

BAT AND BARN OWL SURVEY

THE OLD FARMHOUSE, STONEHAUGH



OCTOBER
2015

FINAL

CLIENT
PROJECT NAME
PROJECT NUMBER

Carole Townsend
The Old Farmhouse, Stonehaugh
986

LEAD AUTHOR
POSITION
CONTACT DETAILS

Tony Martin
Director
Tony.Martin@e3ecology.co.uk

APPROVED BY

Tony Martin

REPORT VERSION	STATUS	DATE	CHANGES	AUTHOR	PROOF READ	APPROVED
R01	Draft	26.02.07	N/A	RJW	JS	ADM
R02	Final	08.03.07	N/A	RJW	JS	ADM
R03	Draft	29.05.2015	Update	SW/ADM	MP	ADM
R04	Final	15.10.2015	Client approval	ADM		CT

Copyright to all written or recorded work howsoever held on whatever medium is vested in E3 Ecology Ltd. On settlement of all agreed fees, written work produced specifically for the named clients is thereafter regarded as joint copyright between the named client and E3 Ecology Ltd. No attempts should be made to reproduce any element of this report for commercial or other purposes, without explicit prior written permission from E3 Ecology Ltd.

TABLE OF CONTENTS

A.	SUMMARY.....	5
B.	INTRODUCTION.....	8
B.1	BACKGROUND TO DEVELOPMENT	8
B.2	CURRENT DEVELOPMENT INFORMATION	8
B.3	PLANNING POLICY AND LEGISLATIVE CONTEXT	9
B.3.1	PLANNING POLICY.....	9
B.3.2	BAT LEGISLATION	10
B.3.3	WILDLIFE SITE POLICY AND LEGISLATION.....	10
B.4	PERSONNEL	10
B.5	SCOPE OF STUDY	11
B.6	OBJECTIVES OF STUDY	11
C.	SURVEY AREA AND METHODOLOGY	11
C.1	SURVEY AREA.....	11
C.2	DESKTOP STUDY METHODOLOGY.....	12
C.3	PRELIMINARY FIELD STUDY METHODOLOGY	12
C.3.1	DAYTIME BAT RISK ASSESSMENT	12
C.3.2	DAYTIME BARN OWL RISK ASSESSMENT	13
C.3.3	ENVIRONMENTAL CONDITIONS	13
C.3.4	SURVEY CONSTRAINTS	13
C.4	DETAILED ACTIVITY SURVEY METHODOLOGY	13
C.4.1	ACTIVITY SURVEY	13
D.	RESULTS	15
D.1	DESKTOP STUDY	15
D.1.1	PRE-EXISTING INFORMATION	15
D.1.2	CONSULTATION.....	15
D.2	DAYTIME RISK ASSESSMENT	16
D.2.1	HABITATS	16
D.2.2	BUILDINGS.....	16
D.2.3	2007 BUILDING DESCRIPTIONS.....	18
D.2.4	2015 BUILDING DESCRIPTION UPDATE	20
D.2.5	BAT RISK SUMMARY	21
D.3	ACTIVITY SURVEY	22
D.4	ADDITIONAL SPECIES GROUPS.....	24
E.	ASSESSMENT	25
E.1	ASSESSMENT OF SURVEY FINDINGS	25
E.2	POPULATION SIZE CLASS ASSESSMENT	26
E.3	LIMITATIONS AND CONSTRAINTS.....	27
F.	IMPACTS	27
G.	RECOMMENDATIONS	28
G.1	FURTHER SURVEY	28
G.2	MITIGATION STRATEGY	28
G.2.1	TIMING OF WORKS	28
G.2.2	WORKING METHODS AND BEST PRACTICE.....	28
G.2.3	MONITORING	29
G.3	COMPENSATION STRATEGY.....	29
G.3.1	HABITAT CREATION AND ENHANCEMENT	29
G.3.2	ADDITIONAL ENHANCEMENT RECOMMENDATIONS.....	ERROR! BOOKMARK NOT DEFINED.
APPENDIX 1.	STATUTORILY AND NON- STATUTORILY DESIGNATED SITES.....	31
APPENDIX 2.	BAT ECOLOGY	33
APPENDIX 3.	SUMMARY OF MAIN IMPACTS AT SITE LEVEL	37

APPENDIX 4. MITIGATION FIGURES.....38

TABLE OF FIGURES AND TABLES

FIGURE 1 – SITE LOCATION.....	8
FIGURE 2 – DEVELOPMENT PROPOSALS.....	9
FIGURE 3 – AERIAL PHOTOGRAPH OF THE SITE ILLUSTRATING ITS EXTENT WITH A RED LINE BOUNDARY	11
FIGURE 4 – AERIAL PHOTOGRAPH CENTRED ON THE SITE WITH A 500M RADIUS ILLUSTRATING THE SETTING AND THE HABITATS IT SUPPORTS.....	12
TABLE 1 – DAYTIME SURVEY CONDITIONS.....	13
TABLE 2 – ACTIVITY SURVEY TIMINGS.....	14
TABLE 3 – ACTIVITY SURVEY ENVIRONMENTAL CONDITIONS.....	14
TABLE 4 – RISK OF SUPPORTING ROOSTING BATS	21
FIGURE 5 – DUSK VANTAGE POINT SURVEY 7 TH MAY 2015.....	23
FIGURE 6 – DUSK VANTAGE POINT SURVEY 10 TH JUNE 2015.....	24
TABLE 5 – ECOLOGICAL IMPACT ASSESSMENT VALUATION.....	25
TABLE 6 – PLANNING AND DEVELOPMENT TRIGGER LIST FOR BAT SURVEYS.....	33
TABLE 7 – BAT LIFECYCLE AS IT RELATES TO SURVEY EFFORT	34
TABLE 8 – SUMMARY OF MAIN IMPACTS AT SITE LEVEL.....	37

This report has been prepared by E3 Ecology Limited and contains opinions and information produced with all reasonable skill, care and diligence within the terms of the Contract with the client. Any recommendation, opinion or finding stated in this report is based on circumstances and facts as they existed at the time that E3 Ecology Limited performed the work and no explicit warranty is made in relation to the content of this report and E3 Ecology assumes no liability for any loss resulting from errors, omissions or misrepresentation made by others.

This report has been prepared for the exclusive use of the commissioning party and unless otherwise agreed by E3 Ecology Limited or the commissioning party, no other party may use, make use of or rely on the contents of the report. No liability is accepted by E3 Ecology Limited for any use of this report, other than for the purposes for which it was originally prepared and provided.

Nothing in this report constitutes legal opinion. If legal opinion is required the advice of a qualified legal professional should be secured.

The contents and layout of this report are subject to copyright owned by E3 Ecology save to the extent that copyright has been legally assigned to us by another. It may not be copied or used without our prior written agreement for any purpose other than the purpose indicated in this report.

A. SUMMARY

E³ Ecology Ltd was commissioned by Carole Townsend to undertake a bat and barn owl survey of buildings at the Old Farmhouse, Stonehaugh. As part of this survey the site was also checked for nesting birds and other features where the conservation of biodiversity may be affected.

The proposed development comprises the conversion of an existing single storey barn to holiday accommodation. The barns to be converted abut the existing farmhouse and 2 storey section, however no works are proposed on these units. Conversion will include underlining the existing roofs, demolition and improvement of existing walls, creation of new openings for doors and windows, repointing and replacement of windows and doors, creation of new internal divisions and boarding out the insides of buildings.

Survey work was undertaken in early March 2007 with updating surveys in 2015. The site is located on the edge of the village of Stonehaugh within a landscape dominated by conifer plantation with a limited area of permanent pasture surrounding the village. Immediately to the east of the site is a small, incised valley, with a margin of semi-mature broadleaved tree cover. Overall, from the habitats present in the local area, the risk of bats being present and roosting in suitable buildings or trees is considered to be high.

The barns to be converted are of random stone construction with unlined slate roofs. Roofs are supported on large, exposed beams, which primarily rest on wall tops. Pointing is in relatively good condition, both internally and externally. However, there are numerous access routes into the fabric of the walls, particularly at the eaves internally where purlins enter the stonework, within ventilation slits and on some external sections. Roof timbers are sound throughout with no gaps at the joints that could be used by roosting bats. The slate roof is also sound with no slipped or missing slates. There are no loft voids present within the barns, however a small loft void, around 1.5m high, is present in the adjacent farmhouse. The slate roof of the farmhouse is unlined and supported on cut timbers; there is no link between the farmhouse loft and the adjacent two-storey barn.

Thorough internal and external inspection of the buildings in 2007, including the farmhouse loft in 2007, recorded no evidence of bat use within the barns and evidence of a historic roost within the farmhouse loft. A small number of old droppings, probably *Myotis* or brown long eared, were recorded below the ridge beam within the farmhouse loft, the number and age suggesting use by an individual bat as an occasional roost before the 2006 season. The ridge beam was cobwebbed along its entire length indicating no recent use of this area by bats. A small number of gaps are apparent externally associated with the ridge tiles, which would allow access into this loft. This area will not be affected by the proposed development.

Survey conditions within the barns were not ideal with stored goods being present throughout hindering survey for field signs. However, sufficient survey could be carried out to be certain that significant numbers of droppings had not been overlooked. The potential roost sites identified within the barns are in the stone walls, with numerous gaps in the stonework allowing access, under the ridge tiles, and under slates at internal gables. The stone walls provide potential cool roost or hibernation sites for individual bats. Light conditions throughout are too high for the interiors to be used as void roost sites and no feeding remains, such as moth wings, were recorded that would indicate use as a night feeding roost. Roosting opportunities associated with the roof structure are limited due to the unlined nature of the roof, and the good condition of both the roof timbers and the slates. The internal sections of the barns are all relatively small and

cluttered providing sub-optimal conditions for pre-emergent flight for species such as brown long eared or Natterer's bat.

A 2015 updating risk assessment noted the structures had remained the same. This highlighted frequent gaps under the ridge tiles with occasional clean gaps at the ridge suggesting potential use by bats. Stone work was in a variable condition but exhibited significant numbers of crevices where pointing had failed, of a size suitable for both roosting and nesting birds and roosting bats. The eaves have abundant gaps. Occasional likely degraded bat droppings were noted within the adjacent 2 storey section and section 1 of the development area.

Two dusk activity surveys were conducted between May and June (inclusive) 2015 and proved the presence of 4 common pipistrelle, 1 soprano pipistrelle and 1 whiskered/Brandt's or Alcaho's day roost. A further common pipistrelle roost (>30 bats) and a single bat day roost, within the farmhouse and 2 storey section which aren't to be renovated, were recorded.

Overall, the survey work and risk assessment has confirmed the presence of 8 roosts with the building suite. Six of these are present within the building to be renovated. The section to be developed is suggested to be of local value to bats. If the Farmhouse roost was included in the assessment it would be of parish value as it is likely to be a maternity colony.

No evidence of roosting or nesting barn owl was recorded within the site, however, there is evidence of swallow nesting within the barns and some gaps within the stone walls have been used by other nesting birds, most likely species such as Robin and Blue Tit.

Based on the above assessment, potential impacts of the proposals without appropriate mitigation would include:

- Loss of a whiskered/Brandt's or Alcaho's day roost within the northern gable, used by individual bats.
- Loss or disturbance of a number of day roosts each used by small numbers of common pipistrelle bats. Four confirmed roosts will be directly affected by the proposed works and one roost may be indirectly affected by disturbance during works.
- Loss or disturbance to a day roost used by individual soprano pipistrelle bats.
- Disturbance or harm to a range of bat species that may be using the buildings at the time, if works are undertaken during the winter.
- Potential disturbance to likely maternity roost if works are carried out between May-August inclusive using bright lights at night (low risk).
- Long term increase in light and noise levels within the site following the change to holiday accommodation, although the farmhouse is currently occupied and the increase in light and noise levels will therefore only be minor.
- Loss of swallow nesting opportunities within the interior of the barns and loss of nesting opportunities for other small birds within the fabric of the stone walls.

Proposals will not affect the structure of the farmhouse; the loft will remain as it currently stands.

Key mitigation measures are likely to include:

- Works on site will not commence until a **Natural England development licence** has been obtained.

- 10 bat boxes (as detailed below) will be provided on site prior to works commencing to provide roosting opportunities during the works.
- Prior to works commencing a site induction meeting will be held, attended by the project ecologist and lead contractors.
- No works by external floodlight will be completed between May to August (inclusive) due to the presence of a likely maternity roost within the adjacent farmhouse.
- Once scaffolding is in place the project ecologist will carry out a detailed inspection of the structures and mark up crevice roost sites and access points to be retained.
- Where evidence of current use is recorded, the project ecologist will install standard one-way exclusion valves.
- Old slates, coping stones and ridge tiles will be removed carefully by hand, being aware that bats may be present beneath slates or ridge tiles, within mortise joints, between loose stones, between lintels and in gaps around window frames.
- If bats are found during works, works will stop in that area and the ecological consultant will be contacted immediately. If it is necessary to move the bats for their safety, this will be undertaken by a licensed bat handler.
- In advance of the start of works 10 bat boxes will be erected in adjacent trees, within the site owners landholding, to provide alternative roost sites, including 3 suitable for hibernation use by small numbers of bats.
- A total of 16 external crevice roost sites will be marked up and access retained/created through careful repointing (see section G.2 and Appendix 4 for details).
- A total of 5 purpose designed “bat slates” will be incorporated into the new roof of the renovation.
- Access to the underside of the ridge tiles will be provided in 10 locations through 20mm diameter gaps in the pointing.
- External lighting that may reduce bat use of the buildings will be avoided.

Means of delivery:

Bat boxes will be erected before the onset of any works. It is recommended that implementation of the remaining bat mitigation be made a planning condition.

Before this report can be used to support a planning application the following elements will be required.

- 1. Cross referencing of this report with the architect’s plans for the detailed description of mitigation, specifically the location of bat slates and external crevices in the stonework.**

B. INTRODUCTION

B.1 BACKGROUND TO DEVELOPMENT

E³ Ecology Ltd was commissioned by Carole Townsend to undertake a bat and barn owl survey of buildings at the Old Farmhouse, Stonehaugh, to meet the requirements of the local planning authority. It is proposed to convert a linear range of traditional stone and slate barns to holiday accommodation. Proposals do not include any tree felling.

As bats are small nocturnal species that can roost in inaccessible crevices only 16mm wide, it can be very hard to demonstrate that they are absent from a site, particularly given a limited number of visits during part of the year. As a result, assessment and development approaches are based on an informed risk assessment, and where appropriate the worst-case scenario, in order to ensure that bats are not recklessly harmed by the proposals.

The site is situated on the edge of the village of Stonehaugh at an approximate central grid reference of NY 793 762. Site location is illustrated below in Figure 1.

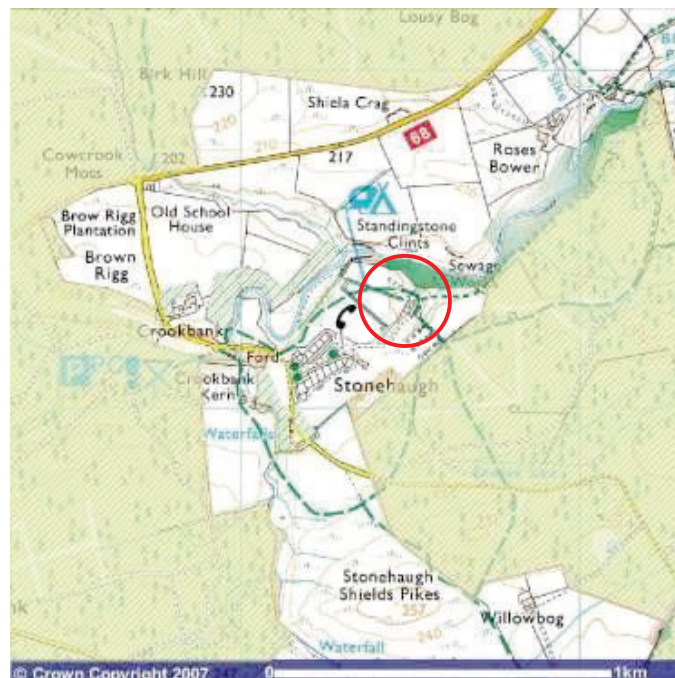


FIGURE 1 – SITE LOCATION
(Reproduced from the ordnance survey map
under licence)

B.2 CURRENT DEVELOPMENT INFORMATION

The proposed development comprises the conversion of a linear range of traditional stone and slate range, abutting the existing farmhouse, into holiday accommodation.

Conversion will include underlining the existing slate roof, demolition and improvement of existing walls, creation of new openings for doors and windows, repointing,

replacement of windows and doors, creation of new internal divisions and boarding out the insides of the barn. Proposals will not directly impact on the adjacent farmhouse, the loft of which will be unaffected.

Figure 2 below illustrates the currently available plans (the dark blocks on the roof are solar panels):

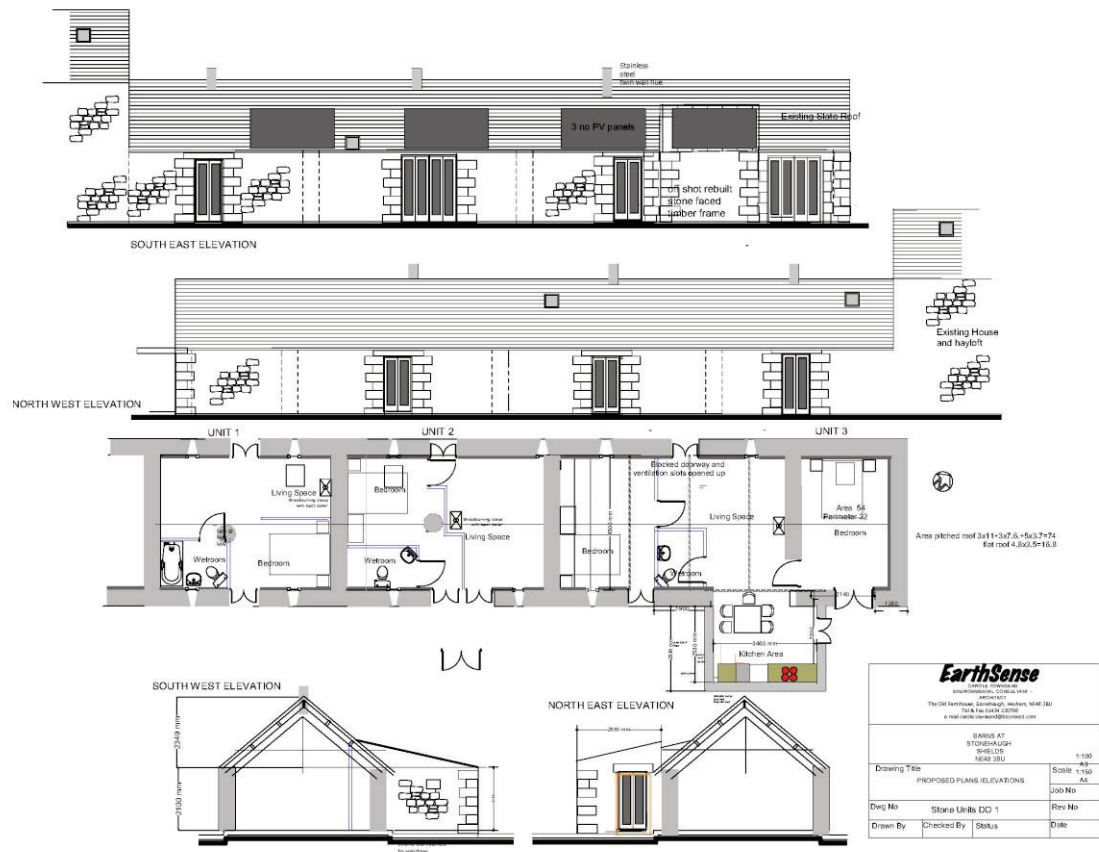


FIGURE 2 – DEVELOPMENT PROPOSALS (PROVIDED BY EARTH SENSE)

B.3 PLANNING POLICY AND LEGISLATIVE CONTEXT

B.3.1 PLANNING POLICY

The National Planning Policy Framework (NPPF) states the following:

- Plan policies and planning decisions should be based upon up-to-date information about the natural environment (Paragraph 158 and 165).
- Plan policies should promote the preservation, restoration and recreation of priority habitats, ecological networks and the recovery of priority species (Paragraph 117).
- Local planning authorities should set out a strategic approach in their Plans, planning positively for the creation, protection, enhancement and management of networks of biodiversity and green infrastructure. (Paragraph 114).
- When determining planning applications in accordance with the Local Plan and the presumption in favour of sustainable development local planning authorities should aim to conserve and enhance biodiversity by applying a number of principles, including if significant harm resulting from a development cannot be avoided, adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused. (Paragraph 118).

As of October 1 2006, public authorities have a duty to conserve biodiversity under the Natural Environment and Rural Communities (NERC) Act 2006.

B.3.2 BAT LEGISLATION

Within England all bat species are specially protected under the Conservation of Habitats and Species Regulations (2010).

As a result there is a requirement to consult with Natural England before undertaking any works that may disturb bats or their roost, and under the Conservation of Habitats and Species Regulations it is illegal to.

- Deliberately kill, injure or capture bats.
- Deliberately obstruct access to a bat roost.
- Damage or destroy a bat roost.
- Deliberately disturb bats; in particular any disturbance which is likely to impair their ability:
 - (i) to survive, to breed or reproduce, or to rear or nurture their young; or
 - (ii) in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
 - (iii) to affect significantly the local distribution or abundance of the species to which they belong.

Under the Wildlife and Countryside Act (1981) the above offence of disturbing bats includes low level disturbance and as such under this act it is also an offence to:

- Intentionally or recklessly disturb a bat while it is occupying a roost.
- Intentionally or recklessly obstruct access to a roost.

Under the above legal protection, only the offences under the Conservation of Habitats and Species Regulations (2010) are strict liability offences; the remaining offences, under the Wildlife and Countryside Act (1981), are offences only where they are carried out "intentionally or recklessly".

Under the Countryside and Rights of Way Act 2000 (CROW Act) the offence in section 9(4) of the Wildlife and Countryside Act 1981 of disturbing bats is extended to cover reckless damage or disturbance.

The Hedgerow Regulations 1997 provide for the conservation of important hedgerows and their constituent trees. The presence of a protected species such as bats is a relevant consideration when assessing whether a hedgerow is important and may influence a local planning authority's decision on whether to approve removal of such hedges.

B.3.3 WILDLIFE SITE POLICY AND LEGISLATION

Details of the legislation surrounding protected sites are provided in the appendices.

B.4 PERSONNEL

Survey work and reporting was undertaken by:

- | | | NE Bat Licence No. |
|---------------|--------------------|---------------------------|
| • Tony Martin | BSc PhD MLI MCIEEM | CLS 2014 2541 |
| • Becky White | MA MSc MCIEEM | CLS 2014 2581 |

Details of experience and qualifications are available at www.e3ecology.co.uk.

B.5 SCOPE OF STUDY

The survey area included all potential roost sites within the development area. In addition potential roosting locations adjacent to the survey area were also considered within the assessment.

B.6 OBJECTIVES OF STUDY

The objective of the study was to gain a sufficiently detailed picture of bat populations to allow an assessment of the likely impacts of the proposed development on these species, and where necessary to allow mitigation to be designed which minimises the risk of harm and maintains their conservation status in the local area (for example by ensuring that there is no net reduction in the number of available roost sites).

C. SURVEY AREA AND METHODOLOGY

C.1 SURVEY AREA

Figure 3 illustrates the site boundary whilst Figure 4 illustrates the broad habitats present on site and within an approximate 500m buffer zone.



**FIGURE 3 – AERIAL PHOTOGRAPH OF THE SITE
ILLUSTRATING ITS EXTENT WITH A RED LINE BOUNDARY
(Reproduced under licence from Google Earth Pro.)**



**FIGURE 4 – AERIAL PHOTOGRAPH CENTRED ON THE SITE
WITH A 500M RADIUS ILLUSTRATING THE SETTING AND THE
HABITATS IT SUPPORTS
(Reproduced under licence from Google Earth Pro.)**

C.2 DESKTOP STUDY METHODOLOGY

Initially, the site was assessed from aerial photographs and 1:25000 OS plans. Following this, consultation was undertaken with the Multi Agency Geographic Information for the Countryside (MAGIC) checking for any notable sites.

C.3 PRELIMINARY FIELD STUDY METHODOLOGY

C.3.1 DAYTIME BAT RISK ASSESSMENT

A daytime assessment was made of all structures affected by the proposed development, in order to evaluate their potential for supporting bat roosts, and where present to record signs of use by bats.

Structures were inspected both externally and internally where access was available. Binoculars and extendable ladders were used to assist with the inspection for droppings and other field signs.

Where present, soffits, purlins and ridge boards were searched thoroughly, together with the walls and floor under potential roost sites and any mortise joints, particularly in the gable walls. Wherever practicable, roof spaces and attic areas were surveyed for signs of droppings, which persist all year in dry conditions, food debris, entry points and bats themselves. Where bats were present the survey was adapted to avoid disturbance, with identification being confirmed by recording bats at emergence and analysing the calls.

Externally, the buildings were examined for potential roost access points indicated by clean crevices, urine marks, polished wood or stonework and droppings. Particular attention was given to sheltered areas under the eaves of buildings, window ledges and towards the tops of windows where droppings are less likely to have been washed off.

The original bat risk assessment was carried out in early march 2007 with an update of the buildings being undertaken in early May 2015.

C.3.2 DAYTIME BARN OWL RISK ASSESSMENT

A survey was carried out looking for field signs indicating barn owl presence, including droppings, pellets and feathers. In addition, any suitable nest sites within the site were identified. The minimum entrance hole size which would allow barn owls to gain access to a building or tree is approximately 7cm by 7cm. Nest sites are usually located in buildings over 3m high, and will be situated in the uppermost part on a ledge or in a cavity.

C.3.2.1 DAYTIME SURVEY EQUIPMENT

- LED Lenser P7 (210 Lumen) inspection lamp
- Leica Ultravid 8 x 32 binoculars
- Olympus Camera

C.3.3 ENVIRONMENTAL CONDITIONS

TABLE 1 – DAYTIME SURVEY CONDITIONS				
DATE	TEMPERATURE	CLOUD COVER	PRECIPITATION	WIND CONDITIONS
7 th May 2015	14°C	0	0	0

C.3.4 SURVEY CONSTRAINTS

Comments on the state of the structures within the site relate solely to their potential use by bats and must not be taken as a professional assessment of the structural integrity or safety of the structures. For example, descriptions of walls and roofs being in 'good' or 'poor condition' relate to likely provision of roost sites for bats, potential access routes to roost sites, and likely persistence of field signs such as droppings and feeding remains, which will not persist in exposed conditions. Maternity roosts are less likely to be present in cool, exposed, damp and draughty locations which may develop in a building in poor condition.

C.4 DETAILED ACTIVITY SURVEY METHODOLOGY

C.4.1 ACTIVITY SURVEY

C.4.1.1 SURVEY METHODS

Surveyor locations sought to box-in the site and give a good degree of confidence of whether bats were flying into or out of the survey area.

Surveyors were positioned to ensure coverage of all high-risk areas of the site, including any potential flight-lines from structures within the site to adjacent cover such as woodland blocks. If bats were recorded within the site before bats were seen in the wider area, or seen flying into the site, it is assumed that roosts are present within the site.

All surveyors used Batbox Duet bat detectors, listening through earphones to both heterodyne and frequency division signals to help ensure that all bats were detected. Timings were recorded

using synchronised clocks accurate to within a few seconds of each other. Data were recorded using Anabat Express detectors to allow confirmation of species identification through sonogram analysis (using Analook software), and to capture brief echolocation calls that could not be reliably identified in the field. Field survey recorded numbers of bats detected, feeding activity, flight paths, species (as far as is practicable), and social calls.

A total of 4 person-nights work was undertaken. Figures provided within the results illustrate the approximate location of each surveyor.

Given good calls many species, including common and soprano Pipistrelles, and noctule can be identified with a good degree of confidence. The *Myotis* genus of bats are much harder to separate reliably as their frequency modulated calls are very similar. For these species either slope analysis of Anabat calls or a combination of call loudness, frequency range, habitat and flight characteristics are used to report species as accurately as possible. Pipistrelles bats echo-locating at 50kHz or 40kHz could not be reliably assigned to a species and are noted as pips, those echo-locating below 40kHz are identified as Nathusius' pipistrelles. If the species name is given without qualification, the record was of good quality. If there is a degree of uncertainty this is indicated by a question mark, e.g. ?brown long-eared. If identification to species is not practicable then just the Genus or 'bats' is used.

C.4.1.2 SURVEY EQUIPMENT

- Duet bat detector
- Anabat Express
- Analook software

C.4.1.3 SURVEY DATES

Activity surveys were undertaken on the following dates:

TABLE 1 – ACTIVITY SURVEY TIMINGS				
DATE	START TIME	END TIME	TIME OF SUNSET	NO. OF SURVEYORS
7 th May 2015	20:45	21:50	20:51	2
10 th June 2015	21:30	23:16	21:44	2

The nature of the site is such that all high-risk buildings could be assessed with the resources used.

Surveys were completed under the following environmental conditions:

TABLE 2 – ACTIVITY SURVEY ENVIRONMENTAL CONDITIONS				
DATE	TEMPERATURE	CLOUD COVER	PRECIPITATION	WIND CONDITIONS
7 th May 2015	14 – 0.5°C	0	0	0
10 th June 2015	16 – 7.5°C	0	0	0

C.4.1.4 SURVEY CONSTRAINTS

Weather conditions and time of year meant the drop in temperature during the survey may have limited bat activity, but in May bats were recorded both emerging and then returning to their roosts as temperatures dropped, which actually improved the quality of the data.

D. RESULTS

D.1 DESKTOP STUDY

D.1.1 PRE-EXISTING INFORMATION

ORDNANCE SURVEY MAPS AND AERIAL PHOTOGRAPHS

Figures 1 (B.1), 3 and 4 (both C.1) show that the general land use in the surrounding area is permanent pasture and conifer plantation, the village of Stonehaugh lying on the edge of Wark forest, which extends to Kielder forest to the north.

The most recent aerial photograph of the site available (Figure 3) indicates that habitats on site are dominated by the buildings onsite, surrounding by associated landscaping and hard standing. Historic imagery suggests that habitats on site have remained the same since at least 2002.

MAGIC WEBSITE

Consultation with the government's Multi Agency Geographic Information for the Countryside website (MAGIC) indicated the site lies within the Northumberland National Park. A large proportion of the 2km search area is dominated by National inventory of woodland and trees designated woodland the closest boundary of which lies approximately 40m from the site boundary.

BAT ATLAS

The National Atlas of bat distribution indicates that pipistrelle bats, brown long-eared bats, Daubenton's bat, whiskered/Brandt's bat, Natterer's bat and Noctule have been recorded within this 10k square.¹

PREVIOUS SURVEY WORK BY E3

Previous survey work undertaken by E³ Ecology in the area has recorded nonbreeding common pipistrelle and Natterer's roosts within properties within 1km of the site.

LOCAL KNOWLEDGE

The site owner reports that a bat has been caught at the site by their cat in the past.

D.1.2 CONSULTATION

LOCAL BAT GROUP

The Northumberland Bat Group provided the following records from within a 2km search radius;

Location	Species	Common Name	Date	Grid Reference	Count	Distance (km)
Stonehaugh	Myotis	Myotis	07/08/2008	NY786761	1	0.9
Stonehaugh	Myotis	Myotis	21/08/2008	NY786761	1	0.9
Stonehaugh	Myotis daubentonii	Daubenton's Bat	07/08/2008	NY786761	7	0.9
Stonehaugh	Myotis daubentonii	Daubenton's Bat	21/08/2008	NY786761	7	0.9

¹ Distribution Atlas of Bats in Britain and Ireland, Phil Richardson 2000, Bat Conservation Trust.

D.2 DAYTIME RISK ASSESSMENT

D.2.1 HABITATS

FORAGING HABITATS

The immediate surroundings of the site provides moderate quality habitat for bats with abundant semi mature broadleaved tree cover and sheltered foraging opportunities within the valley to the east, an area of higher quality habitat within a landscape dominated by conifer plantation (poorer quality habitat for bats).

COMMUTING ROUTES

Immediate woodland edges and plantations provide numerous potential commuting routes.

SHELTERED FLIGHT AREAS

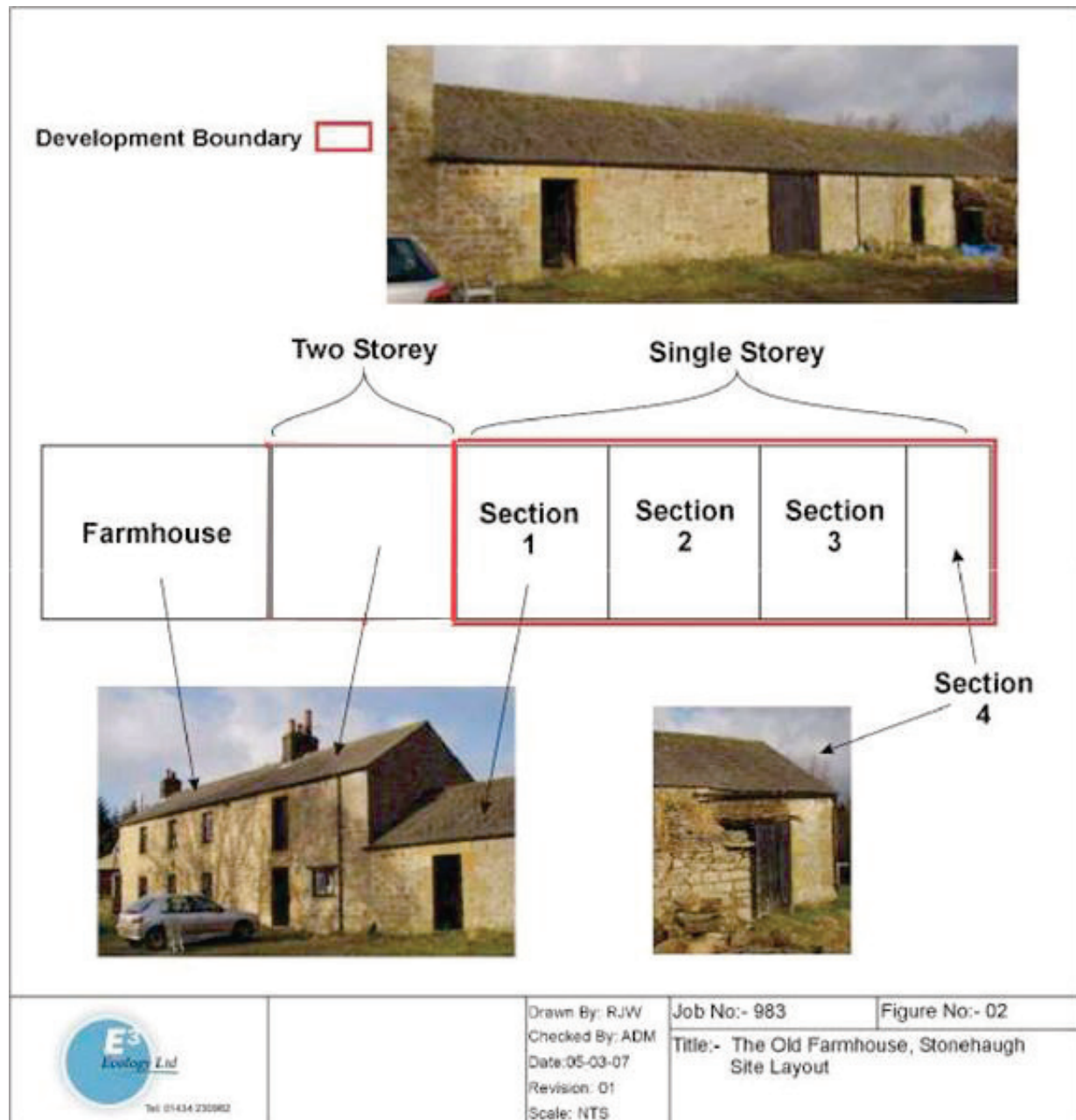
The adjacent semi mature broadleaved woodland provides sheltered foraging opportunities.

ALTERNATIVE ROOST LOCATIONS

Moderate numbers of potential alternative roost sites can be found within the village. However these are limited to a number of traditional buildings, with the majority being more modern forestry development.

D.2.2 BUILDINGS

The site comprises a farmhouse, two storey barn and single storey barn in a linear arrangement, illustrated below in figure 2. The complex is constructed of random stone with unlined slate roofs. A loft space is present within the farmhouse, which lies outwith the proposed development area. Internally the two-storey barn is split into a single room on the ground floor and a single room on the upper floor, open to the ridge. The single storey barn is split into 4 small sections internally, each small section open to the ridge.



D.2.3 2007 BUILDING DESCRIPTIONS

Farmhouse (Outwith proposed development):

- Stone and slate.
- Loft small and cluttered loft void, approximately 1.5m to the ridge, running the length of the farmhouse. Internal gable walls exposed stone. Roof unlined. Insulation present throughout.
- External stonework well sealed.
- Slate roof sound but small number of gaps at the ridge tiles and associated with the flashing around the chimneys.
- Internal gables within loft are well-mortared, occasional gaps at the eaves.
- Roof timbers sound, ridge board cobwebbed for much of length.
- Internal survey conditions good, loft void dry.
- Small number of old Myotis/BLE droppings scattered below the ridge. No accumulations that would indicate a breeding site, likely to be individual bats roosting at times. Droppings in 2007 of an age that would suggest use pre-2006 season.



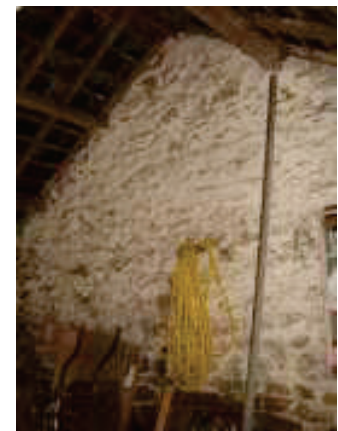
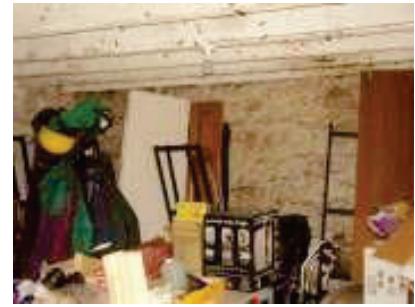
Two Storey Barn(Outwith proposed development):

- Stone and slate.
- Unlined roof, single sarking board either side of ridge board.
- Single ground floor room, single upper floor room open to the ridge.
- Small number of crevices within the internal stonework in the upper floor where purlins enter the gable walls.
- External stonework generally sound.
- Roof timbers sound.
- No loft void.
- High light conditions throughout.
- Internal conditions dry and relatively clean but not swept.
- Used for storage, hindering survey in places.
- Scattered butterfly wings, old swallow nests present.



Single Storey Barn:

- Stone and slate, split into four small sections internally, all of similar structure.
- Unlined roof, single sarking board either side of the ridge board.
- No loft voids, all sections open to the ridge.
- Externally stonework in moderate condition, however, numerous crevices particularly toward the eastern end on the southern elevation.
- The roof is primarily sound with no slipped or missing slates.
- Internal stonework generally well-sealed apart from section 3 where there are numerous gaps and section 4 where ventilation slits give access into the rubble fill. Within the remaining sections there are a small number of gaps at the eaves particular where the purlins enter the stonework.
- Roof timbers sound.
- High light conditions throughout.
- Interior of each section likely to be too small and cluttered to be used as pre-emergent light sampling areas.
- Survey conditions poor due to the stored goods throughout.
- Section 1 - No field signs recorded.
- Section 2 - Scattered butterfly wings, old swallow nests.
- Section 3 - No field signs recorded.
- Section 4 - Old swallow nests.



D.2.4 2015 BUILDING DESCRIPTION UPDATE

Overview:

- Stone work variable in nature and condition with significant numbers of crevices where pointing has failed.
- Gaps created are of a size suitable for both roosting and nesting birds and roosting bats.
- Abundant gaps at eaves. As previously lots of stored materials making internal survey difficult and swallow nests resulting in lots of swallow droppings.
- Occasional likely degraded bat droppings within 2 storey section and the first of the single storey unit (section 1).

2 storey section:

- Clean areas at eaves on internal gables and along internal ridge.
- Scattered butterfly wings.
- Field signs suggest occasional use by individual bats but nothing more.

Single storey Section 1:

- Occasional possible bat dropping but degraded and amongst degraded swallow droppings.
- Butterfly wings beneath north gable which is clean at apex.
- Potential roosting crevices at tops of gable walls and into ridge board.



Section 2: Tractor store





- No definite field signs.
- Some clean sections to ridge.

Section 3 and 4:

- Sections becoming increasingly dilapidated with a lower risk of supporting roosting bats.

Overview:

Ref. No.	Potential Roost Sites	Field Signs	Bat Use Proven	Likely Additional Use
Two Story 	Small number of crevices within the stonework including within the upper floor where purlins enter the gable walls.	Scattered butterfly wings, old swallow nests. Clean areas at eaves and internal ridge odd dropping.	None.	Moderate risk of use of the walls as cool roost or hibernation site by individual bats.
1 	Small number of gaps in the stonework including internally at the eaves particularly where the purlins enter the stonework.	Scattered butterfly wings, old swallow nests odd dropping	None.	Moderate risk of use of the walls as cool roost or hibernation site by individual bats.

<p>2</p> 	<p>Small number of gaps in the stonework including internally at the eaves particularly where the purlins enter the stonework.</p>	<p>Scattered butterfly wings, old swallow nests</p>	<p>None.</p>	<p>Moderate risk of use of the walls as cool roost or hibernation site by individual bats.</p>
<p>3</p> 	<p>Numerous crevices in stonework. State increasingly dilapidated in 2015 update.</p>	<p>No field signs recorded.</p>	<p>None.</p>	<p>Moderate risk of use of the walls as cool roost or hibernation site by individual bats.</p>
<p>4</p> 	<p>Stonework generally well sealed but ventilation slits give access into rubble fill and numerous gaps in external stonework. State increasingly dilapidated in 2015 update.</p>	<p>Old swallow nests.</p>	<p>None.</p>	<p>Moderate risk of use of the walls as cool roost or hibernation site by individual bats.</p>
<p>Farmhouse 2007</p> 	<p>Slate roof sound but small number of gaps at the ridge tiles and associated with the flashing around the chimneys. Small loft void.</p>	<p>Small number of old Myotis/BLE droppings scattered below the ridge. No accumulations that would indicate a breeding site, likely to be individual bats roosting at times.</p>	<p>Historic occasional use of the loft void and ridge timbers as a cool roost by individual non-breeding bats, probable Myotis or Brown long eared.</p>	<p>Moderate risk of use of the walls as cool roost or hibernation site by individual bats.</p>

D.2.5 BAT RISK SUMMARY

TABLE 3 – RISK OF SUPPORTING ROOSTING BATS				
HABITATS AND SETTING ²				
	MINIMAL	LOW	MEDIUM	HIGH
HABITATS AND COVER WITHIN 200M	City Centre	Open, exposed arable, amenity grass or pasture	Hedges and trees linking site to wider countryside	Excellent cover with mature trees and/or good hedges
HABITATS WITHIN 1KM	City Centre	Little tree cover, few hedges, arable dominated	Semi-natural habitats e.g. trees, hedgerows	Good network of woods, wetland and hedges
ALTERNATIVE ROOSTS WITHIN 1KM	City centre	Numerous alternative roost sites of a similar nature	A number of similar buildings in the local area	Few alternative buildings and site of good quality for roosts

² Building and habitat risk assessment technique audited in a research project with York University which compared the risk assessment scoring with the results of detailed field assessment for over 100 sites. Statistically significant associations were found between habitat setting and building features and the presence of absence of different bat species. For example habitat connections and nearby woodland were significant for brown long-eared bats and the presence of species-rich grassland is important for many species.

TABLE 3 – RISK OF SUPPORTING ROOSTING BATS				
SETTING	Inner city	Urban with little green space	Build development with green-space, wetland, trees	Rural Lowland with woodland and trees.
DISTANCE TO WATER/ MARSH	>1km	500m-1000m	200m-500m	<200m
DISTANCE TO WOODLAND/ SCRUB	>1km	500m-1000m	200m-500m	<200m
DISTANCE TO SPECIES-RICH GRASSLAND	>1km	500m-1000m	200m-500m	<200m
COMMUTING ROUTES	Isolated by development, major roads, large scale agriculture	No potential flyways linking site to wider countryside	Some potential commuting routes to and from site	Site is well connected to surrounding area with multiple flyways
BUILDINGS ²				
	MINIMAL	LOW	MEDIUM	HIGH
AGE (APPROX.)	Modern	Post 1940's	1900-1940	Pre 20 th C
BUILDING/ COMPLEX TYPE	Industrial complex of modern design	Single, small building	Several buildings, large old single structure	Traditional farm buildings, country house, hospital
BUILDING - STOREYS	N/A	Single storey	Multiple storeys	Multiple storeys with large roof voids
STONE/BRICK WORK	No detectable crevices	Well pointed	Some cracks and crevices	Poor condition, many crevices, thick walls
FRAMEWORK – TIMBERS/STEEL	Modern metal frame with sheet cladding	Timber purlins, sheet asbestos	Timbers kingpost or similar	Large timbers traditional joints
ROOF VOID	Fully sealed or flat roof	Small, cluttered void	Medium, relatively open	Large, open, interconnected
ROOF COVERING	Modern sheet materials and tightly sealed	Good condition or very open not weatherproof modern sheet materials	Some potential access routes, slates, tiles	Uneven with gaps, not too open, stone slates
ADDITIONAL FEATURES	Very well maintained and tightly sealed	No features with potential access	Some features with potential access	Hanging tiles, cladding, barge boards, soffits with access gaps
EXTERNAL LIGHTING	Extensive security lights covering much of the site	Widespread areas above 2 lux at night	Intermittent lights of low intensity	Minimal
BUILDING USE	Very noisy, dusty	Regular use	Intermittent use	Disused

It can be seen that despite its upland location, the habitats adjacent to the site are of moderate quality for bats, with the valley to the east providing a sheltered feeding area and link into the broader area. Traditional stone barns often have a particularly high risk of supporting roosting bats, at least in small numbers, however the small nature of the barns at this site and the generally good condition of the buildings reduces this risk. The only roof void present is within the farmhouse (not affected by the proposed development) and this is small and cluttered.

D.3 ACTIVITY SURVEY

Dusk emergence survey on the 7th May 2015 (figure 5 below) recorded moderate levels of bat activity, a single common pipistrelle was recorded emerging from the northern gable end of the single storey section (section 4). Two bats were recorded returning to the roost towards the end of the survey, probably due to the drop in temperature. One was within the ridge tiles of section 1 of the area to be renovated, whilst the other was within the farmhouse, which will be unaffected during the development. Other species commuting and foraging on site included Natterer's and soprano pipistrelle. Common pipistrelle bats were seen emerging, and swarming around as temperatures fell, the leadwork near the chimney on the farmhouse.

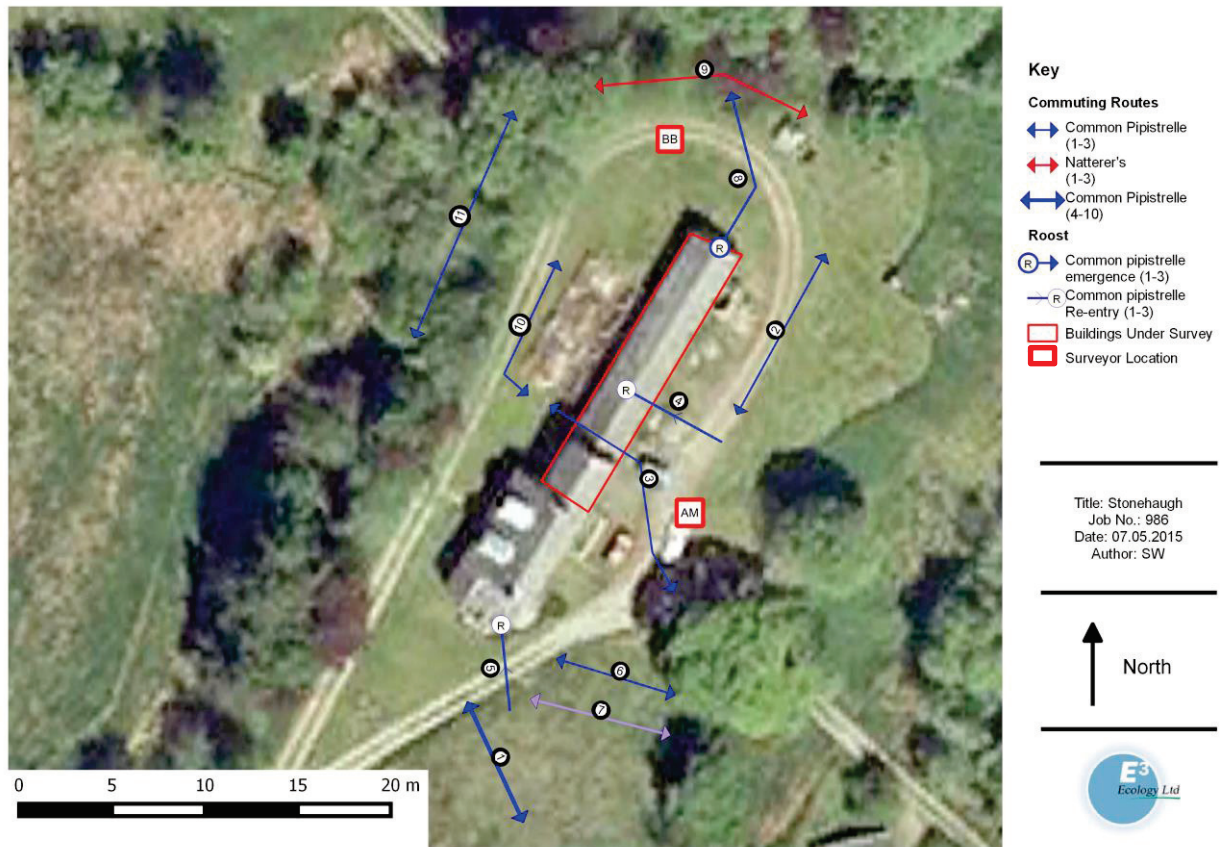


FIGURE 5 – DUSK VANTAGE POINT SURVEY 7TH MAY 2015

Dusk emergence survey on the 10th June 2015 (figure 6 below) was conducted on a warm (16-8°C), dry and still evening and 7 roost locations were confirmed. A likely common pipistrelle maternity roost is located on the southern gable of the 2 storey, main house (30+ bats), with a single bat seen emerging, but not echo locating, from the northern gable. Five further individual day roosts were recorded on the single storey section. A single soprano pipistrelle, three common pipistrelle and a single whiskered/Brandt's or Alcaethoe's. These emergences were primarily associated with gaps between the wall tops and roof. Activity across the site was high for the majority of the survey with the three species mentioned above commuting and foraging around the site.

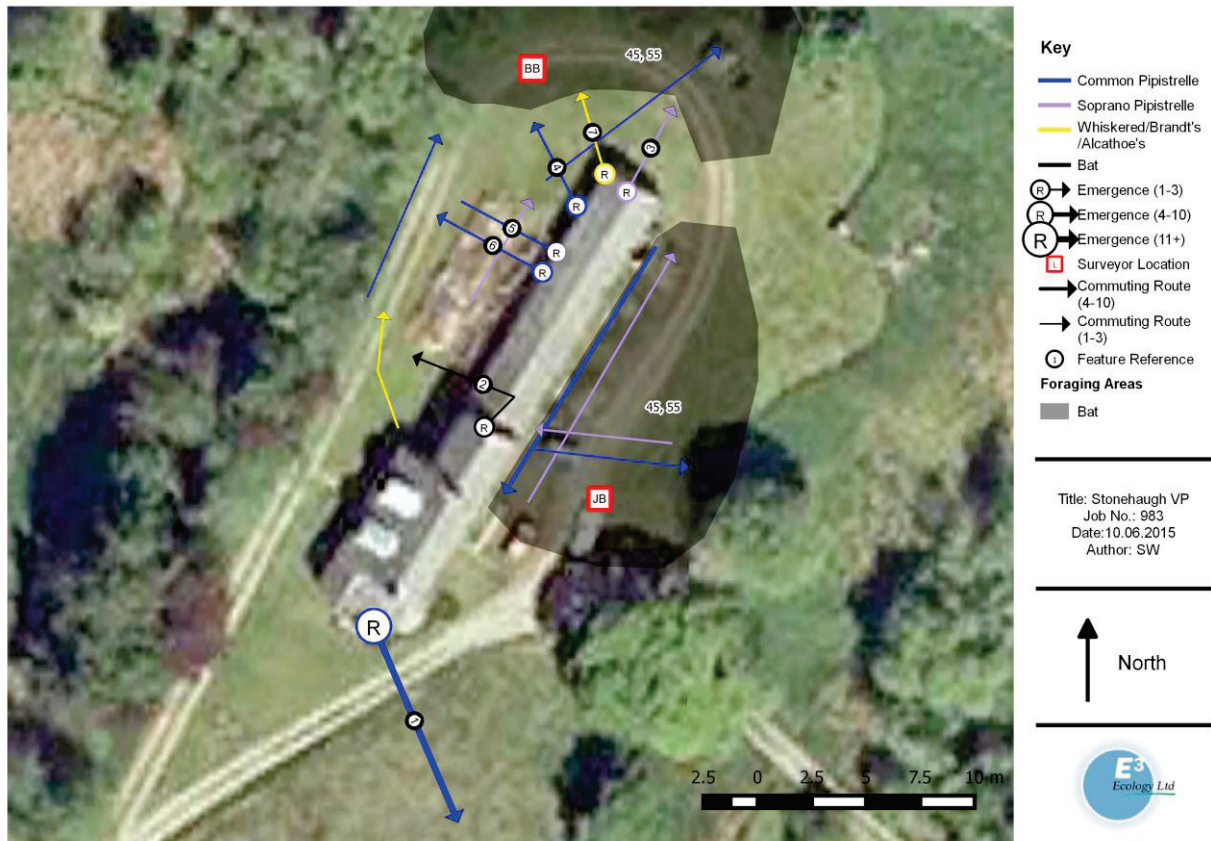


FIGURE 6 – DUSK VANTAGE POINT SURVEY 10TH JUNE 2015

D.4 ADDITIONAL SPECIES GROUPS


The buildings are used by small numbers of nesting swallows, and other birds are likely to nest or roost in the site at times. From the surveys undertaken it is considered unlikely that any other protected species or important habitats would be affected by the proposed development.

E. ASSESSMENT






The value and significance of the habitats and species found was assessed against the following criteria developed from the Guidelines for Ecological Impact Assessment produced by the Chartered Institute of Ecology and Environmental Management³.

TABLE 5 - ECOLOGICAL IMPACT ASSESSMENT VALUATION	
LEVEL OF VALUE	EXAMPLES
International	<ul style="list-style-type: none"> An internationally designated site or candidate site with annex 2 listed bat species as a reason for the designation (SACs).
National	<ul style="list-style-type: none"> A nationally important site designated as a result of bat populations. A nationally important bat roost due to size, type, species present, assemblage or location.
Regional	<ul style="list-style-type: none"> Large maternity, mating or hibernation sites used by rare species in the region, including Nathusius' pipistrelle, Leisler's and Brandt's bats.
County	<ul style="list-style-type: none"> Large maternity, mating or hibernation sites used by uncommon species in the region, including Daubenton's, Natterer's, soprano pipistrelle, noctule, brown long eared and whiskered Small to moderate maternity roosts, hibernation and autumn swarming roosts used by rare species; Species assemblage of at least 6 species.
District	<ul style="list-style-type: none"> Small numbers of non-breeding rare species (5+); Small-moderate maternity or hibernation roosts used by uncommon species; Large maternity roost of common species to the region (common pipistrelle); Species assemblage comprising at least 4 species.
Parish	<ul style="list-style-type: none"> Hibernation, small-moderate maternity and autumn swarming roosts of common species; Small numbers of uncommon species; Occasional (1-4 bats) roost of rare species.
Local	<ul style="list-style-type: none"> Small numbers of common species; Feeding/individual roosts of uncommon species; Feeding roosts of rare species.
Low	<ul style="list-style-type: none"> No roosts recorded, habitats unlikely to support foraging behaviour of local population.

E.1 ASSESSMENT OF SURVEY FINDINGS

Ref. No.	Bat Use Proven	Likely Additional Use
Two Storey 	2015: confirmed roost on northern gable.	Moderate risk of use of the walls as cool roost or hibernation site by individual bats.

³ Chartered Institute for Ecology and Environmental Management (2006) Guidelines for Ecological Impact Assessment in the United Kingdom (Version 7 July 2006). <http://www.ieem.org.uk/ecia/index.html>.

1 	2007: None. 2015: Confirmed roost, with bat emerging from gaps under ridge tiles.	Moderate risk of use of the walls as cool roost or hibernation site by individual bats.
2 	2007: None	Moderate risk of use of the walls as cool roost or hibernation site by individual bats.
3 	2015: Confirmed common pipistrelle roost under door lintel on north western elevation.	Moderate risk of use of the walls as cool roost or hibernation site by individual bats.
4 	2015: Confirmed roosts (WAB, common pipistrelle and soprano pipistrelle) on gable and north western elevation.	Moderate risk of use of the walls as cool roost or hibernation site by individual bats.
Farmhouse 	2007: Evidence of historic occasional use of the loft void and ridge timbers as a cool roost by individual non-breeding bats, probable Myotis or Brown long eared. 2015: Confirmed roost on southern gable.	Moderate risk of use of the walls as cool roost or hibernation site by individual bats.
<p>Overall bat use of the buildings is high, with 8 confirmed roost sites within the suite of buildings including a likely common pipistrelle maternity roost. However only 6 individual day roosts are present within the building to be renovated. A single soprano pipistrelle and whiskered/Brandt's or Alcaethoe's roost and four common pipistrelle day roosts. Commuting and foraging activity around the buildings was moderate with the majority associated with the south eastern elevation of the buildings and tree line to the north of the site. Overall the development site (single storey section) is of local value to bats. If the farmhouse is included in this assessment, which is to unaffected by the renovation, the presence of the large common pipistrelle roost would increase this assessment to parish value.</p>		

E.2 POPULATION SIZE CLASS ASSESSMENT

The proposed work has the potential to directly affect the following roosts:

Common Pipistrelle	4x day roost	individual
Soprano Pipistrelle	1x day roost	individual
WAB	1x day roost	individual

The proposed work has the potential to indirectly affect the following roosts:

Bat	1x day roost	individual
Common Pipistrelle	Likely Maternity Roost	>30 Bats

E.3 LIMITATIONS AND CONSTRAINTS

The initial vantage point survey was conducted under sub optimal conditions due to the drop in temperature during the course of the survey, but bats were active, emerged and timings provided an opportunity to observe bats returning to their roosts as well as emerging.

F. IMPACTS

Bats are most vulnerable to disturbance during June, July and August, when they are breeding, and between November and March when they are hibernating.

This site is considered to support breeding and likely to support hibernation roosts.

- Loss of a whiskered/Brandt's or Alcaethoe's day roost within the northern gable, used by individual bats.
- Loss or disturbance of a number of day roosts each used by small numbers of common pipistrelle bats. Four confirmed roosts will be directly affected by the proposed works and one roost may be indirectly affected by disturbance during works.
- Loss or disturbance of a day roost used by individual soprano pipistrelle bats.
- Disturbance or harm to a range of bat species that may be using the buildings at the time, if works are undertaken during the winter.
- Potential disturbance to likely maternity roost if works are carried out between May-August inclusive at dusk or dark with bright lights (low risk main flight path away from development area).
- Long term increase in light and noise levels within the site following the change to holiday accommodation, although the farmhouse is currently occupied and the increase in light and noise levels will therefore only be minor.
- Loss of swallow nesting opportunities within the interior of the barns and loss of nesting opportunities for other small birds within the fabric of the stone walls.

G. RECOMMENDATIONS

G.1 FURTHER SURVEY

As bat roosts are present within the site and will be affected by the proposed works, a Natural England licence will be obtained prior to works commencing on site.

If development does not happen within 12 months of this report, an updating survey will be required, ideally between May and August.

G.2 MITIGATION STRATEGY

G.2.1 TIMING OF WORKS

- Works on site will not commence until a Natural England development licence has been obtained.
- 15 bat boxes (as detailed below) will be provided on site prior to works commencing to provide roosting opportunities during the works.
- Prior to works commencing a site induction meeting will be held, attended by the project ecologist and lead contractors.
- Works will not commence until a detailed inspection of the structure has taken place once scaffolding has been provided.
- The following key elements of work will not be completed during the hibernation period (November to March inclusive):
 - Demolition of stonework
 - Demolition of brickwork
 - Re-structuring/re-pointing of existing stone/brickwork
 - Keying in of new build to existing stone/brickwork
 - Removal of ridge tiles and slates
 - Removal of roof timbers
 - Exposing of the wall tops via roof stripping works
- No exclusion will be undertaken during the hibernation period (November to March inclusive).
- No works by floodlight will be completed between May to August inclusive due to the presence of a likely maternity roost within the adjacent farmhouse.

G.2.2 WORKING METHODS AND BEST PRACTICE

- A copy of the relevant Natural England licence method statement will be provided to contractors prior to the induction process at the start of works. The project ecologist will review all key points with contractors during the induction and provide all necessary training.
- A detailed method statement and training will be provided to contractors as part of the induction process at the start of works.
- Once scaffolding is in place the project ecologist will carry out a detailed inspection of the structures and mark up crevice roost sites and access points to be retained.
- Where evidence of current use is recorded, the project ecologist will install standard one-way exclusion valves. If one-way valves are used these will be left in place for a minimum of 2 nights when temperatures remain higher than 10°C for at least one hour after dusk. No exclusion will be undertaken during the maternity period (June to August inclusive) unless the site inspection completed by the project ecologist has confirmed that maternity roosts are absent / No exclusion will be undertaken during the hibernation period (November to March inclusive).

- Old slates, coping stones and ridge tiles will be removed carefully by hand, being aware that bats may be present beneath slates or ridge tiles, within mortise joints, , between loose stones, between lintels and in gaps around window frames.
- If bats are found during works, works will stop in that area and the ecological consultant will be contacted immediately. If it is necessary to move the bats for their safety, this will be undertaken by a licensed bat handler.
- External lighting that may reduce bat use of the buildings will be avoided. High intensity security lights will be avoided as far as practical, and any lighting in areas identified as being important for bats will be low level (2m) and low lumin. Light spillage to areas used by foraging or commuting bats should be less than 2 lux. No lighting will be installed along the flyways between the roosts and adjacent trees, woodland and foraging areas. Where security lights are required, these will be of minimum practicable brightness, be set on a short timer and will be motion sensitive only to larger objects.

The following measures should be included as general good working practice:

- Timber treatments that are toxic to mammals will be avoided. If required, timber treatment will be carried out in the spring or autumn. Both pre-treated timbers and timber treatments will use chemicals classed as safe for use where bats may be present (see http://www.jncc.gov.uk/pdf/batwork_manualpt4.pdf).

G.2.3 MONITORING

As a condition of the Natural England licence the site will be monitored in the second year following completion of the development works.

G.3 **COMPENSATION STRATEGY**

G.3.1 HABITAT CREATION AND ENHANCEMENT

G.3.1.1 *BAT BOXES*

In advance of the start of works 10 bat boxes will be erected in adjacent trees, within the site owners landholding, to provide alternative roost sites. Boxes will be erected as high as possible, ideally at a minimum height of 4m.

Boxes will include 3 suitable for hibernation use by small numbers of bats.

G.3.1.2 *CREVICE ROOST SITES*

A total of 16 external crevice roost sites, 7 on the northern and southern elevation and 2 on the eastern, within the stone walls and at the eaves will be marked up and access retained/created through careful repointing (see Appendix 4). Such gaps will be from 15-20mm wide and 40-80mm long, or repointed to create such a gap by using a roll of newspaper 20mm in diameter angled upwards into the gap, applying the mortar around, and then removing the paper before the mortar is fully cured to leave a weather-proof access route for bats.

A total of 5 purpose designed “bat slates” will be incorporated into the new roof of the converted outbuilding, in order to provide access to the gap between the external slates and the roof lining. Where possible these access slates will be located in the same position as current access routes.

Access to the underside of the ridge tiles will be provided in 10 locations through 20mm diameter gaps in the pointing. Access between ridge tiles will be provided through gaps in the mortar

joints. All voids accessible from such gaps will be lined with type 1F bitumastic sarking rather than breathable roofing membrane.

APPENDIX 1. STATUTORILY AND NON- STATUTORILY DESIGNATED SITES

A1.i STATUTORILY DESIGNATED SITES

Ramsar Sites

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. The Convention recognizes wetlands as important ecosystems and includes a range of wetland types from marsh to both fresh and salt water habitats. The wetlands can also include additional areas adjacent to the main water-bodies such as river banks or coastal areas where appropriate.

Special Protection Areas (SPAs)

SPAs are classified by the UK Government under the EC Birds Directive and comprise areas which are important for both rare and migratory birds.

Special Areas of Conservation

SACs are designated under the EC Habitats Directive and are areas which have been identified as best representing the range and variety of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the Conservation of Habitats and Species Regulations 2010 (as amended) unless they are offshore.

Sites of Special Scientific Interest

SSSIs are designated as sites which are examples of important flora, fauna, or geological or physiographical features. They are notified under the Wildlife and Countryside Act 1981 with improved provisions introduced by the Countryside and Rights of Way Act 2000. They are often components of larger SACs or SPAs.

National Nature Reserves (NNRs)

NNRs are designated by Natural England under the National Parks and Access to the Countryside Act 1949 and the Wildlife and Countryside Act 1981 and support important ecosystems which are managed for conservation. They may also provide important opportunities for recreation and scientific study.

Country Parks

Country Parks are statutorily designated and managed by local authorities in England and Wales under the Countryside Act 1968. They do not necessarily have any nature conservation importance, but provide opportunities for recreation and leisure near urban areas.

A1.ii NON-STATUTORILY DESIGNATED SITES

Local Nature Reserves (LNRs)

LNRs are designated under the National Parks and Access to the Countryside Act 1949 by local authorities in consultation with Natural England. They are managed for nature conservation and used as a recreational and educational resource.

Non-Governmental Organisation Property

These are sites of biodiversity importance which are managed as reserves by a range of NGOs. Examples include sites owned by the RSPB, the Woodland Trust and the Wildlife Trusts

Local Wildlife Sites (LWSs)

These are sites defined within the local plans under the Town and Country Planning system and are material considerations of any planning application determination. They are designated by the local authority although criteria can vary between authorities.

APPENDIX 2. BAT ECOLOGY

A2.i PROPOSALS LIKELY TO AFFECT BATS

A list of development types likely to affect bats where they impact on particular features is provided below:

TABLE 4 – PLANNING AND DEVELOPMENT TRIGGER LIST FOR BAT SURVEYS⁴

REFERENCE	NATURE OF WORK	TYPE OF BUILDING OR FEATURE
1	Conversion, modification, demolition or removal of buildings (including hotels, schools, hospitals, churches, commercial premises and derelict buildings)	Agricultural buildings e.g. farmhouses, barns and outbuildings) of traditional brick or stone construction and/or with exposed wooden beams
		Buildings with weather boarding and/or hanging tiles that are within 200m of woodland and/or water
		Pre-1960 detached buildings and structures within 200m of woodland and/or water
		Pre-1914 buildings within 400m of woodland and/or water
		Pre-1914 buildings with gable ends or slate roofs, regardless of location
		Buildings located within, or immediately adjacent to woodland and/or immediately adjacent to water
		Dutch barns or livestock buildings with a single skin roof and board and gap or Yorkshire boarding if following a preliminary roost assessment, the building appears particularly suited to bats
2	Any development works	Any underground duct or structure including tunnels, mines, kilns, ice houses, adits, military fortifications, air raid shelters, cellars
		Unused industrial chimneys that are lined and of brick/stone construction
3	Floodlighting	Churches and listed buildings, green space (e.g. sports pitches) within 50m of woodland, water, field hedgerows or lines of trees with connectivity to woodland or water
		Any building listed in reference 1
4	Felling, removal or lopping	Woodland
		Field hedgerows and/or lines of trees with connectivity to woodland or water bodies
		Old and veteran trees that are more than 100 years old
		Mature trees with obvious holes, cracks or cavities or which are covered with mature ivy (including dead trees)
5	Any development works	Within 200m of rivers, streams, canals, lakes, reedbeds or other aquatic habitats
6	Any development works	Within or immediately adjacent to quarries or gravel pits
		Immediately adjacent to or affecting natural cliff faces and rock outcrops with crevices or caves and sinkholes
7	Any single or multiple wind turbine construction	N/A – although for single turbines this can depend on size and location
8	Any development works	Sites where bats are known to be present

⁴ Hundt L. (2012) Bat Surveys: Good Practice Guidelines 2nd Edition, Bat Conservation Trust. Box 2.1 Planning and development trigger list for bat surveys, p9

Factors which are known to affect the probability of buildings, trees or structures listed above being used by roosting bats are presented in table 4.

A2.ii BAT LIFECYCLE

Bat survey timings are based on the lifecycle of bats which is varied throughout the calendar year. The figure below illustrates survey timings and how they relate to the bat lifecycle:

TABLE 5 – BAT LIFECYCLE AS IT RELATES TO SURVEY EFFORT ⁵												
SURVEY TYPE	J	F	M	A	M	J	J	A	S	O	N	D
Roost Inspection												
Mating/ Swarming Survey												
Hibernation Survey												
Tree survey from the ground												
Tree roost activity survey												
Building roost activity survey												
Dark grey are optimal timings, light grey suboptimal.												
BAT ACTIVITY THROUGH THE YEAR												
Day Roost												
Night Roost												
Feeding Roost												
Transitional/ Occasional Roost												
Swarming Site												
Mating Site												
Maternity Roost												
Hibernation Roost												
Satellite Roost												

⁵ Based on Hundt L (2012) Bat Surveys: Good Practice Guidelines, 2nd Edition, Bat Conservation Trust p27

A2.iii BAT ROOST TERMS

DAY ROOST

A place where individual bats or small groups of males, rest or shelter in the day but are rarely found by night in the summer.

NIGHT ROOST

A place where bats rest or shelter in the night but are rarely found in the day. May be used by a single individual on occasion or could be used regularly by the whole colony.

FEEDING ROOST

A place where individual bats or a few individuals rest or feed during the night but are rarely present by day.

TRANSITIONAL/OCCASIONAL ROOST

Used by a few individuals or occasionally small groups for generally short periods of time on waking from hibernation or in the period prior to hibernation.

SWARMING SITE

Where large numbers of males and females gather during late summer to autumn. Appear to be important mating sites.

MATING SITE

Sites where mating takes place from late summer and can continue through winter.

MATERNITY ROOST

Where female bats give birth and raise their young to independence. Females typically give birth to a single pup per year, therefore these roosts are critical to the long-term survival of a colony. Disturbance of maternity roosts can lead to abandonment and death of young.

HIBERNATION ROOST

Where bats may be found individually or together during winter. They have a constant cool temperature and high humidity. Bats are particularly vulnerable to disturbance during the hibernation period as, once roused, they may be unable to replace energy lost due to a lack of sufficient available insect prey at this time.

SATELLITE ROOST

An alternative roost found in close proximity to the main nursery colony used by a few individual breeding females to small groups of breeding females throughout the breeding season.

A2.iv SPECIES SPECIFIC ECOLOGY

Pipistrelle maternity colonies generally consist of 25 to 100 individuals, but colonies numbering up to 1000 are not uncommon⁶. Adult females often form large maternity roosts, occupied between May and August, and frequently number around 300 individuals. Males are often solitary or in small groups during the summer, later congregating with the females at winter hibernation roosts⁷.

⁶ Roberts, G.M. & Hutson, A.M. 2000. *Pipistrelle*. British Bats No. 6. The Bat Conservation Trust, London

⁷ Corbet, G.B & Southern, H.N., 1964. The handbook of British Mammals).

Maternity colonies of brown long-eared bats are generally small, consisting of 10 to 20 adults^{8,9} (although numbers are likely to be underestimated, due to presence in inaccessible areas of the roost). In exceptional circumstances, colonies can reach 200+ bats.

Natterer's bats roost within crevices and cavities, typically within hollow trees, old buildings, caves and tunnels¹⁰. Maternity colonies comprising up to 200 adult females can be found in buildings during the summer months while bachelor roosts comprising up to 28 males have been recorded during the summer months in Scotland¹¹. Maternity roosts are not exclusively female, with both adult and immature males comprising up to 25% of the colony. Male only colonies have been found with up to 30 bats¹². Foraging individuals will perch during the night at roosts near to foraging areas, not used as day roosts. Mostly these roosts are trees or shrubs but barns will also be used¹³.

Whiskered bats roost in trees and buildings. Nursery roosts can number over 100 bats, and are almost exclusively female bats. This species hibernates singly in caves, hanging on the open wall or in crevices¹².

Brandt's bat is thought to have similar roosting behaviour and foraging ecology to the whiskered bat, however, further research is needed to clarify this¹².

A third small *Myotis* species, the Alcaethoe's bat has recently been confirmed within the UK.

⁸ Speakman, J. R. *et al.*, 1991. Minimum summer populations and densities of bats in NE Scotland, near the northern borders of their distributions. *J. Appl. Ecol.*, 225: 327-345

⁹ Entwistle, A.C., 1994. Roost ecology of the brown long-eared bat *Plecotus auritus* in north-east Scotland. Unpublished PhD thesis, University of Aberdeen, UK

¹⁰ Stebbings, R.E. 1991. Natterer's bat *Myotis nattereri*. In The handbook of British Mammals. 3rd Edition Corbet, G.B. & Harris, S. (Eds) Oxford: Blackwell Scientific.

¹¹ Swift, S. M. 1997 Roosting and foraging behaviour of Natterer's bats (*Myotis Nattereri*) close to the northern border of their distribution. *J. Zool. (Lond)* **242**: 375-384.

¹² Altringham, J.D. 2003. British Bats. The New Naturalist. Pub. Harper Collins.

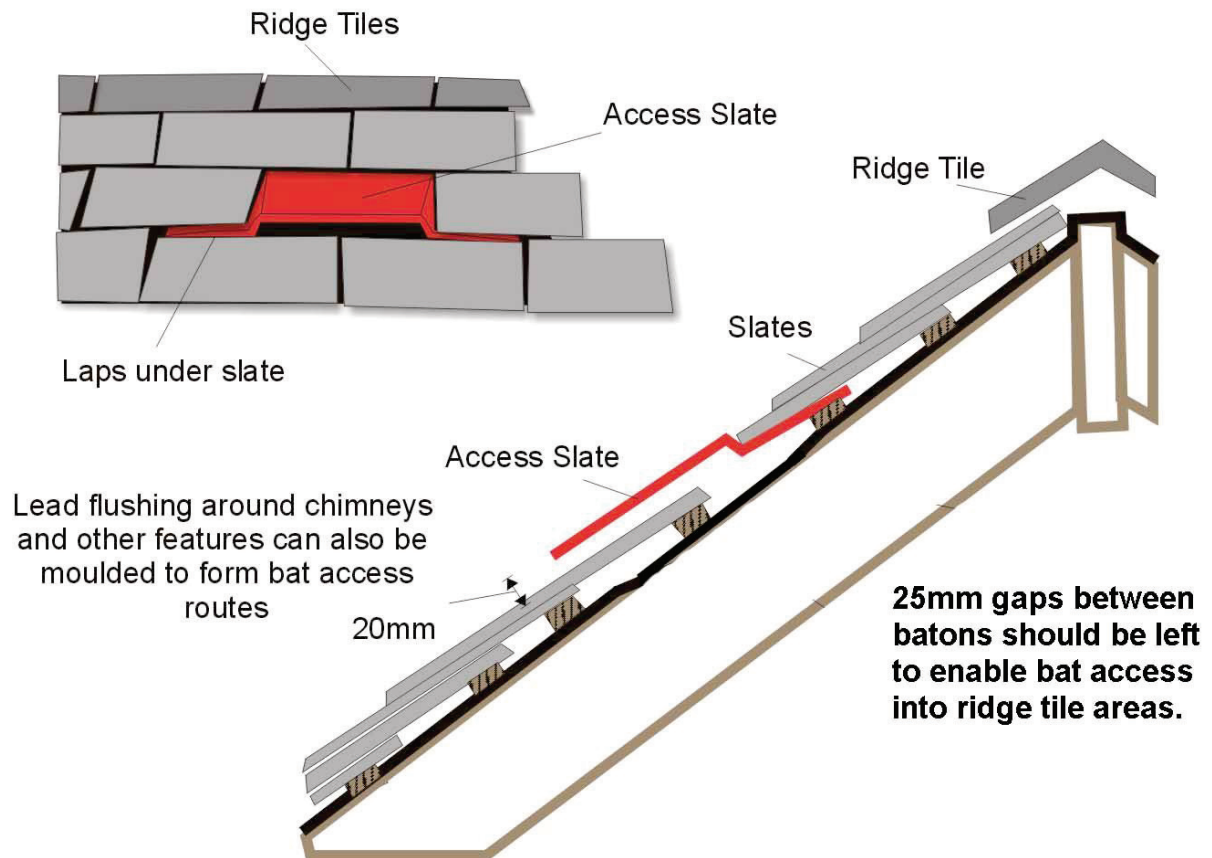
¹³ Smith, P.G. & Racey, P.A. 2005. The itinerant Natterer: physical and thermal characteristics of summer roosts of *Myotis nattereri* (Mammalia: Chiroptera) *J. Zool. Lond.* 266: 171-180.

APPENDIX 3. SUMMARY OF MAIN IMPACTS AT SITE LEVEL

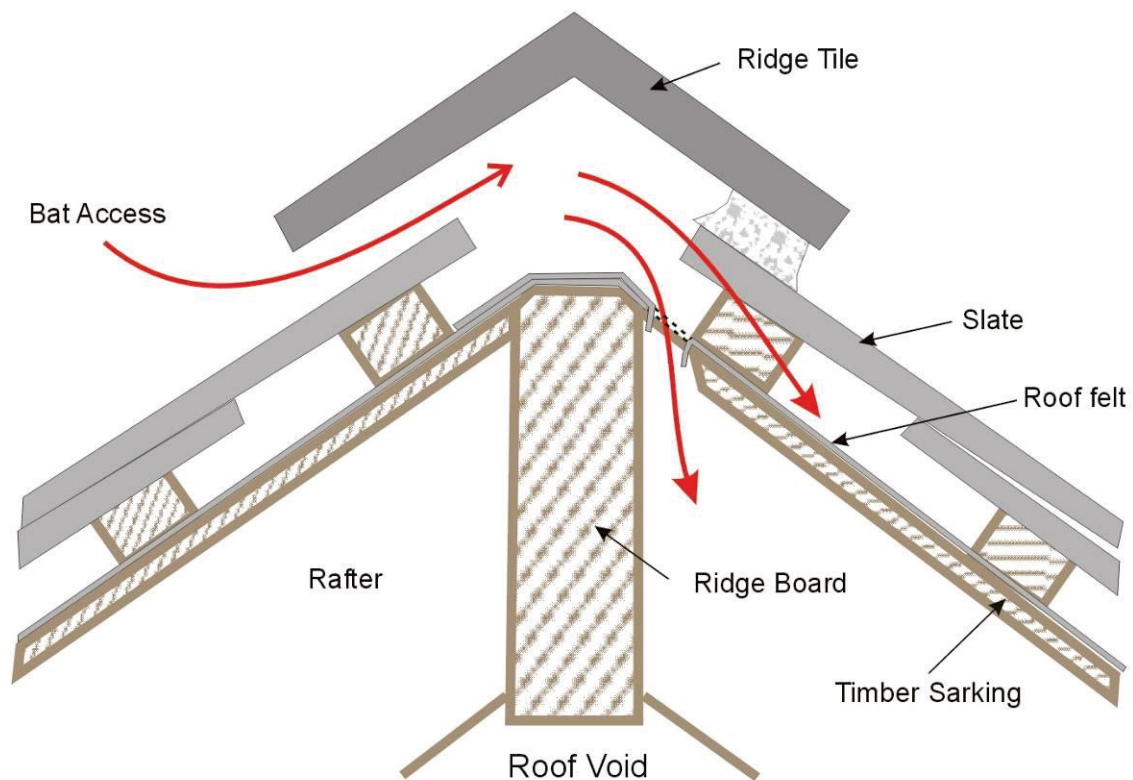
TABLE 8 – SUMMARY OF MAIN IMPACTS AT SITE LEVEL				
Habitat Feature	Development Effect	Scale of impact		
		Low	Medium	High
Maternity Roost	Destruction			✓
	Isolation caused by fragmentation			✓
	Partial destruction; modification		✓	
	Temporary disturbance outside breeding season	✓		
	Post-development interference			✓
Major Hibernation	Destruction			✓
	Isolation caused by fragmentation			✓
	Partial destruction; modification		✓	
	Temporary disturbance outside hibernation season	✓		
	Post-development interference			✓
Minor Hibernation	Destruction			✓
	Isolation caused by fragmentation			✓
	Partial destruction; modification		✓	
	Modified management		✓	
	Temporary disturbance outside hibernation season	✓		
	Post-development interference		✓	
	Temporary destruction then reinstatement	✓		
Mating	Destruction		✓	
	Isolation caused by fragmentation		✓	
	Partial destruction; modification	✓		
	Modified management	✓		
	Temporary disturbance outside hibernation season	✓		
	Post-development interference	✓		
	Temporary destruction then reinstatement	✓		
Night Roost	Destruction	✓		
	Isolation caused by fragmentation	✓		
	Partial destruction; modification	✓		
	Modified management	✓		
	Temporary disturbance outside hibernation season	✓		
	Post-development interference	✓		
	Temporary destruction then reinstatement	✓		
N.B. This is a general guide only and does not take into account species differences. Medium impacts in particular depend on the care with which any mitigation is designed and implemented and could range between high and low.				

APPENDIX 4. MITIGATION FIGURES

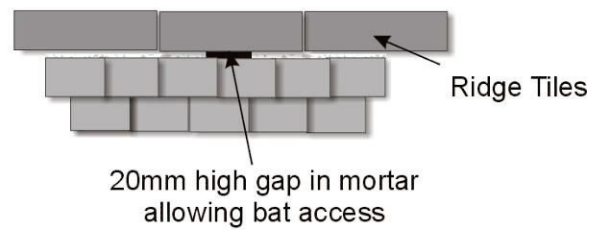
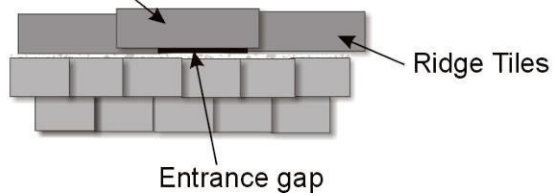
'Bat Slate'



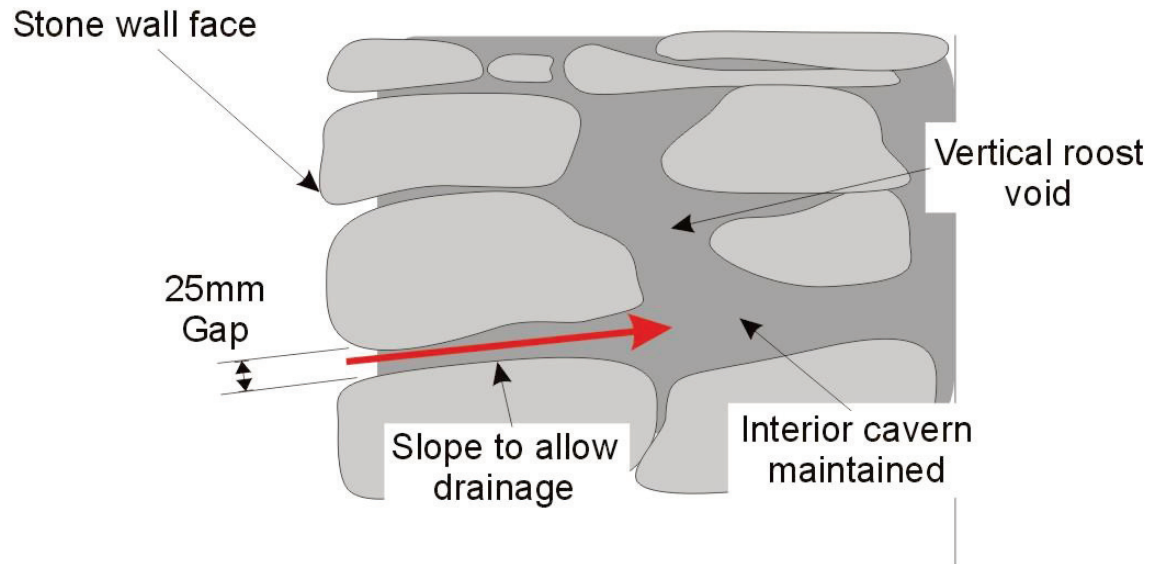
Ridge Tile Access

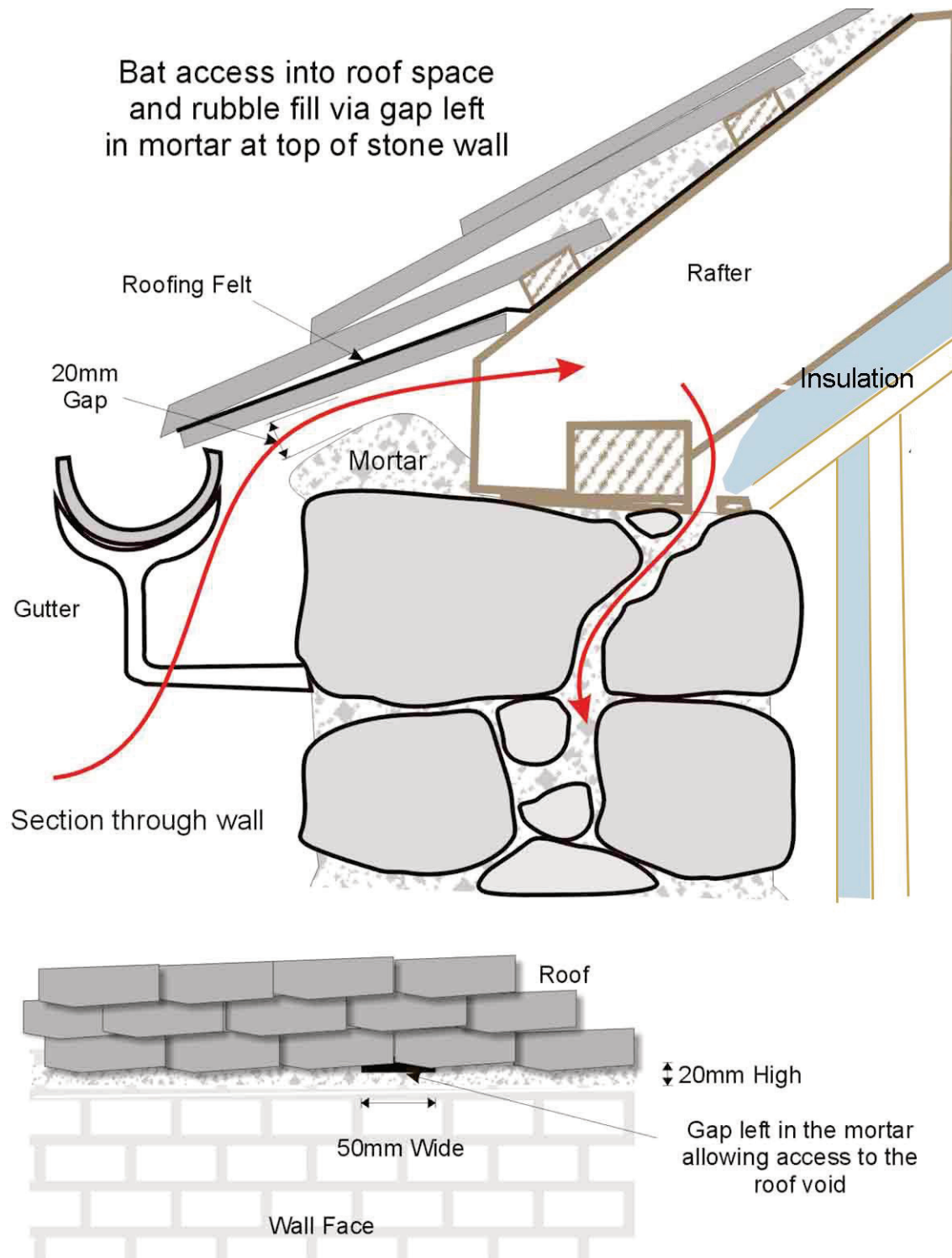


Ridge tile set on top
allowing bat access



Solid stone wall bat roost





Elevation of eaves