	Habitat surveys	
2.4.2	Roost survey – weather conditions and timing	
2.4.3	Roost and Activity surveys	
3	Results	14
3.1	Pre-survey data search	
3.2	Field surveys	
3.2.1	Habitat description	
3.2.2	Roost survey	
3.2.3	Summary of Roost survey	
3.2.4	Activity surveys	
4	Impact Assessment	26
4.1	Constraints on survey information	
4.2	Constraints on equipment used	
4.3	Potential impacts of development	
4.3.1	Designated sites	
4.3.2	Roosts	
4.3.3	Foraging and commuting habitat	
4.4	Legislation and policy guidance	
5	Ecological Provisions	28
6	Summary	32
6.1	Bat and Bird Ecology	
6.2	Ecological Provisions	
7	References	33
8	Appendices	34
9	LIMITING CONDITIONS / DISCLAIMERS	44

Bat and Bird Presence/Absence Survey

1 INTRODUCTION

This report has been prepared at the request of the Alcock Estate Beneficiary. This is in relation to the identification and location of protected bat and bird species at Rakeway Farm, Rakeway Road, Cheadle, Staffordshire (grid reference: SK 02060 42057).

The 'Preliminary Roost Appraisal (PRA) Survey' (daytime inspection survey) and the bat activity surveys (dusk/dawn) were undertaken by Evolution Ecology Ltd on the following dates;

- 9th of August 2022 (PRA survey).
- 10th of August 2022 (dawn bat activity survey).
- 24th of August 2022 (dusk bat activity survey).
- 1st of September 2022 (dusk bat activity survey).

1.1 Site Description

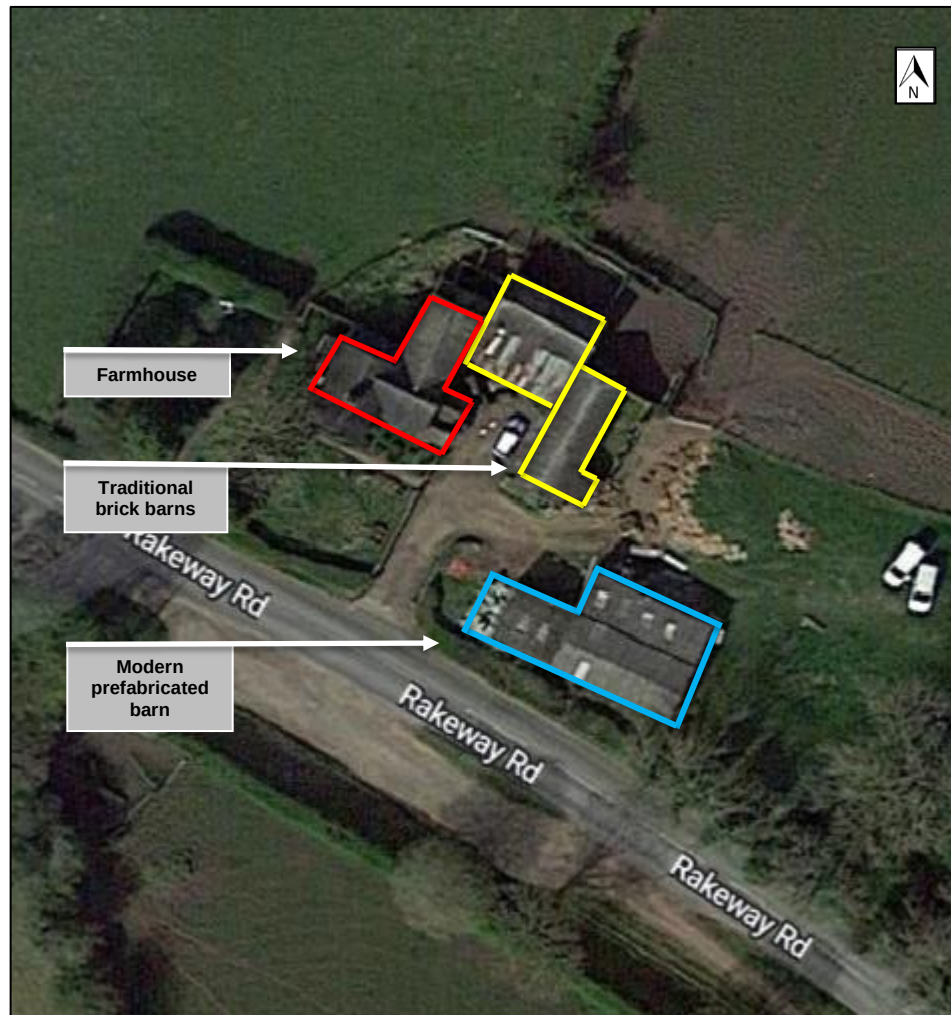
The site consists of a farmhouse, and barns, a garden and is surrounded by agricultural land, scattered trees, hedgerows and roads.

There is agricultural land, scattered trees/woodland, hedgerows, and residential and commercial units (with their associated gardens/yards) in the broader landscape.

Therefore, the site and the surrounding area contain roosting, commuting, and foraging features for the local bat and bird populations.

Bat and Bird Presence/Absence Survey

Figure 1: An aerial map showing the location of the buildings at the site in relation to some of the local landscape.



1.2 **Proposed works**

Under the current proposals, the farmhouse and barns are to be redeveloped.

1.3 **Aims of the survey**

The actions of the surveyors on-site and during the production of the report were conducted in accordance with the Bat Conservation Trust (BCT) guidelines (3rd Edition). The aim of the survey was to undertake an appraisal of the building/s and the surrounding area to establish the following:

Bat and Bird Presence/Absence Survey

1.3.1 Survey protocol considered any protected bat species on-site**Bats**

- To establish the probability of bats and their roost sites being present at the proposed redevelopment site.
- To assess the roost status.
- To assess suitable food resources and habitat requirements.
- If a roost site is found, provide an impact assessment.

1.3.2 Survey protocol also considered any protected bird species on-site:**Barn Owls**

- To establish if barn owls were using the site.
- To locate nest sites if present.
- To assess what activities were shown within the site of interest.
- To evaluate suitable food resources and habitat requirements.
- To provide an impact assessment if barn owls are present.

Birds

- To establish if birds were using the site.
- To locate nest sites if present.
- To assess what activities were shown within the site of interest.
- To assess suitable food resources and habitat requirements.
- To provide an impact assessment if nests are found.

1.3.3 The information was subsequently used in conjunction with the knowledge of the proposed works at the site to determine:

- What impacts the works are likely to have on any protected species found at the site.
- The need for any Natural England development licence application to be made in respect of activities concerning protected species.
- Recommendations for any mitigation measures that would be required.

Bat and Bird Presence/Absence Survey

2 SURVEY METHODOLOGY

2.1 Summary of survey methods

The objective of this report is to provide an ecological evaluation of the site in relation to its suitability for bat and bird utilisation. The survey considered the potential for roosting bats and gathered any anecdotal evidence (i.e., bats, bat droppings, feeding remains, urine stains and grease marks) that may support their presence within the building unit(s).

2.1.1 Walkover survey

A walkover survey of the site and a visual inspection of the building/s and any trees were undertaken to determine the availability of the required resources for the protected species in the immediate area. This would allow us to determine:

- Presence or absence of bats on-site (i.e., roosting).
- Evidence and/or potential of bat roosts on-site (i.e., summer roosts).
- Whether additional surveys are required.

2.1.2 External Inspection of the Building/s Elevations

The building/s on-site were inspected both externally and internally for signs of bat activity. Notes were made on the following in accordance with the guidelines published by the BCT for the scoping and surveying of building/s and built structures:

The objective of this survey was to locate suitable ingress, and egress points that protected species (bats) could use to fly into the building/s and also to identify any areas within the building/s in which these species may be able to roost and/or nest. The survey method used to inspect the external walls and roof of the buildings was a visual assessment with the use of binoculars, a torch, an endoscope, and ladders in full daylight.

This allowed us to determine the following information:

- Type and age of building/s.
- Type of construction.
- Presence of potential roost features (e.g., missing roof tiles, raised tiles, roof voids).
- Presence of suitable entry and exit points (e.g., broken windows, missing windows and doors/ridges and the apex of the buildings).
- Amount and location of evidence of bats such as the presence of live or dead bats, droppings, grease marks, urine stains and/or characteristic smell of bats.

Bat and Bird Presence/Absence Survey

2.1.3 Internal Inspection of the Building/s Elevations and Rooms

The object of this survey was to locate and focus on areas that provide appropriate environmental conditions for bats. To do this, we must:

- Look for warm dark areas, joints, crevices, beams and cavities for possible bat roost sites and nest sites.
- Locate roost sites.
- Listen for bats.
- Examine floors, walls and structural elements for droppings, corpses, skeletons and dead insects.

2.1.4 Building/s Rating

In the absence of evidence, structures have been assigned a rating of suitability from negligible to a high potential for supporting bats. The rating is based on the location of the structure in the surrounding landscape, the number and type of features suitable for use by bats and the surveyor's experience.

For example, a structure with a high level of regular disturbance with few opportunities for access by bats, that is, in a highly urbanised area with few, or no mature trees, parkland, woodland or wetland would generally equate to having negligible potential. Conversely, a pre-20th century or early 20th-century building with many features suitable for use by bats close to good foraging habitat would have high potential.

2.1.5 Roost Categories

Any structures with evidence of bats will be further evaluated to assess which of the following roost categories may be present on-site (if any):

- **Maternity or Nursery Roost** – used by breeding bats, where pups are born and raised to independence (anecdotal evidence may support this prospect).
- **Hibernation Site** – where bats may be found during the winter (this is assessed within the context of this report).
- **Daytime Summer Roost** – used by males and/or non-breeding females.
- **Night Roost** – where bats rest between feeding bouts during the night but are rarely present during the day.
- **Feeding Roost** – where bats temporarily hang up to eat an item of prey.

Bat and Bird Presence/Absence Survey

- **Transitional (or Swarming) Site** – where bats may be present during the spring or autumn (this cannot be assessed within the context of this report).

2.1.6 Bat Detector Survey (Dusk/Dawn surveys)

If required, the object of this survey is to detect active bats leaving possible roost sites identified in the external and internal surveys. This is achieved by:

- Being at the site 30 minutes before sunset and 90 minutes before sunrise.
- Listening for social calls at potential roost sites.
- Standing at different transect points around the buildings, using the bat detector for hearing the bats, plus trying to see the first bats emerge.
- Standing at different transect points at foraging areas.
- Carrying out this survey up to two hours after the first bats emerge and 15 minutes after sunrise. This will cover the emergence and returning period to the roost site for some bat species.

- 2.1.7 Evidence will be used to determine whether a European Protected Species (EPS) licence will be required to ensure legal compliance during the re/development. This will also include identifying which mitigation measures [if any] would be most appropriate.

2.2 Pre-survey Data Search

2.2.1 Desktop Study (Ecological Data Search)

Staffordshire Ecological Record (SER) was commissioned to conduct an ecological data search of all protected species and sites recorded within a 2km radius of the site.

- 2.2.2 A desktop study of the area using online resources was undertaken independently to corroborate the current overview of the site and its importance in the landscape. Websites/applications used for this study include www.naturalengland.org.uk, www.ordnancesurvey.co.uk, and Google Earth. A search for other relevant nature conservation information was made using the Multi-Agency Geographic Information for the Countryside ([MAGIC](#)). MAGIC also features aerial imagery that can be studied for connecting habitats (or likewise, Google Maps can be viewed).

Bat and Bird Presence/Absence Survey

2.3 Surveyors Information

2.3.1 The survey was undertaken by licensed bat ecologist/s and members of the Institute of Ecology & Environmental Management (CIEEM):

- **Mr Paul Keeling** BSc (Hons), MCIEEM, Principal Ecologist, Natural England Bat Survey Licence Number: 2015-11546-CLS-CLS Bat Survey Level 2.
- **Mr Ashley Milward** - Assistant Ecologist.
- **Jake Steele** – Assistant Ecologist.

2.4 Field surveys

2.4.1 Evolution Ecology Ltd has no previous ecology information about the site.

2.4.2 Roost Surveys - weather conditions and timing

The building/s on-site was externally and internally inspected for the presence of bats and birds with the use of binoculars, torches, an endoscope and ladders in full daylight.

Table 1: Preliminary Roost Appraisal (PRA) Survey, Environmental Variables

Environmental variables	PRA Survey of the building/site– 9 th August 2022.
Temp Start	26°C
Temp Finish	22°C
Humidity Start	50%
Humidity Finish	50%
Cloud Cover Start	25%
Cloud Cover Finish	25%
Wind Speed Average	6mph
Precipitation	Dry

Bat and Bird Presence/Absence Survey

Table 2: Dawn Activity Survey, Environmental Variables

Environmental variables	Dawn Activity Survey – 10 th August 2022.
Temp Start	14°C
Temp Finish	13°C
Humidity Start	82%
Humidity Finish	82%
Cloud Cover Start	10%
Cloud Cover Finish	10%
Wind Speed Average	None
Precipitation	Dry

Table 3: Dusk Activity Survey, Environmental Variables

Environmental variables	Dusk Activity Survey of the building/site– 24 th August 2022.
Temp Start	19°C
Temp Finish	15°C
Humidity Start	50%
Humidity Finish	50%
Cloud Cover Start	50%
Cloud Cover Finish	50%
Wind Speed Average	6mph
Precipitation	Dry

Bat and Bird Presence/Absence Survey

Table 4: Dusk Activity Survey, Environmental Variables

Environmental variables	Dusk Activity Survey of the building/site– 1st September 2022.
Temp Start	18°C
Temp Finish	17°C
Humidity Start	50%
Humidity Finish	50%
Cloud Cover Start	25%
Cloud Cover Finish	25%
Wind Speed Average	6mph
Precipitation	Dry

2.4.3 Roost and Activity Surveys

During the PRA survey, the types of equipment used included an endoscope, ladders and torches.

The type of equipment used during the dusk and dawn bat activity surveys are the Batbox Duet, S.S.F. Bat2 heterodyne and frequency division bat detectors, along with the Echo Meter Touch 2 (E.M.T.) bat detector.

Echo Meter Touch 2

The E.M.T. bat detector is a data recorder that distinguishes bat calls from other sound sources in real-time (online signal analysis). Calls are recorded digitally as call sequences. The E.M.T. is used alongside Batbox Duet and S.S.F. Bat2 heterodyne and Frequency Division bat detectors and provides an unbiased statistical analysis of bat species recorded during a survey on site. All statistical analysis software is included in the E.M.T., giving us real-time results quickly and efficiently.

Bat and Bird Presence/Absence Survey

3 RESULTS

3.1 Field surveys

3.1 Desktop Study Results

3.1.2 Bats Recorded in the Area

Seven British bat species are currently given UK BAP (2007) Priority Species Status (table A). Of these, four UK BAP species were recorded within a 2km radius of the proposed application area (highlighted by the tick):

Table A: UK BAP (2007) Priority bat species status

UK BAP	Common name	Species	County records within 2km
☒	Brown long-eared bat	<i>Plecotus auritus</i>	☒
☒	Barbastelle bat	<i>Barbastella barbastellus</i>	☐
☒	Bechstein's bat	<i>Myotis bechsteinii</i>	☐
☒	Noctule	<i>Nyctalus noctula</i>	☒
☒	Greater horseshoe bat	<i>Rhinolophus ferrumequinum</i>	☐
☒	Lesser horseshoe bat	<i>Rhinolophus hipposideros</i>	☐
☒	Soprano pipistrelle	<i>Pipistrellus pygmaeus</i>	☒
☒	Common Pipistrelle	<i>Pipistrellus pipistrellus</i>	☒

 Bat and Bird Presence/Absence Survey

3.1.1 Habitat description

The site is surrounded by hard-standing ground, buildings, gardens, and scattered trees.

The broader landscape shows evidence of agricultural land, scattered trees/woodland, hedgerows, and residential and commercial units (with their associated gardens/yards).

Therefore, the site and the surrounding area contain roosting, commuting, and foraging features for the local bat and bird populations.

3.2.1 **Bat roost and birds nest (including barn owl) survey**

Table 5: FARMHOUSE - External features identified during the PRA.

<u>External features for the farmhouse</u>	<u>Yes</u>	<u>No</u>
Staffordshire blue/clay tiles	☒	
Stone ridge tiles		☒
Felt roof	☒	
Pitch roof	☒	
Skylights	☒	
Flat roof		
Brick solid walls	☒	
Cavity walls		☒
Timber beams	☒	
Rendered walls	☒	
Gaps in the windows		☒
Cracks/crevices in walls	☒	
Slipped/missing/dislodged tiles	☒	
Gaps around fascia/soffit	☒	
Air/ridge vents	☒	
Birds' nests		☒
Prefabricated steel sheeting		☒
Breeze blocks		☒
Notes: The farmhouse is currently empty.		

Bat and Bird Presence/Absence Survey

Table 6: FARMHOUSE - Internal features identified during the PRA.

<u>Internal Features for the Farmhouse</u>	<u>Yes</u>	<u>No</u>
Shed Roof		☒
Timber beams	☒	
Steel beams		☒
Commercial rooms		☒
Educational rooms		☒
Storage rooms	☒	
Warehouse		☒
Agricultural (inc. domestic livestock)	☒	
Derelict building	☒	
Moth/Butterfly remains		☒
Mouse droppings		☒
Cobwebs	☒	
Bat droppings		☒
Birds' nests	☒	
Notes: A section of the farmhouse contains a 'livestock enclosure/room', which has a swallow nest within the ceiling beams.		

Bat and Bird Presence/Absence Survey

Table 7: BARNS - External features identified during the PRA.

External features for the traditional barns	Yes	No
Staffordshire blue/clay tiles	☒	
Stone ridge tiles		☒
Felt roof		☒
Pitch roof	☒	
Skylights		☒
Flat roof		☒
Brick solid walls	☒	
Cavity walls		☒
Timber beams	☒	
Rendered walls		☒
Gaps in the windows	☒	
Cracks/crevices in walls	☒	
Slipped/missing/dislodged tiles	☒	
Gaps around fascia/soffit	☒	
Air/ridge vents		☒
Birds' nests		☒
Prefabricated steel sheeting		☒
Breeze blocks		☒
Notes: There are several missing/open doors and windows throughout the two barns, which provide access points for bats and birds.		

Table 8: BARNS - Internal features identified during the PRA.

Internal Features for the traditional barns	Yes	No
Shed Roof		☒
Timber beams	☒	
Steel beams		☒
Commercial rooms		☒
Educational rooms		☒
Storage rooms	☒	
Warehouse		☒
Agricultural (inc. domestic livestock)	☒	
Derelict building		☒
Moth/Butterfly remains		☒
Mouse droppings	☒	
Cobwebs	☒	
Bat droppings		☒
Birds' nests	☒	
Notes: Four swallow nests and one wren nest are present in the ground floor rooms and the first floor rooms (along timber beams).		

Bat and Bird Presence/Absence Survey

Table 9: Modern Prefabricated Barn - External features identified during the PRA.

<u>'External' features for the modern prefabricated barn</u>	<u>Yes</u>	<u>No</u>
Staffordshire blue/clay tiles		☒
Stone ridge tiles		☒
Felt roof		☒
Pitch roof	☒	
Skylights	☒	
Flat roof		☒
Brick solid walls		☒
Cavity walls	☒	
Steel beams	☒	
Rendered walls		☒
Gaps in the windows		☒
Cracks/crevices in walls		☒
Slipped/missing/dislodged tiles		☒
Gaps around fascia/soffit		☒
Air/ridge vents		☒
Birds' nests		☒
Prefabricated Steel sheeting	☒	
Breeze Blocks	☒	
Notes: N/A		

Table 10: Prefabricated Barn - Internal features identified during the PRA.

<u>Internal features for the modern prefabricated barn</u>	<u>Yes</u>	<u>No</u>
Shed Roof		☒
Steel beams	☒	
Timber beams		☒
Commercial rooms		☒
Educational rooms		☒
Storage rooms	☒	
Warehouse		☒
Agricultural (inc. domestic livestock)	☒	
Derelect building		☒
Moth/Butterfly remains		☒
Mouse droppings		☒
Cobwebs		☒
Bat droppings		☒
Birds' nests		☒
Notes: There was direct evidence of a bat roost inside the building.		

Bat and Bird Presence/Absence Survey

3.2.3 Summary of the external and internal inspections

Due to the number of potential access points and suitable roosting features, the buildings are deemed as 'High' potential.

Therefore, three bat activity surveys are required during the bat activity season (May to August/September).

Table 11: Features of buildings and built structure classification, which may indicate the potential for bats. The full guidance can be found in the Bat Conservation Trust Good Practice Survey Guidelines.

Bat Conservation Trust

Table 7.3 Recommended minimum number of survey visits for presence/absence surveys to give confidence in a negative result for structures (also recommended for trees but unlikely to give confidence in a negative result).

Low roost suitability	Moderate roost suitability	High roost suitability
One survey visit. One dusk emergence or dawn re-entry survey ^a (structures). No further surveys required (trees).	Two separate survey visits. One dusk emergence and a separate dawn re-entry survey. ^b	Three separate survey visits. At least one dusk emergence and a separate dawn re-entry survey. The third visit could be either dusk or dawn. ^b

^a Structures that have been categorised as low potential can be problematic and the number of surveys required should be judged on a case-by-case basis (see Section 5.2.9). If there is a possibility that quiet calling, late-emerging species are present then a dawn survey may be more appropriate, providing weather conditions are suitable. In some cases, more than one survey may be needed, particularly where there are several buildings in this category.

^b Multiple survey visits should be spread out to sample as much of the recommended survey period (see Table 7.1) as possible; it is recommended that surveys are spaced at least two weeks apart, preferably more. A dawn survey immediately after a dusk one is considered only one visit.

Bat and Bird Presence/Absence Survey

Table 12: Low/Moderate/High potential building(s) survey recommendations. The full guidance can be found in the Bat Conservation Trust Good Practice Survey Guidelines. These guidelines are what all local authorities abide by.

Table 4.1 Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape, to be applied using professional judgement.		
Suitability	Description Roosting habitats	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
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^a and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation^b). A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.^c	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions ^a and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions ^a and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.

Bat and Bird Presence/Absence Survey

3.2.4 Activity Dusk and/or Dawn Surveys

10th August 2022 Dawn Activity Survey –

- **Brown Long-Eared** (*Plecotus Auritus*) bats: During the dawn activity survey, identified two foraging Brown Long-Eared bats flying around the buildings and the nearby fields.
- **Common Pipistrelle** (*Pipistrellus pipistrellus*) bats: During the dawn activity survey, identified two Common Pipistrelle bats flying around the buildings and the nearby fields.

24th August 2022 Dusk Activity Survey –

- **Brown Long-eared bats:** During the dusk activity survey, Brown Long-eared bats were seen perched on the roof beams and flying around the inside of the 'Modern Prefabricated Barn'.

Additionally, two bats were seen emerging from the top row of the south elevation breeze block wall (hollow inside).

A peak count of five Brown Long-Eared bats were seen inside the 'Modern Prefabricated Barn'.

- **Common Pipistrelle bats:** During the dusk activity survey, Common Pipistrelle bats were seen flying around the inside of the 'Modern Prefabricated Barn'.

Additionally, one bat was seen emerging from the top row of the breeze block wall.

A peak count of four Common Pipistrelle bats were seen inside the 'Modern Prefabricated Barn'.

1st September 2022 Dusk Activity Survey –

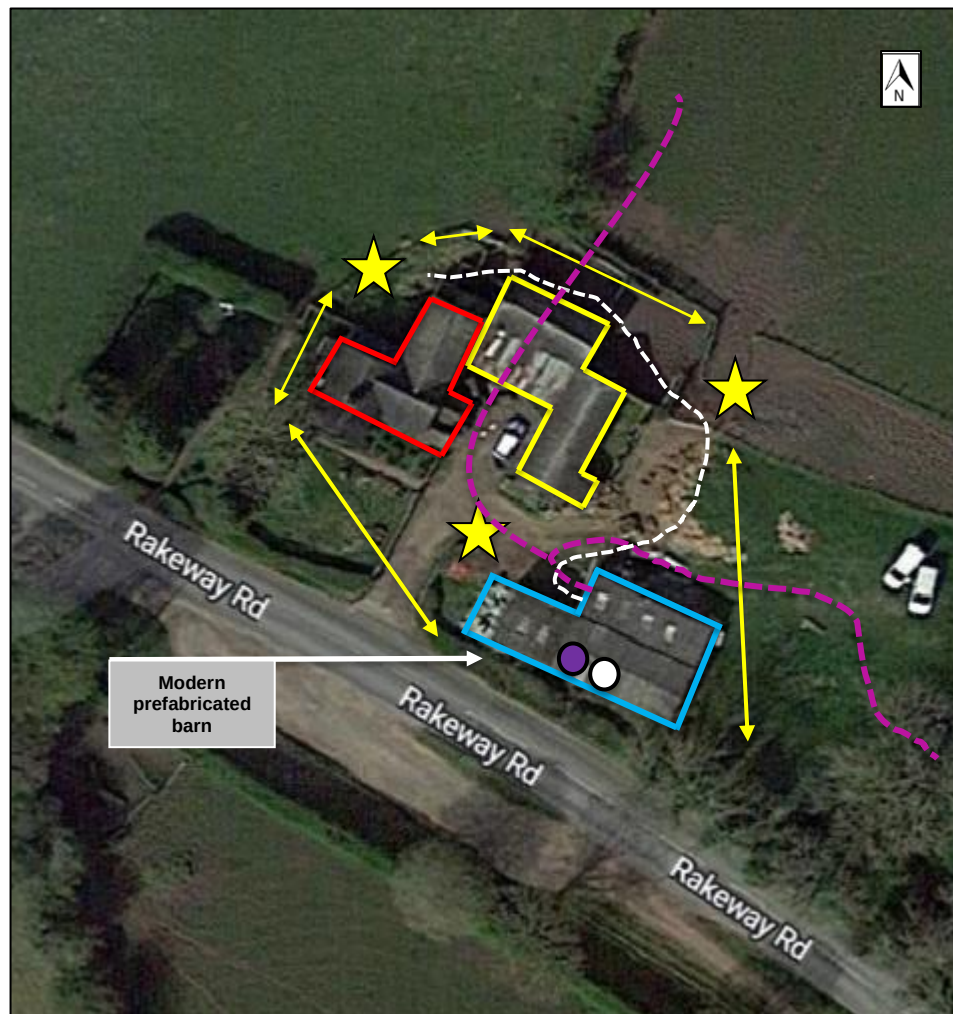
- During the dusk activity survey, recorded the same bat activity as the previous dusk survey.

Please see Figures 2 and 3 below for further information on the roost locations and Appendix B for additional photographic records.

Bat and Bird Presence/Absence Survey

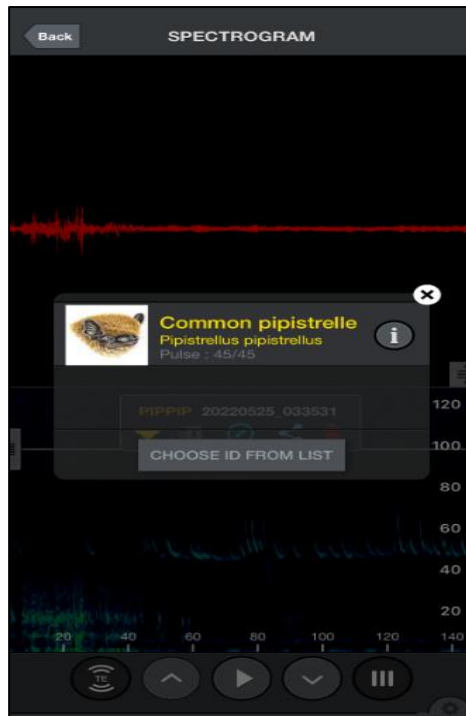
Figure 2: This image shows an aerial view of the buildings/site (red, yellow, blue outlines), the surveyors' locations (yellow stars), their line of sight (yellow arrows), and the flying/foraging flight path.

- Purple circle – Brown long-eared bat roost,
- White circle – Common Pipistrelle bat roost,
- Purple dashed line – Brown long-eared flight/foraging paths.
- White dashed line – Common Pipistrelle flight/foraging paths.



Bat and Bird Presence/Absence Survey

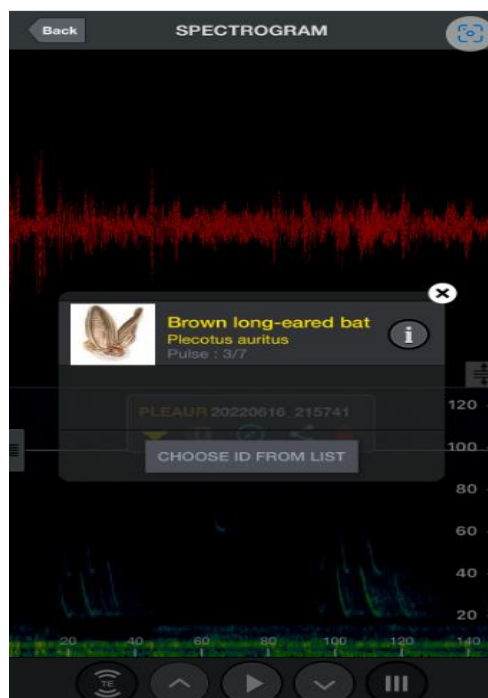
Figure 3: This spectrogram shows a Common Pipistrelle bat that was recorded flying/foraging/roosting at the site.



Pipistrelle Bat - It is the smallest UK bat, with brown fur and black wings and face. Its wingspan is normally around 20cm, and it weighs no more than a pound coin.



Figure 4: This spectrogram shows a brown long-eared bat that was recorded flying/foraging/roosting at the site.



The brown long-eared is a medium size bat and lives up to its name: its ears are nearly as long as its body.



Bat and Bird Presence/Absence Survey

- 3.2.5 The LUX light meter reader was used to confirm the amount of artificial light pollution at the site and from nearby buildings and streetlights.

Bats have evolved to emerge at night, with only moonlight providing a source of light at night (up to 0.3 Lux). However, with the creation of artificial lights via the installation of streetlights, security lights and light coming from residential and commercial properties, meaning that the light pollution can range from 4 Lux to 1000 Lux.

Impacts on bats and their roosts - Artificial lighting is known to affect bat roosting and foraging behaviour, with lighting shown to result in a range of impacts, including roost desertion (BCT, 2009), delayed emergence of roosting bats (Downs et al., 2003), increased activity of some bat species and decreased activity by others (Stone et al., 2012).

Please see below the Lux meter reading recorded at the site (Middleton Hall).

Figure 5: This image shows minimal artificial light pollution at the site (0.00lux).



Bat and Bird Presence/Absence Survey

- 3.2.6 Thermal Image of the building (the thermal camera was used to aid in observing any bats emerging/returning from and to the buildings).

Figure 6 and 7: Thermal image of the farmhouse and the traditional barns



Bat and Bird Presence/Absence Survey

4 IMPACT ASSESSMENT

4.1 Constraints on survey information

There were no constraints with regard to obtaining survey information.

4.2 Constraints on equipment used

No constraints were present with regard to the equipment used during the survey (i.e., endoscope, ladders, and high-powered binoculars).

4.3 Potential impacts of the re-development

Based on the current planning proposal, whereby:

Under the current proposals, the potential impacts have been identified as follows:

4.3.1 Designated sites

Any designated sites nearby are not applicable to the proposed project, as only restoration works to the building are taking place. This, therefore, means that any building work would be of no detriment to the surrounding landscape.

4.3.2 Bat Roosts**Short-term impacts: Disturbance**

Farmhouse and Traditional Barns - There will be no impact on the bats or their roosts for any redevelopment works undertaken at the farmhouse or the traditional barns.

Modern Prefabricated Barn - The client informs Evolution Ecology Ltd that the 'modern prefabricated barn' is not to be redeveloped. Therefore, there will be no impact on the known bat roosts, with no mitigation and compensation measures required to be implemented to safeguard the bats and their roost/s at the site.

Long-term impacts: Roost modification

Same as 'Short-term impacts: Disturbance.'

Long-term impacts: Roost loss

Bat and Bird Presence/Absence Survey

Same as 'Short-term impacts: Disturbance.'

4.3.3 Foraging and commuting habitat.

It is considered that the works to the buildings would have a negligible effect on potential foraging and commuting habitat at the site/area.

4.4 Legislation and Policy Guidance

National Planning Policy Framework, Section 11: The recently published framework in 2012, replaces the previous Planning Policy Statement 9. Section 11: Conserving and enhancing the natural environment reaffirms the government's commitment to maintaining green belt protections and preventing urban sprawl, retains the protection of designated sites and preserves wildlife, aims to improve the quality of the natural environment and halt declines in species and habitats, protects and enhances biodiversity and promotes wildlife corridors.

Article 10 of the E.C. Habitats Directive: The published article requires government to develop features such as 'stepping-stones' on the landscape, such as clusters of ponds, tracts of rough grassland or scrubland and vegetated railway line embankments.

Wildlife and Countryside Act 1981: All species of bat are fully protected under the Wildlife and Countryside Act 1981, the European Conservation (Natural Habitats, etc.) Regulations 1994, and the Countryside and Rights of Way Act 2000. This legislation makes it illegal to possess or control any live or dead specimens, to damage, destroy or obstruct access to any structure or place used for shelter, protection or breeding, and to intentionally disturb a bat while it is occupying a structure or place which it uses for that purpose.

Most resident nesting birds are protected under the Wildlife and Countryside Act 1981, which protects birds, nests, eggs, and nestlings. Some rarer species, such as barn owls are afforded extra protection.

Bat and Bird Presence/Absence Survey

5 ECOLOGICAL PROVISIONS

5.1 Bats

Farmhouse and Traditional Barns - There will be no impact on the bats or their roosts for any redevelopment works undertaken at the farmhouse or the traditional barns.

Modern Prefabricated Barn - The client informs Evolution Ecology Ltd that the 'modern prefabricated barn' is not to be redeveloped. Therefore, there will be no impact on the known bat roosts, with no mitigation and compensation measures required to be implemented to safeguard the bats and their roost/s at the site.

Please Note – If in the future redevelopment works are planned for the 'Modern Prefabricated Barn', which impact the known bat roosts, it will be necessary that a Natural England (NE) development licence is granted to disturb bats and their roosts legally.

Construction works that impact bats, and their roosts can only be undertaken between the months of October to March to prevent injury/killing of bats, and the reinstatement of the roosts should be carried out within this period.

The Natural England licence application process takes approximately 60 working days. Licence applications can only be submitted once planning permission is granted and must be prepared by a qualified ecologist. The licence itself must be issued prior to any redevelopment activities taking place, which might impact the known bat roosts. So, this route can cause delays to development if not considered when setting out the construction schedule

Since 2019, Natural England now charges a service fee of between £500 to £2000 per application.

For more information, please go to;
<https://www.gov.uk/government/collections/bat-licences>

Hibernating Bats - Bats tend to use loft spaces during the summer months (April/May to September) as they require hot and dry roosts to provide shelter and give birth to their young (pups).

However, during the winter months (October to March) they require cool and humid roosts to hibernate, which tend to be caves, cellars, and mature

Bat and Bird Presence/Absence Survey

trees. Nevertheless, some individual bats have been known to hibernate within their summer roosts.

5.2 Birds

Several swallow nests and a wren nest are scattered inside various rooms of the traditional barns and the farmhouse (livestock section of the building).

Law - Birds and their nests are protected under the 'Wildlife and Countryside Act 1981', making it illegal to kill, injure or destroy a bird, its chicks or nest.

Therefore, time avoidance measures will need to be put in place to prevent disturbing nesting birds during any redevelopment works that impact nesting birds (the breeding season is from March to August).

Additionally, black plastic sheeting could be installed around the windows outside the nesting season to prevent birds from nesting during the nesting season.

Bat and Bird Presence/Absence Survey

New Swallow Nest Sites – It is recommended that seven replacement swallow nests are installed in the 'Modern Prefabricated Barn' scattered around the roof beams (at least 1m apart from each other).

These new nest sites will compensate for the loss of the existing nest sites in the traditional barns and the farmhouse.

Figure 8: An image of a replacement swallow nest (supplier www.nhbs.com)



Bat and Bird Presence/Absence Survey

New Wren Sites - It is recommended that two replacement wren nests are installed in the 'Modern Prefabricated Barn' scattered around the roof beams (at least 1m apart from each other).

These new nest sites will compensate for the loss of the existing nest sites in the traditional barns.

Figure 9: An image of a replacement wren nest (supplier www.nhbs.com)



Bat and Bird Presence/Absence Survey

6 SUMMARY

6.1 Bat and Bird Ecology

Bats - It can be concluded from the above survey results that Brown long-eared, and Common Pipistrelle bats are roosting in the south elevation of the breezeblock wall (hollow) inside the 'Modern Prefabricated Barn'.

No bats were seen emerging or entering the farmhouse or the traditional barns' roof spaces.

Birds – Swallows and wrens are nesting inside the traditional barns and the farmhouse (livestock section).

6.2 Ecological Provisions

Please see 'Section 5 – Ecological Provisions' for an outline of the proposed ecological provisions for the works at the site.

Bat and Bird Presence/Absence Survey

7 REFERENCES

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Bat and Bird Presence/Absence Survey

8 APPENDICES

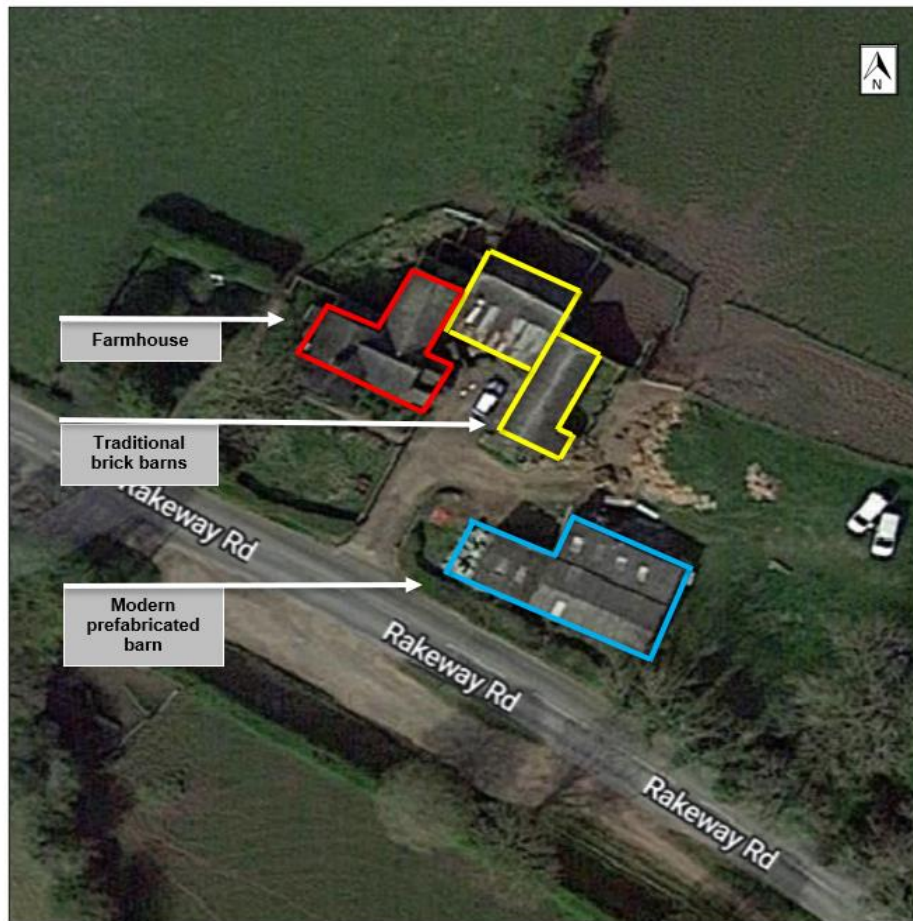
Appendix A: Site Plans

Appendix B: Additional Photographic Records

Appendix C: Bats and Artificial Light

Bat and Bird Presence/Absence Survey

Appendix A: Site Plan.



Bat and Bird Presence/Absence Survey

Appendix B: Additional Photographic Records

Plate 1: A photograph of the modern prefabricated barn. The bats were flying in and out of the open doorway.



Plate 2: A photograph of the traditional barns.



Bat and Bird Presence/Absence Survey

Plate 3: A photograph of the farmhouse.



Plate 4: A photograph of the north and east elevations of the traditional barns.



Bat and Bird Presence/Absence Survey

Plate 5: A photograph of the north and west elevations of the traditional barns and the farmhouse.



Bat and Bird Presence/Absence Survey

Plate 6: A photograph of an ecologist inspecting the roost location of the Brown Long-eared and Common Pipistrelle bats seen emerging from their roost (orange outline) inside the 'modern prefabricated barn'.



Plate 7: A photograph of the roost inside the hollow breeze block wall.



Bat and Bird Presence/Absence Survey

Plate 8: A photograph of a Brown Long-eared bat seen emerging from the roost and then perching on a roof beam inside of the 'modern prefabricated barn'.



Bat and Bird Presence/Absence Survey

Appendix C: Bat and Artificial Lights

Artificial lighting is known to affect bat roosting and foraging behaviour with lighting shown to result in a range of impacts including roost desertion (BCT, 2009), delayed emergence of roosting bats (Downs et al., 2003), increased activity of some bat species and decreased activity by others (Stone et al., 2012).

An experimental approach using L.E.D. units, demonstrated that relatively fast-flying bat species, including common pipistrelle, showed no significant impacts as a result of new artificial lighting, even when lighting was set at relatively high levels close to 50 lux. In contrast, slow flying bats, including myotis bats (*Myotis* spp.) showed sharp reductions in presence, even at low light levels of 3.6 lux (Stone et al., 2012). Current recommendations for all bat species specifies that no bat roost should be directly illuminated (BCT 2014).

Mitigation and lighting design Bat friendly lighting plans should firstly look to avoid lighting where possible and minimise lighting impacts by adopting the following measures:

- Lighting curfews or use of P.I.R. sensors. Lighting curfews can be an effective way of avoiding impacts on bats. These curfews may involve either turning off lighting or dimming light units at specific times of the night, dimming units at key times of the year, providing the luminaire allows for this option via a control unit. Lighting to be triggered by P.I.R. sensors can be expected to be illuminated only when required and for a low proportion of the overall time.
- Consider no lighting solutions where possible. Options such as white lining, good signage, and L.E.D. cat's eyes, should be considered as preferable, especially within Zones 1 and 2. Reflective fittings may help make use of headlights to provide any necessary illumination in some areas.
- Use only high pressure sodium, or warm white L.E.D. lamps where possible. High pressure sodium and warm white L.E.D. lamps emit lower proportions of insect attracting U.V. light than mercury, metal halide lamps, and white L.E.D. lighting. Generally, lamps should have a lower proportion of white or blue wavelengths, with a colour temperature <4200 kelvin recommended (BCT, 2014).
- Minimise the spread of light. The light spread should be kept at or near horizontal to ensure that only the task area is lit. Flat cut-off lanterns or accessories should be used to shield or direct light to where it is required. Baffles, hoods, louvers, and shields should be used where necessary to reduce light spill.
- Consider the height of lighting column. While downward facing bollard lighting is often preferable, it should be noted that a lower mounting height does not automatically reduce impacts to bats as bollard lighting can often be designed to provide up lighting. Where bollard lighting is considered to be the most appropriate system, bollard spacing or unit density should be kept to a minimum and units should be fitted with the appropriate hoods/deflectors to reduce up lighting. Column height should be carefully considered to balance task and mitigation measures.
- Avoid reflective surfaces below lights. The polarisation of light by shiny surfaces attracts insects increasing bat activity (BCT, 2012). Consequently, surface materials around lighting require consideration.

Bat and Bird Presence/Absence Survey

The Bat-Year

January Hibernating; using up fat reserves.



February Still hibernating; few fat reserves left.



March Some activity; occasional bat seen feeding.



April Awake and feeding at night.



May Females looking for nursery sites.



June Young born usually only one.

Bat and Bird Presence/Absence Survey



July Young still suckling.



August Young start catching insects; females leave nursery to find males.



September Mating season begins; start building fat reserves for hibernation.



October Search for suitable hibernation site.



November Hibernation begins although still some activity in warm weather.



December Hibernating.

Bat and Bird Presence/Absence Survey

9 LIMITING CONDITIONS/DISCLAIMERS (Unless stated otherwise)

9.1 The Service

- 9.2 Evolution Ecology agrees to supply ecological consulting services of a preliminary nature or a more thorough service as advised or as commissioned.

10 Fees

- 10.1 The client(s) will settle the agreed fee in full, within 30 days of receiving the invoice. Reports will remain the property of Evolution Ecology until full payment has been received. No liability is accepted for the contents of a report that is not paid in full. Any queries should be notified to Evolution Ecology within 7 days of the invoice date.
- 10.2 If the client(s) fails to pay within the time specified in 2.1 then Evolution Ecology shall charge the client(s) interest on the outstanding fee, both before and after any judgment, at the rate of 4% per annum above the HSBC Bank base rate, until payment is made in full (A part of a month being treated as a full month for the purposes of calculating interest).
- 10.3 In the event that it is necessary to recover any outstanding fees from the client(s), the client(s) will fully reimburse any costs and expenses incurred during the recovery period, including court costs. Evolution Ecology reserves the right to make a charge for every letter sent and telephone/fax call made, in connection with the recovery.

11 The Report

- 11.1 If any part of the report is lost, or altered without the written consent of Evolution Ecology, then the entire report becomes invalid.
- 11.2 The general format of reports is a certified product and cannot be shown, copied or distributed to third parties without the permission of Evolution Ecology. No liability is accepted for the contents of the report, other than to that of the client(s).
- 11.3 The report will purport not to express any opinion or comment as to the condition or structural integrity of any building and no reliance should be made on any such comments.

Bat and Bird Presence/Absence Survey

12.1 Insurance Cover

12.2 All work carried out by Evolution Ecology is covered by a £1,000,000 professional indemnity insurance.

13.1 Quality of Craftsmanship

13.2 When appointing an Ecologist, please use only suitably qualified and experienced companies (The Local Authority and the Institute of Ecology and Environmental Managers may be able to provide a select list of such companies)

13.3 Evolution Ecology will not accept liability for any works undertaken by any other companies, or contractors.