

BAT SURVEY

KEEPERS COTTAGE, HIGH GREEN,
NORTHUMBERLAND



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SPECIES	RECORDER	DATE	LOCATION (4 FIG. NGR)	ABUNDANCE	COMMENT
unknown	E3 Ecology Ltd	Nov 19	NZ8191	Unknown	Roost, Nr Greenhaugh, Tasset (droppings)

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A. SUMMARY

E3 Ecology Ltd was commissioned by Mr N Nicholson in November 2019 to undertake a daytime bat risk assessment of Keepers Cottage, High Green, Greenhaugh.

It is proposed to extend the cottage to the east and north east and convert two redundant small outbuildings to two one-bedroom holiday cottages.

Consultation with the MAGIC website¹ indicated that there are no protected sites listed for bats within 2km. The site lies within a Site of Special Scientific Interest (SSSI) Impact Risk Zone (IRZ), the terms of which are not relevant to this site.

Northumberland Bat Group has no records from within 2km of the site. E3 Ecology are aware of a significant Natterer's bat maternity roost and multiple day roosts used by whiskered/Brandt's, brown long eared, common and soprano pipistrelle approximately 1km to the south west.

Initial site inspection was undertaken on 4th November 2019 and comprised a detailed inspection of the structures on site.

The site is situated in an area dominated by upland pasture and moorland, with a small wooded area immediately adjacent to the cottage and a larger woodland approximately 350m to the south. Connectivity to the larger, better quality wooded habitat is via upland pasture, with no trees or hedges, and the site is relatively exposed. Overall, the habitats present in the local area are of moderate suitability for use by foraging/commuting bats.

There are three buildings to be affected by proposed works. Keepers Cottage (to be extended) is two-storey, of stone construction with a pitched slate roof. Pointing is in relatively good condition, both internally and externally, with only a very small number of crevices noted. Boxed-in eaves are present on all elevations and gaps were recorded between these and the stone walls, potentially allowing access to wall tops and the loft void. The roof is in good condition, with just one area of missing mortar below ridge tiles noted. The slates are attached directly onto Scotch boarding, therefore there is no gap between the slates and sarking. The loft void is around 0.75m high and runs the length of the cottage.

The bothy (to be converted and extended) is a small 1.5 storey stone outbuilding with a pitched slate roof. The first floor is open to the roof, again with slates attached directly to the Scotch boarding. Externally there are some gaps in the stonework and occasional slipped slates; internally it is moderately well sealed. The kennels building (to be converted) is single storey, of stone construction with a pitched slate roof. Numerous gaps are present at the wall tops and into the stonework internally, and there are gaps under the ridge tiles. Slates are directly onto Scotch boarding. Overall, the buildings are considered to be of moderate suitability for use by roosting bats.

Thorough internal and external inspection of the buildings recorded a single bat (thought to be *Myotis* sp.) in the cottage loft void, and numerous droppings, primarily in one accumulation (in a different location from where the bat was seen). The majority of droppings appeared old and degraded, with a small number of more recent droppings both in this location and scattered along the void, indicating recent use. From the level of recent droppings and degradation of old ones, it is most likely that the building is currently used by a small number of bats, although the presence of a maternity roost cannot be ruled out. The loft void is not to

¹ MAGIC website: www.magic.gov.uk

be directly affected by the proposals, however potential access routes into the void may be lost or significantly modified by the proposed extensions. No field signs were found in the bothy or kennels. All three buildings have the potential to support hibernating bats.

Possible old barn owl pellets were found in the first floor of the bothy, although no evidence of a nest was seen, and house martin nests are present under the gables of the cottage. The bothy and kennels are also used by nesting birds such as swallows, with a number of old nests noted.

No trees with potential roosting features are to be lost to the proposals. Some tree pruning is likely to be required where branches overhang the buildings, particularly around the kennels, but these branches appeared to be sound, and the trees of low suitability for roosting bats.

Further survey is required to assess potential impacts and confirm mitigation/compensation requirements however, based on the initial assessment, potential impacts of the development are:

- The potential loss of access routes to a known roost associated with the cottage loft void, depending on how bats are accessing this area.
- The loss of a number of potential crevice roost sites associated with boxed in eaves of the cottage, and gaps associated with stonework and ridge tiles in the other two structures.
- Disturbance or harm to any bats that may be using the buildings at the time, potentially including hibernating bats if works are undertaken during the winter and breeding bats if works are undertaken during the maternity period.
- Increased levels of disturbance due to occupants of the properties, following on from the conversion of the bothy and kennels.
- Increased lighting around the site due to the conversion.

Detailed mitigation and compensation proposals can only be confirmed once further survey is completed. However preliminary proposals are provided in Section E. As a summary, key measures are likely to include:

- Should works on site be likely to impact on bat roosts (through loss of or modification of roosts and/or their access points or significant disturbance) it will not commence until a Natural England development licence for the relevant structure(s) has been obtained. Otherwise works will proceed to a precautionary method statement.
- Access routes to the cottage loft void will be retained (either existing access routes, if they are unaffected, or new access routes provided should these be in the location of the extension) so the identified roost can continue to be used in the long term.
- Roosting opportunities will be created within the bothy and kennels.
- Bat boxes will be provided on trees within the garden.
- Works will be timed to minimise risk of harm to breeding and hibernating bats (see Section E for details).
- If works to the buildings are undertaken or branches are felled during the bird breeding period (March to August), a checking survey will be undertaken by a suitably experienced ornithologist.
- Bird boxes and a barn owl box will be erected on trees.
- Lighting around the site, following on from conversion, will be low level and low lux, with minimal light spill on the wooded garden.

The local planning authority and Natural England are likely to require the means of delivery of the mitigation to be identified. It is recommended that mitigation and enhancement proposals, once confirmed, are incorporated into the master-planning documents.

Before this report can be used to support a planning application it is recommended that:

- 1. Two activity surveys are completed between May and September to provide more robust data, one of which should be during the peak maternity period (June/July).**
- 2. Mitigation will be confirmed following survey, and will need to be incorporated into the architect's plans that support the planning application including design details of bat access routes.**

If you are assessing this report for a local planning authority and have any difficulties interpreting plans and figures from a scanned version of the report, E3 Ecology Ltd would be happy to email a PDF copy to you. Please contact us on 01434 230982.

B. INTRODUCTION

The purpose of this report is:

- To detail the results of the survey work of the buildings and trees on site that has been undertaken for bats.
- To provide recommendations to be incorporated into the design for the site.
- To provide recommendations for further survey work, where required.
- To set out the mitigation measures required to ensure compliance with nature conservation legislation and to address any potentially significant effects
- To identify appropriate enhancement measures

The site is located at High Green, near Greenhaugh, at an approximate central grid reference of NY 8141 9179.

B.1 CURRENT DEVELOPMENT INFORMATION

The planning application is for extension of the cottage and conversion of the other two buildings to one bed holiday cottages. Development proposals are likely to involve:

Cottage

- The addition of a two-storey extension to the east side of the cottage; the roof of this will be slightly lower than the existing roof, so will not tie in at roof level, and it is not proposed to link new and existing loft voids. Doorways will be created on first floor and ground floor level.
- The creation of a single storey extension to the north east of the cottage; this will lead to the creation of a cat-slide roof, to match the existing central extension, and therefore will lead to the exposure of wall tops whilst the slates are tied in, and removal of boxed-in eaves.

Bothy & Kennels

- Potential re-roofing or roof repairs where necessary
- Internal fitting out
- External repointing
- Creation of new windows and doors.
- Rebuild of existing timber single storey extension on western elevation of bothy.
- Timber two-storey extension to eastern elevation of bothy.



The Cottage (extension shown to left)



The kennels



The Bothy

FIGURE 1: DEVELOPMENT PROPOSALS

C. PLANNING POLICY AND LEGISLATIVE CONTEXT

C.1 NATIONAL PLANNING POLICY

The table below details the key paragraphs from the National Planning Policy Framework (NPPF)² relating to the natural environment:

TABLE 1: NATIONAL PLANNING POLICY FRAMEWORK: CONSERVING AND ENHANCING THE NATURAL ENVIRONMENT	
Statement	Paragraph
<p>Planning policies and decisions should contribute to and enhance the natural and local environment by:</p> <ul style="list-style-type: none"> a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan); b) recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland; c) maintaining the character of the undeveloped coast, while improving public access to it where appropriate; d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures; e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate. 	170
<p>Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework³; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.</p>	171
<p>Great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to these issues. The conservation and enhancement of wildlife and cultural heritage are also important considerations in these areas, and should be given great weight in National Parks and the Broads⁴. The scale and extent of development within these designated areas should be limited. Planning permission should be refused for major development⁵ other than in exceptional circumstances, and where it can be demonstrated that the development is in the public interest. Consideration of such applications should include an assessment of:</p> <ul style="list-style-type: none"> a) the need for the development, including in terms of any national considerations, and the impact of permitting it, or refusing it, upon the local economy; b) the cost of, and scope for, developing outside the designated area, or meeting the need for it in some other way; and c) any detrimental effect on the environment, the landscape and recreational opportunities, and the extent to which that could be moderated. 	172
<p>Within areas defined as Heritage Coast (and that do not already fall within one of the designated areas mentioned in paragraph 172), planning policies and decisions should be consistent with the special character of the area and the importance of its conservation. Major development within a</p>	173

² National Planning Policy Framework (February 2019), Department for Communities and Local Government,

³ Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality.

⁴ English National Parks and the Broads: UK Government Vision and Circular 2010 provides further guidance and information about their statutory purposes, management and other matters.

⁵ For the purposes of paragraphs 172 and 173, whether a proposal is 'major development' is a matter for the decision maker, taking into account its nature, scale and setting, and whether it could have a significant adverse impact on the purposes for which the area has been designated or defined.

TABLE 1: NATIONAL PLANNING POLICY FRAMEWORK: CONSERVING AND ENHANCING THE NATURAL ENVIRONMENT	
Statement	Paragraph
Heritage Coast is unlikely to be appropriate, unless it is compatible with its special character.	
To protect and enhance biodiversity and geodiversity, plans should: <ul style="list-style-type: none"> a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity⁶; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation⁷; and b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity. 	174
When determining planning applications, local planning authorities should apply the following principles: <ul style="list-style-type: none"> a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused; b) development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest; c) development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons⁸ and a suitable compensation strategy exists; and d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity. 	175
The following should be given the same protection as habitats sites: <ul style="list-style-type: none"> a) potential Special Protection Areas and possible Special Areas of Conservation; b) listed or proposed Ramsar sites⁹; and c) sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites. 	176
The presumption in favour of sustainable development does not apply where the plan or project is likely to have a significant effect on a habitats site (either alone or in combination with other plans or projects), unless an appropriate assessment has concluded that the plan or project will not adversely affect the integrity of the habitats site.	177

Section 40 of the Natural Environment and Rural Communities Act 2006, places a duty on all public authorities in England and Wales to have regard, in the exercise of their functions, to the purpose of conserving biodiversity.

Planning Practice Guidance¹⁰ states:

⁶ Circular 06/2005 provides further guidance in respect of statutory obligations for biodiversity and geological conservation and their impact within the planning system.

⁷ Where areas that are part of the Nature Recovery Network are identified in plans, it may be appropriate to specify the types of development that may be suitable within them.

⁸ For example, infrastructure projects (including nationally significant infrastructure projects, orders under the Transport and Works Act and hybrid bills), where the public benefit would clearly outweigh the loss or deterioration of habitat.

⁹ Potential Special Protection Areas, possible Special Areas of Conservation and proposed Ramsar sites are sites on which Government has initiated public consultation on the scientific case for designation as a Special Protection Area, candidate Special Area of Conservation or Ramsar site.

¹⁰ Planning Practice Guidance: Natural Environment (www.planningguidance.communities.gov) Updated July 2019

- Planning authorities need to consider the potential impacts of development on protected and priority species, and the scope to avoid or mitigate any impacts when considering site allocations or planning applications. (para. 016)
- Information on biodiversity and geodiversity impacts and opportunities needs to inform all stages of development (including site selection and design, pre-application consultation and the application itself). An ecological survey will be necessary in advance of a planning application if the type and location of development could have a significant impact on biodiversity and existing information is lacking or inadequate. (para. 018)
- Even where an Environmental Impact Assessment is not needed, it might still be appropriate to undertake an ecological survey, for example, where protected species may be present or where biodiverse habitats may be lost. (para. 018)
- As with other supporting information, local planning authorities should require ecological surveys only where clearly justified. Assessments should be proportionate to the nature and scale of development proposed and the likely impact on biodiversity. (para. 018)
- The National Planning Policy Framework encourages net gains for biodiversity to be sought through planning policies and decisions. Biodiversity net gain delivers measurable improvements for biodiversity by creating or enhancing habitats in association with development. Biodiversity net gain can be achieved on-site, off-site or through a combination of on-site and off-site measures. (para. 022)

C.2 RELEVANT LEGISLATION

Within England all bat species are specially protected under the Conservation of Habitats and Species Regulations (2017).

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 (2017) 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.

C.3 WILDLIFE SITE POLICY AND LEGISLATION

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

C.4 PRIORITY SPECIES

Although not afforded any legal protection, national priority species (species of principal importance, as listed in Section 41 of the NERC Act (2006)), and local and regional priority species, as detailed within the relevant biodiversity action plans, are material considerations in the planning process and as such have been assessed accordingly within this report.

The following bat species are listed as national priority species: Barbastelle bat, Bechstein's bat, noctule, soprano pipistrelle, brown long-eared bat, greater horseshoe bat and lesser horseshoe bat. 'Bats' as a species group is also listed on the relevant local biodiversity action plan for this site.

D. METHODOLOGY

D.1 SCOPE OF STUDY

The scope of the study, in terms of the survey area and the desk study area, is based on professional judgement. The scope has been determined based on the site's characteristics, the nature of the surrounding area, the development proposed at the time of reporting and the likely associated zone of influence.

For this site the survey area comprised the yellow line boundary as defined within the figure below, with, in addition, a 50m buffer around the periphery appraised where access was available. The survey area included all potential roost sites within and adjacent to the survey area, which may be affected by the proposed development.

The desk study included an assessment of land-use in the surrounding area and a data search covering a 2km buffer zone (see below for further detail).

The level of survey effort employed at the site has taken account of the recommendations within the Bat Conservation Trust Good Practice Survey Guidelines¹¹.

The figures below illustrate firstly the site boundary and secondly, to provide context, the broad habitats present on site and within an approximate 500m buffer zone.

¹¹ Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust



FIGURE 2: SITE BOUNDARY
(Reproduced under licence from Google Earth Pro.)



FIGURE 3: SITE AND SETTING
(Reproduced under licence from Google Earth Pro.)

D.2 DESK STUDY

Initially, the site was assessed from aerial photographs and 1:25,000 Ordnance Survey maps. Following this, a data search was submitted to the local bat group, requesting data relating to bats. In addition, a search was made of the MAGIC website¹² for any Natura 2000 sites within 10km, where the development may have the potential to lead to indirect disturbance of these sites, and any relevant SSSI IRZ that indicates development proposal could potentially have adverse impacts on protected sites.

D.3 PRELIMINARY FIELD STUDY METHODOLOGY

D.3.1 PRELIMINARY ASSESSMENT

The potential suitability of the habitats within the survey area in relation to commuting and foraging bats was classified as negligible, low, moderate or high, based on guidelines provided by the Bat Conservation Trust¹³ and detailed within the table below.

TABLE 2: GUIDELINES FOR ASSESSING THE POTENTIAL SUITABILITY OF PROPOSED DEVELOPMENT SITES FOR BATS, BASED ON PRESENCE OF HABITAT FEATURES WITHIN THE LANDSCAPE. <i>(TO BE APPLIED USING PROFESSIONAL JUDGEMENT, TABLE 4.1 BAT SURVEY GUIDELINES)</i>	
Suitability	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un-vegetated 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	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	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.

D.3.2 DAYTIME BAT RISK ASSESSMENT (STRUCTURES)

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.

¹² Multi Agency Geographic Information for the Countryside (www.magic.gov.uk)

¹³ Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust

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 either by recording bats at emergence and analysing the calls or through undertaking DNA analysis of droppings.

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.

Structures were categorised as having negligible, low, moderate or high suitability to be used by roosting bats, based on guidelines provided by the Bat Conservation Trust¹⁴ and detailed within the table below.

TABLE 3: GUIDELINES FOR ASSESSING THE POTENTIAL SUITABILITY OF PROPOSED DEVELOPMENT SITES FOR BATS, BASED ON PRESENCE OF ROOSTING HABITAT FEATURES (STRUCTURES) <i>(TO BE APPLIED USING PROFESSIONAL JUDGEMENT, TABLE 4.1 BAT SURVEY GUIDELINES)</i>	
Suitability	Roosting Habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation).
Moderate	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (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).
High	A structure with one or more potential roost site that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.

Note that 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.

D.3.3 PRELIMINARY SURVEY - EQUIPMENT

- Clulite CB2 high powered torch.
- Opticron 8 x 32 binoculars
- Digital camera
- Extendable ladders

D.3.4 PRELIMINARY SURVEY – DATES & ENVIRONMENTAL CONDITIONS

TABLE 4: DAYTIME SURVEY CONDITIONS

¹⁴ Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust

DATE	TEMPERATURE	CLOUD COVER	PRECIPITATION	WIND CONDITIONS
4.11.19	6°C	100%	Light rain	F1-2

D.4 PERSONNEL

The table below details the personnel who undertook the survey work.

Name	Position	Professional Qualifications	Natural England Survey Licence Numbers
Mary Martin	Director	BSc MCIEEM	2015-12822-CLS-CLS

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

D.5 ASSESSMENT METHODOLOGY

The relative value of the ecological receptors (habitats, species and designated sites) was assessed using a geographical frame of reference. For designated sites this is generally a straightforward process with the assigned designation generally being indicative of a particular value, e.g. Sites of Special Scientific Interest are designated under national legislation and are therefore generally considered to be receptors of national value. The assignment of value to non-designated receptors is less straightforward and as recognised by the Guidelines for Ecological Impact Assessment produced by the Chartered Institute of Ecology and Environmental Management¹⁵, is a complex and subjective process and requires the application of professional judgement.

When assessing the value of species and habitats, relevant documents and legislation are considered including the lists of species and habitat of principal importance annexed to the NERC Act (2006) and those provided within relevant local Biodiversity Action Plans. Data provided through consultation is also considered. These data sources can provide context at a local, regional and national scale.

The table below provides examples of receptors of value at different geographical scales.

Level of Value	Examples
International	An internationally designated site or candidate site.
	A site meeting criteria for international designation.
	The site is of functional importance* to a species population with internationally important numbers (i.e. >1% of the biogeographic population)
National	A nationally designated site.
	The site is of functional importance* to a species population with nationally important numbers (i.e. >1% of the national population)
Regional	The site is of functional importance* to a species population with regionally important numbers (i.e. >1% of the regional population)
County	A Local Wildlife Site (LWS) or equivalent, designated at a County level
	The site is of functional importance* to a species population of county value (i.e. >1% of the county population)
District	A Local Wildlife Site (LWS) or equivalent, designated at a District level
	The site is of functional importance* to a species population of district value (i.e. >1% of the district population)

15 Chartered Institute for Ecology and Environmental Management (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland - Terrestrial, Freshwater and Coastal

TABLE 6: ECOLOGICAL RECEPTOR VALUATION	
Level of Value	Examples
Parish	A species population considered to appreciably enrich the nature conservation resource within the context of the parish.
	Local Nature Reserves
Local	A species population that contributes to local biodiversity but are not exceptional in the context of the parish.
Low	Habitats that are unexceptional and common to the local area.

** Functional importance defined as 'a feature which, based on professional judgement, is of importance to the day to day functioning of the population, the loss of which would have a detectable adverse effect on that population'.*

E. RESULTS

E.1 DESKTOP STUDY

E.1.1 PRE-EXISTING INFORMATION

ORDNANCE SURVEY MAPPING AND AERIAL PHOTOGRAPHY

The figures in Sections B and D show that the general land use in the surrounding area is upland pasture and moorland, with a wooded garden immediately adjacent and larger wood approximately 350m to the south.

The most recent aerial photograph of the site (Section D, 2006) indicates that habitats on site are dominated by buildings, gardens and woodland. Historic imagery suggests that this has been unchanged since at least 2002, and site survey in 2019 confirmed the site has largely remained unchanged since 2006, although a garden room has been added to the western elevation of the cottage since 2006.

MAGIC WEBSITE¹⁶

There are no internationally and nationally statutorily designated sites for bats within 2km. The site lies within a SSSI IRZ, but which is not of relevance to this development. One Natura 2000 site lies within 10km (North Pennines Dales Meadow Special Area of Conservation ~7.8km away). Given the small scale proposals, small size and isolated nature of the SAC, the lack of public access and the distance from the site, it is not considered that proposals will affect this SAC.

PREVIOUS SURVEY WORK BY E3 ECOLOGY

Survey by E3 between 2014 and 2018 of buildings at High Green Manor, approximately 1km away, have recorded a large Natterer's bat maternity roost and multiple day roosts used by whiskered/Brandt's, brown long eared, and common and soprano pipistrelle bats.

LOCAL KNOWLEDGE

The owners use the building as a holiday cottage so are not there permanently, but they were not aware of any bat roosts within the buildings.

E.1.2 CONSULTATION

The Northumberland bat group has no records within 2km.

¹⁶ MAGIC Website: www.magic.gov.uk

E.2 DAYTIME RISK ASSESSMENT

E.2.1 HABITATS

FORAGING HABITATS

The adjacent wooded garden will provide a small area of foraging habitat, with a larger woodland approximately 350m to the south. Otherwise, habitats are relatively exposed, being largely upland pasture and moorland.



COMMUTING ROUTES

There are no tree or hedge-lines connecting to the better quality large woodland, but upland pasture will provide some low quality habitat that may also be used by commuting bats.



SHELTERED FLIGHT AREAS

The small wooded garden will provide some shelter from winds.

ALTERNATIVE ROOST LOCATIONS

Alternative roosting opportunities are limited, due to the isolated upland nature of the setting, although numerous buildings are present associated with High Green Manor, 1km to the south west. Trees within woodlands may also provide roosting opportunities.



E.2.2 BUILDINGS

The following text provides building descriptions and the location of each structure is illustrated within the figure below. Where recorded, field signs that confirm bat use are in bold.

Keepers Cottage

- Two-storey, of random stone construction, with single storey extension.
- Pitched slate roof, extending to a cat-slide roof over central extension.
- Stone walls, in good condition where extensions are proposed with only a single gap noted.

- Roof in good condition, with a single area of missing mortar under a ridge tile noted.
- Boxed in eaves around the property, with gaps between boxing and wall allowing potential access.
- Single loft void runs the length of the property, around 0.75m high, only eastern end has full insulation.
- Slates are attached directly onto Scotch boarding.
- Oak and pitched slate roofed garden room has been added onto the western elevation in the last ~10 years (not shown on aerial imagery).
- **One area of accumulated *Myotis* type droppings, largely old and degraded but with small numbers of fresh droppings, in centre of void, and scattered droppings to the west. No droppings in eastern section of void, where extension to be added.**
- **Single bat tucked in crevice along ridge, thought to be a *Myotis* bat, though could not be reached to confirm.**
- **Proven roost.**



Mainly degraded pile of droppings, small number more recent



Extensions to be added to rear, with cat slide roof to match existing, and to gable end



The Bothy

- 1.5 storey random stone and slate.
- Slates directly attached to Scotch boarding.
- Occasional slipped slates; mortar on roof edges good, therefore minimal roosting potential.
- Ridge tiles well pointed.
- Some gaps at wall tops on northern elevation and around quoin stones, crack in stonework on east side, but too narrow for bat use, otherwise stonework well sealed.
- Internally divided into one room on each floor; first floor room open to roof.
- First floor walls well sealed, occasional cracks in ground floor walls.
- Roof skylights, with glazing missing to one, creating moderately light conditions on first floor.
- Broken vents in walls provide potential internal access but do not appear to provide access to internal rubble fill.
- Single storey timber extension used to house generator
- Evidence of nesting birds and small number of old barn owl pellets, but no evidence of barn owl nest.
- No bat field signs.
- **Moderate suitability, but most likely be used by individual bats at most.**





The Kennels

- Single storey of random stone construction, with numerous holes in stonework
- Pitched slate roof, slates directly onto timber sarking.
- Gaps along ridge tiles.
- Internally divided into four small rooms (three former kennels and a store).
- Some internal cracks in store room, and eastern kennel, remainder generally well-sealed.
- Occasional suitable gaps between purlins and walls.
- Roof overhangs walls, but no boxed eaves or fascias.
- Evidence of nesting birds.
- No field signs.
- **Moderate suitability.**



FIGURE 4: BUILDING LOCATIONS
(Reproduced under licence from Google Earth Pro.)

E.2.3 TREES

No trees suitable for supporting bats will be felled to allow development. A small number of branches are likely to require cutting back where they overhang the kennels and bothy; from ground inspection these all appeared sound and the trees of low suitability for use by roosting bats.



E.3 OVERVIEW OF SITE SUITABILITY

TABLE 7: OVERVIEW OF SITE SUITABILITY FOR BATS				
HABITATS AND SETTING ¹⁷				
	NEGLIGIBLE	LOW	MODERATE	HIGH
HABITATS AND COVER WITHIN 200M	City Centre	Open, exposed arable, amenity grass or pasture	Some woodland and other foraging habitat	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
SETTING	Inner city	Urban with little green space	Built 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,	No potential flyways linking site to wider	Some potential commuting routes to and from site	Site is well connected to surrounding area with

¹⁷ 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 7: OVERVIEW OF SITE SUITABILITY FOR BATS				
	major roads, large scale agriculture	countryside		multiple flyways
BUILDINGS²				
	NEGLECTIBLE	LOW	MODERATE	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

Overall, the site is considered of moderate suitability for foraging, commuting and roosting bats.

E.4 ADDITIONAL SPECIES GROUPS

A small number of old barn owl pellets were recorded in the first floor of the bothy, but there was no evidence of a nest. House martins' nests were present around the cottage and old nests, most likely swallow, were noted in the bothy and kennels.

F. SITE ASSESSMENT

F.1 ASSESSMENT OF SURVEY FINDINGS

A roost has been proven in the cottage. Further survey is required to fully assess use of the site by bats. Barn owl have roosted within the bothy in the past but no evidence of a nest was recorded.

F.2 POPULATION SIZE CLASS ASSESSMENT

From the field survey, it is concluded that the cottage is used by at least a small numbers of bats, most probably *Myotis* sp., at intervals through the year although the presence of a maternity roost cannot be ruled out. The other buildings also have the potential to be used, most probably by small numbers of bats, and all three have potential for hibernation use.

F.3 LIMITATIONS AND CONSTRAINTS

Daytime survey only has been undertaken to date.

G. IMPACT ASSESSMENT

Further survey is required to finalise impacts and mitigation/compensation requirements, but impacts are likely to include:

G.1 DIRECT DEVELOPMENT IMPACTS

- The potential loss of access routes to a known roost associated with the cottage loft void, depending on how bats are accessing this area.
- The loss of a number of potential crevice roost sites associated with boxed in eaves of the cottage, and gaps associated with stonework and ridge tiles in the other two structures.
- Disturbance or harm to any bats that may be using the buildings at the time of works, potentially including hibernating bats if works are undertaken during the winter and breeding bats if works are undertaken during the maternity period.

G.2 LONG TERM DIRECT IMPACTS

- Increased levels of disturbance due to occupants of the properties, following on from the conversion of the bothy and kennels.
- Increased lighting around the site due to the conversion.

G.3 INDIRECT IMPACTS ON LOCAL POPULATIONS

- No indirect impacts are anticipated, although this will be confirmed following further survey.

H. RECOMMENDATIONS

H.1 FURTHER SURVEY

As per the Bat Conservation Trust Bat Surveys, Good Practice Guidelines¹⁸, the following additional survey is recommended to ensure a robust assessment of bat activity at the site:

- Two surveys between May and September, with at least one of these being in the peak maternity period in June/July.

In addition, a Natural England licence will be required for any works that affect bat roosts, and this will require a site visit within 3 months prior to licence submission, and will need to be supported by up to date activity survey data from the season of, or immediately before (where applications are over the winter) the application date.

H.2 AVOIDANCE AND MITIGATION STRATEGY

Further survey is required to finalise the strategy, but preliminary mitigation/compensation proposals include:

H.2.1 SITE DESIGN

- External lighting that may reduce bat use of potential roost sites (retained and/or new) 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 lumen. 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.

H.2.2 TIMING OF WORKS

- Should works on site be likely to impact on bat roosts (through loss of or modification of roosts and/or their access points or significant disturbance) it will not commence until a Natural England development licence for the relevant structure(s) has been obtained. Otherwise works will proceed to a precautionary method statement.
- 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.
- The following key elements of work will not be completed during the hibernation period (mid-November to mid-March inclusive):
 - Demolition of stonework
 - Re-structuring/re-pointing of existing stonework
 - Keying in of new build to existing stonework
 - Removal of ridge tiles and slates, where required
 - Removal of roof timbers, if required
 - Exposing of the wall tops via roof stripping works
 - Works on site will not commence during the maternity period (June to August inclusive) unless a confirming survey has demonstrated that maternity roosts are absent. If substantial disturbance has occurred before the maternity season, such

¹⁸ Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust

as removal of roofs, then maternity roosts are very unlikely to become established and spring work may continue into the summer.

- If required, exclusion will not be completed 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 (mid-November to mid-March inclusive).
- If works to the buildings are undertaken or branches are felled during the bird breeding period (March to August) a checking survey will be undertaken by a suitably experienced ornithologist.

H.2.3 WORKING METHODS AND BEST PRACTICE

- A copy of the relevant Natural England licence/precautionary 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.
- Once scaffolding/cherry picker access is provided, if required, 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 required, old slates, coping stones, ridge tiles and boxed in eaves will be removed carefully by hand, being aware that bats may be present beneath slates or ridge tiles, within mortise joints, cavity walls, 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.

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).

H.3 **COMPENSATION STRATEGY**

The following compensation strategy is proposed:

H.3.1.1 *BAT BOXES*

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

H.3.1.2 *CREVICE ROOST SITES*

Potential roosting opportunities will be incorporated into the development, which are likely to include external crevice roosts in stonework and/or under ridge tiles and retention of access to boxed-in eaves around the cottage.

H.3.1.3 *BAT VOID CREATION*

Access routes around the cottage will be retained to allow bats to continue to use the loft void (potential access routes are currently present right around the cottage via gaps in boxed-in eaves, with only part of the boxed-in eaves affected by the proposed development).

H.4 MONITORING

Requirement for monitoring will be confirmed following activity surveys.

H.5 ADDITIONAL ENHANCEMENT RECOMMENDATIONS

The following additional enhancement measures are recommended in order to further enhance the site for biodiversity:

- A barn owl box will be provided within trees on site to provide alternative roosting opportunities.
- Three artificial house martin nests will be erected under overhanging eaves.
- Six bird boxes will be erected on retained trees.

APPENDIX 1. STATUTORILY AND NON- STATUTORILY DESIGNATED SITES

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 2017 (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.

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-STATUTORILY DESIGNATED SITES

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

BAT LIFECYCLE

Bat survey timings are based on the lifecycle of bats which varies through the calendar year. The table below illustrates recommended survey timings and how they relate to the bat lifecycle:

BAT LIFECYCLE AS IT RELATES TO SURVEY TIMING ¹⁹												
SURVEY TYPE	J	F	M	A	M	J	J	A	S	O	N	D
Roost Inspection	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey
Mating/Swarming Survey							Light grey	Dark grey	Dark grey	Dark grey	Light grey	
Hibernation Survey	Dark grey	Dark grey	Dark grey	Light grey	Light grey							Dark grey
Tree survey from the ground	Dark grey	Dark grey	Dark grey	Dark grey	Light grey	Light grey	Light grey	Light grey	Light grey	Light grey	Light grey	Dark grey
Tree roost activity survey				Light grey	Light grey	Dark grey	Dark grey	Dark grey	Dark grey	Light grey	Light grey	
Building roost activity survey					Dark grey	Dark grey	Dark grey	Dark grey	Light grey	Light grey		
Dark grey are optimal timings, light grey suboptimal.												
BAT ROOST USE THROUGH THE YEAR												
Day Roost				Dark grey	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey		
Night Roost	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey
Feeding Roost				Dark grey	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey	Dark grey		
Transitional/Occasional Roost			Dark grey	Dark grey	Dark grey					Dark grey	Dark grey	Dark grey
Swarming Site								Dark grey	Dark grey	Dark grey		
Mating Site								Dark grey	Dark grey	Dark grey		
Maternity Roost					Dark grey	Dark grey	Dark grey	Dark grey	Dark grey			
Hibernation Roost	Dark grey	Dark grey	Dark grey	Dark grey							Dark grey	Dark grey
Satellite Roost					Dark grey	Dark grey	Dark grey	Dark grey	Dark grey			

¹⁹ Based on information provided within Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust

BAT ROOST TYPES

Bat Roost Types	
Roost Type	Definition
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.

SPECIES SPECIFIC ECOLOGY

Pipistrelle maternity colonies generally consist of 25 to 100 individuals, but colonies numbering up to 1000 are not uncommon²⁰. 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 roosts²¹.

Maternity colonies of brown long-eared bats are generally small, consisting of 10 to 20 adults^{22,23} (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 tunnels²⁴. 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 Scotland²⁵. 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

²⁰ Roberts, G.M. & Hutson, A.M. 2000. *Pipistrelle*. British Bats No. 6. The Bat Conservation Trust, London

²¹ Corbet, G.B & Southern, H.N., 1964. The handbook of British Mammals).

²² 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

²³ 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

²⁴ 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.

²⁵ 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.

bats²⁶. 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 used²⁷.

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 crevices²⁶.

Brandt's bat is thought to have similar roosting behaviour and foraging ecology to the whiskered bat, however, further research is needed to clarify this²⁶.

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

²⁶ Altringham, J.D. 2003. British Bats. The New Naturalist. Pub. Harper Collins.

²⁷ 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. BATS AND DEVELOPMENT

A list of development types likely to affect bats where they impact on particular features is provided within the table below.

PLANNING AND DEVELOPMENT TRIGGER LIST FOR BAT SURVEYS²⁸	
NATURE OF WORK	TYPE OF BUILDING OR FEATURE
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
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
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
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)
Any development works	Within 200m of rivers, streams, canals, lakes, reedbeds or other aquatic habitats
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
Any single or multiple wind turbine construction	N/A – although for single turbines this can depend on size and location
Any development works	Sites where bats are known to be present

²⁸ Collins, J. (ed) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). Bat Conservation Trust

A summary of the likely scale of impact at a site level in relation to various bat features and development effects is provided below.

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.