

Bat Conservation Trust

Bats and Buildings

Bats and the Built Environment series



© John Black

Guidance for built environment professionals, consultants, building owners and managers on the conservation actions to promote and cater for bats in buildings.

Why do bats roost in buildings?

About half of the bat species in the world use holes in trees for roosting. The other half use either caves or cavities, but also buildings. In fact, bats and people have been sharing dwellings for thousands of years. As natural roosting sites have become scarce due to development and land use change, so the number of artificial roost sites has increased in the form of houses, bridges, mines, barns, ice-houses, etc. These man-made roosts can provide stable micro-climates for the bats.

Loss of natural roosts has increased the importance of man-made structures for bats to the point that artificial roosts are becoming essential in the survival of many bat species. However even these man-made roosts are now under threat; demolition of old buildings, renovations, changes in use, artificial lighting and the move towards air-tight buildings, all have implications for bat populations using buildings.

Protection and the law

In the UK, due to the decline in bat numbers in the last century, all species of bat are protected by the Wildlife & Countryside Act (1981) as amended, Countryside and Rights of Way Act (2000) and the Conservation of Habitats and Species Regulations (2010). This makes it illegal to deliberately or recklessly kill, injure, capture or disturb bats, obstruct access to bat roosts or damage or destroy bat roosts, whether occupied or not.



Natterer's bat in brick work

Having bats does not mean that building work, roof repairs, pest control or timber treatment cannot take place. However, if any work is going to alter the roost or access space an EPS licence will be needed. You should consult your local Statutory Nature Conservation Organisation (SNCO) via the Bat Conservation Trust Helpline, before work starts and follow their advice on how to proceed. In many cases they will send a trained licensed volunteer bat worker to inspect your roost and provide advice, free of charge. If the work is subject to planning consent an ecological consultant should be employed.

To avoid delays, allow sufficient time ahead of the work to allow the SNCO to comment.

Bats are biodiversity indicators. Having a bat roost in your building or surrounding area is a sign of a healthy green environment.

Making space for bats is an important conservation action.

Which bats roost in buildings?

All the UK bat species have been known to use buildings but some species are more building reliant than others. Different bat species select different types of roosts in buildings since they look for sites comparable to those chosen in natural habitats. Bats that use buildings can generally be divided into four categories, although there is regional variation and some species can occupy more than one category:

1. **Crevice-dwelling bats** (which tend to be hidden from view) such as the common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, Brandt's bat and whiskered bat
2. **Roof-void dwelling bats** (that may be visible on roof timbers) are serotine, Leisler's bat, Daubenton's bat and barbastelle
3. **Bats that need flight space in certain types of roost** are Natterer's bat, and brown and grey long-eared bat
4. **Bats that need flight space and flying access into the roost** are greater horseshoe and lesser horseshoe bat

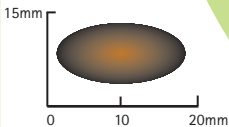
Where in the building?

In buildings a range of possible roosting opportunities exist that mimic those found in the natural environment. Crevice-like or tree-cavity type spaces include those found in both modern and traditional houses such as behind fascia and barge boarding, spaces beneath roof

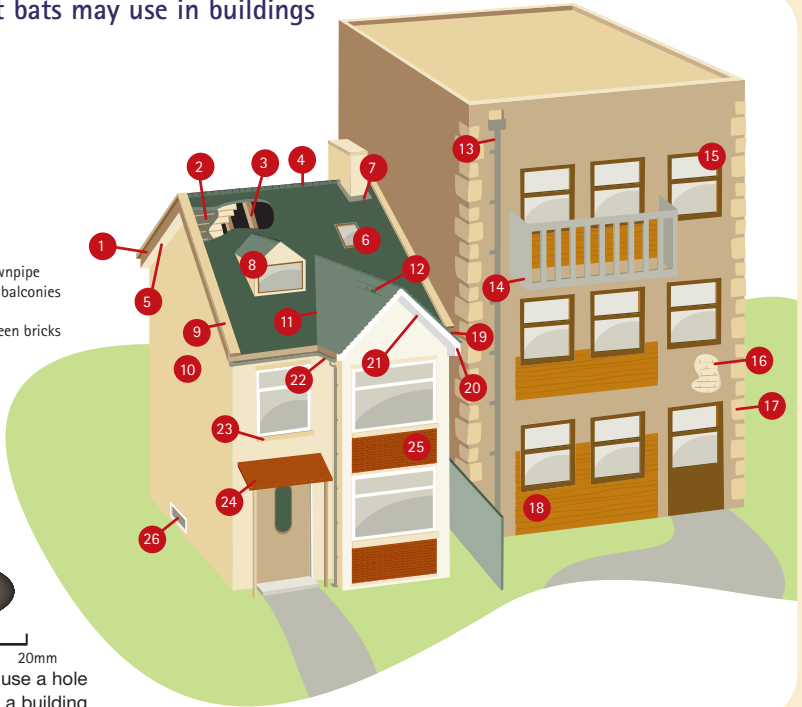
tiles, wall coatings, hollow mortice joints, rain gutters and chimneys. Cave-like spaces include attics and cellars that are dark, exhibiting stable temperatures and humidity. These spaces may be found in a range of buildings including barns and other farm buildings, historic buildings, castles, churches and terraced houses.

Places that bats may use in buildings

- 1 Barge board
- 2 Roofing felt
- 3 Roof joists
- 4 Ridge tiles
- 5 Soffit
- 6 Attic
- 7 Lead flashing
- 8 Dormer window
- 9 Coping stones
- 10 Gable end
- 11 Valley
- 12 Broken tiles
- 13 Space between downpipe
- 14 Metal elements on balconies
- 15 Sash window
- 16 Loose mortar between bricks
- 17 Quoins
- 18 Wood cladding
- 19 End tiles
- 20 Fascia board
- 21 Eaves
- 22 Guttering
- 23 Window sill
- 24 Porch
- 25 Hanging tiles
- 26 Cellar



A pipistrelle can use a hole this size to enter a building



Bat signs:

Bats do not make nests or cause structural damage. The most obvious sign of their presence is droppings but even these can be hard to find. Bat droppings consist largely of insect remains and crumble easily between your fingers to a powder of semi-shiny fragments. Rodent droppings are smooth and plastic, quickly becoming hard. They cannot be crumbled. Bat droppings are frequently mistaken for mouse droppings, so do the 'crumble test'.

Bat droppings do not present any known health hazards in the UK. They can be swept up

safely to use as an excellent fertilizer in the garden.

Large accumulations may reflect use over a number of years rather than large numbers of bats at any one time.

Droppings may not always be readily visible in a loft. Other signs to look for are grease marks on the rafters, urine splashes, cobweb free corners, or insect remains from a feeding perch.

*When looking for bats or their signs
make sure not to disturb the roost!*

What do bats look for in a home?

Like us, bats are looking for shelter that is clean (free of disease and parasites), comfortable (protected from the weather) and secure (safe from predators and disturbance). However, bats also have unique requirements and may live in several different roosts throughout the year depending on their seasonal needs. A number of factors are very important when considering roosts for bats:

Temperature

Temperature is very important to bats. Bats are different to us in that they look for warm roosts in the summer and cool roosts in the winter.

Summer:

Bats usually only have one young a year. Mother bats gather together and find somewhere warm to rear their young called a maternity roost. Males will form smaller roosts elsewhere that are often cooler than the needs of the females. Generally maternity roosts should probably be between 30 and 40°C (keeping in mind that the larger the number of bats the greater the temperature gain from body heat). Also, some species have their own unique preferences and studies have shown that even a 1.5°C difference may influence bats to choose one building over another. It is always best to provide a number of different options for bats so that they can choose the right roosts and temperature based on their needs.



Lesser horseshoe bat roost in garage loft

Winter:

British bats feed on insects which are scarce in the winter. Bats have adapted to this seasonal scarcity by going into hibernation where they lower their body temperature to the ambient temperature or just above. Hibernation roosts are often a cool space, generally between 0 and 6°C, with high humidity. Horseshoe bats prefer slightly warmer conditions of 6–10°C.

Aspect and orientation

Summer maternity roosts in the northern hemisphere often have a southerly or westerly aspect for maximum solar heating. Male roosts and hibernation sites typically have a northerly aspect.

Creating roosts in buildings

General principles for creating new spaces for bats in buildings

The advice below describes general principles to consider when providing new spaces for bats. It does not provide sufficient information for mitigation when a roost is already present. Work on existing roosts should be covered by an EPS licence.

Access, size of roost space and structure

- Crevice-dwelling bats can crawl into their roosts via small gaps in the range of 15 – 20mm high by 20 – 50mm wide. The roost area should maintain a crevice of this approximate size gap that the bats can roost between. The area this roost provision covers can be small but about 1m² would be useful for summer nursery roosts. The height of entry can be from 2 – 7m.
- Roof-void dwelling bats require similar dimensions to access the roost but typically need timber joists or beams on which to roost. The height of entry can be from 2 – 7m.
- Bats needing a flying area require the same access dimension as mentioned above, 15 – 20mm (h) x 20–50mm (w) situated over 2m in height. The roosting area should not be

trussed, to allow flight, and should ideally be about 2.8m in height and 5m in length and width.

- Horseshoe bats need a larger access so that they can fly (instead of crawl) directly into the roost. Lesser horseshoe bats need an access of 300mm (w) x 200mm (h), while greater horseshoe bats need 400mm (w) x 300mm (h). As above, the roosting area should not be trussed, to allow flight, and should ideally be about 2.8m in height and 5m in length and width.

Materials and structure

Materials for the roosts should be rough (for grip), non-toxic or corrosive, with no risk of entanglement. The materials should also have suitable thermal properties that reduce 24 hour fluctuations but allow maximum thermal gain for summer roosts.

Lighting

Bats are nocturnal animals and are adapted to low-light conditions. This means that most bat species can find artificial lighting to be very disturbing. Artificial lights shining on bat roosts, their access points and the flight paths away from the roost must always be avoided.

If it is considered necessary to illuminate a building known to be used by roosting bats, the lights will need to be switched off at bat emergence time and during peak bat activity



© Kelly Gurnell

Roof reconstruction

times. Or better still, it is usually straightforward to ensure that the light does not fall on the roost access point or the flight line away from the roost used by bats. Celebratory lighting of buildings should be limited to special occasions.

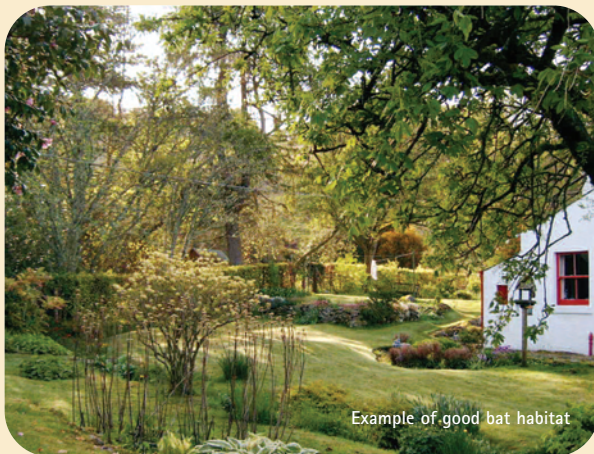
Please see BCT's specialist document on *Bats and Lighting* for more detailed information.

Landscape

In addition to the building requirements, it is important to provide the correct planting and landscape features to attract bats in the first place. Proximity to vegetation, linear features such as hedges and tree-lines, and access to water are all important.

Bats use linear features such as hedgerows, tree lines, and waterways as commuting pathways from the roost to foraging areas. The vegetation not only acts as cover from potential predators and the weather, but also provides structure for acoustic orientation and navigation and potential for feeding on the insects found there.

Maintaining or creating good foraging areas for bats means establishing areas that attract insects, especially nocturnal insects. These habitat features include rivers, ponds, unimproved grassland, ancient semi-natural woodland and hedgerows planted with native vegetation. See BCT's *Encouraging Bats* document and the *Landscaping for Bats* document for more information.



© Anne Youngman

Example of good bat habitat

By taking bats into account prior to starting work, you will:

- *Minimise any costs and delays*
- *Help to avoid disturbing bats or their roosts, which means you will be avoiding the risk of prosecution and helping to conserve an important protected species.*

Maintenance, repairs and alterations

Bats are in an area that may be affected by building works:

Having bats does not mean that building work, roof repairs, pest control or timber treatment cannot take place. However, you should consult your local Statutory Nature Conservation Organisation (SNCO) before work starts and follow their advice on how to proceed. In many cases they will send a trained licensed volunteer bat worker to inspect your roost and provide advice, free of charge.

It is important to allow sufficient time ahead of the work to allow the SNCO to comment.



Serotine house roost

Finding bats during building works:

It is always important to keep in mind the possibility of finding bats when doing any work to buildings. If bats are found during works, the work should stop and your local SNCO should be consulted immediately.

Timing

Building works should avoid the times of year when bats are most vulnerable to disturbance. The summer months, when bats are in maternity roosts, and the winter months, when bats are hibernating, should be avoided. Typically early spring and autumn months are the best times to do work that may affect bats but it is always best to consult your local SNCO for advice.

Insulation

Loft insulation

Almost all UK bat species have been found roosting in roofs. Any work that you carry out in your roof void that has the potential to affect bats or their roost should be carried out only following advice from the SNCO. To avoid disturbance, works should only be carried out when bats are absent which will depend on the type of roost present but during April or between September to October are likely to be the best times.

When installing insulation it is important to retain the bat access points to the roost. It is advised to pare back the insulation a minimum of 10cm from the eaves (this also helps to maintain building ventilation). Spray insulation is not recommended since access points cannot be easily retained and due to the possible effect of the fumes on bats.

Cavity wall insulation

Bats are known to roost in cavity walls during all seasons. The degree of importance for any one species in each season is difficult to discern due to the inaccessibility of the structure. A concern about the carbon footprint of housing stock has led to an emphasis on having cavity walls insulated. To avoid entombing bats in cavity walls it is advised to begin insulation from the bottom of the cavity wall and work upwards, thus giving any bats still remaining in the wall a chance to wake and escape. If possible, a gap at the top of the cavity wall should be left for bats. Check with your installer if this is appropriate.

If this is a known roost, access points and a gap for the roost must be retained and the work must not be done between 1 November and the

end of March, in case bats are hibernating in the wall. However, it is best to consult your SNCO, via the Bat Conservation Trust Helpline, for advice.

Demolition

The demolition of buildings is a major threat to bat species that use them. This is especially true for demolitions where they are not part of a planning application. Where this occurs an S80 demolition notice is completed by the applicant and an S81 issued by a Building Control Officer at the local authority. In most cases the S80 form supplied by the local authority does not include a question on protected species and therefore it would seem likely that in many cases the presence of bats could be overlooked.

If there is a suspicion or likelihood that bats use a structure then it should be surveyed by an ecologist prior to demolition as the Countryside Right of Way Act and other legislation still applies.

BCT is working with the Association of Local Government Ecologists (ALGE), the Chartered Institute of Building (CIOB), CCW and others to address this matter and raise awareness of local authority duty in this situation.

Bats in new buildings

The move towards low and zero carbon buildings places great emphasis on building structures that are air-tight. Air-tight buildings will not have the access and crevices normally used by building-reliant species such as bats and birds. In more traditional designs that use weather boarding/wood cladding, there may be potential for some crevice dwellers (perhaps particularly pipistrelles, Brandt's bat and whiskered bats) to find roosts. However, unless positive, proactive steps are taken, there is concern that future housing stock will hold no potential for bat roosts for several species.

However, it is possible to design into the fabric of the building ready-made or bespoke spaces for bats that still maintain the airtightness (U-value) of the building. Please consult the RIBA Publication *Biodiversity for Low and Zero Carbon Buildings* for more information.

The Bats and Built Environment leaflet series

Bats in Buildings is the first volume in a series of Built Environment guidance leaflets that can be found at www.bats.org.uk. Other volumes will include guidance on Lighting, Insulation, Landscaping, Pest Control, Wind Turbines and Roads.



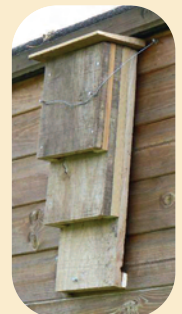
Norfolk bat brick



© EcoSurv Ltd



Schwegler bat box



Kent bat box

Resources

For more detailed information, please consult the following resources:

- *Bats in Traditional Buildings*, 2009. English Heritage, National Trust and Natural England

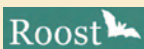
- Dr Carol Williams, 2010.

Biodiversity for Low and Zero Carbon Buildings: A Technical Guide for New Build, RIBA Publishing, London

- *Roost*, the Bat

Roost Replacement and Enhancement Resource:

<http://roost.bats.org.uk>



© Hugh Clark

Leisler's bat on brick work



© Patrick Smith

Brown long-eared bats in roof corner

About the Bat Conservation Trust

The Bat Conservation Trust's (BCT) vision is a world where bats and people thrive together in harmony. Your help can make a difference! Become a member of BCT today and help us to ensure future generations can enjoy these amazing mammals.

You can join online or contact us on the details below. We can also provide details of your local bat group.

Bat Conservation Trust



Bat Conservation Trust

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