LAND OFF NEWLANDS ROAD, CARDIFF

PRELIMINARY GROUND LEVEL BAT ROOST ASSESSMENT OF TREES

A Report to: Cubex-Land

Report No: RT-MME-157553-01

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REPORT VERIFICATION AND DECLARATION OF COMPLIANCE

This study has been undertaken in accordance with British Standard 42020:2013 “Biodiversity, Code of practice for planning and development”.

Report Version	Date	Completed by:	Checked by and Approved by
Final	13/05/2022	Emma Clarke BSc (Hons) (Ecological Project Officer) and Sophie Meredith MSc MCIEEM (Principal Ecological Consultant)	Tom Docker CEcol MCIEEM (Managing Director)

The information which we have prepared is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management’s Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

DISCLAIMER

The contents of this report are the responsibility of Middlemarch Environmental Ltd. It should be noted that, whilst every effort is made to meet the client’s brief, no site investigation can ensure complete assessment or prediction of the natural environment.

Middlemarch Environmental Ltd accepts no responsibility or liability for any use that is made of this document other than by the client for the purposes for which it was originally commissioned and prepared.

VALIDITY OF DATA

The findings of this study are valid for a period of 12 months from the date of survey. If works have not commenced by this date, it may be necessary to undertake an updated survey to allow any changes in the status of bats on site to be assessed, and to inform a review of the conclusions and recommendations made.

NON-TECHNICAL SUMMARY

Middlemarch Environmental Ltd was commissioned by Cubex-Land to undertake a Preliminary Ground Level Bat Roost Assessment at the site of a proposed development at land off Newlands Road in Wentloog, Cardiff.

Middlemarch Environmental Ltd previously completed a Preliminary Ecological Appraisal at this site in October 2021 (Report RT-MME-155392RevB). Following the results of this survey it was recommended that a Preliminary Ground Level Bat Roost Assessment was conducted for any semi-mature and mature trees which may be impacted by the proposed works. To fulfil the above brief to assess the potential for the existing trees on site to support roosting bats, a Preliminary Ground Level Roost Bat Assessment of trees was undertaken on 11th April 2022.

Most trees on site were assessed as having either low or negligible potential for roosting bats. The exception was T1 which was a semi-mature oak tree located on the southern boundary. This was assessed as having moderate potential for roosting bats. Whilst no evidence of bats (e.g droppings, feeding remains, scratch marks or urine staining) was identified during the survey a full assessment of the ivy could not be completed given the height that it extended up the tree. The ivy stems against the trunk of the tree offer potential cavities for crevice dwelling species of bats such as pipistrelles *Pipistrellus* sp.

The Site Layout Plan provided by the client indicates that whilst tree T1 is to be retained it is located immediately adjacent to the proposed service yard. Due to the proximity of the tree to the proposed works area there is potential for indirect disturbance impacts (e.g. increases in noise, vibrations and lighting). As a result, roosting bats are a notable consideration and further survey work is required in line with the Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016) to establish presence/absence.

The mosaic of habitats on site including woodland, running water, grassland and trees also provide suitable foraging and commuting habitat for bats. The Site Layout Plan indicates that most of the site will be cleared to facilitate the new warehouse and associated service yard. Extensive areas of alternative habitat are located immediately adjacent to the site, extending into the wider landscape and existing vegetation along the site boundaries will be retained. However, any additional lighting installed on site has the potential to reduce the value of retained vegetation for bats.

Following the survey the following recommendations are made (please refer to Chapter 6 for full details):

R1 **Dusk/Dawn Surveys of T1:** Tree T1 was identified as having moderate potential to support roosting bats. Bat Surveys: Good Practice Guidelines published by the Bat Conservation Trust (Collins, 2016) recommends that for trees with moderate bat roosting potential two separate survey visits (consisting of one dusk emergence and a separate dawn re-entry survey) be undertaken during the bat activity season to determine the presence/absence of roosting bats within the tree. The bat activity season extends from May to September. At least one of the surveys should be undertaken during the peak season between May and August.

R2 **Remaining Trees**: The other trees on site were assessed as having either negligible or low potential for roosting bats. The survey data obtained for the site is valid for 12 months from the survey date. If proposed site works have not commenced within this timeframe it will be essential to update the survey effort to establish if the trees have developed features that could be used by roosting bats in the interim.

R3 **Lighting**
In accordance with best practice guidance relating to lighting and biodiversity (Miles et al, 2018; Gunnell et al, 2012), any new lighting should be carefully designed to minimise potential disturbance and fragmentation impacts on sensitive receptors, such as bat species.

R4 **Habitat Enhancement**
In line with the National Planning Policy Framework, the development should aim to enhance the site for bats. Bat boxes should be installed to provide roosting habitat for species such as pipistrelle. The planting of species which attract night flying insects is encouraged as this will be of value to foraging bats.

CONTENTS

1. INTRODUCTION

1.1 PROJECT BACKGROUND

In March 2022, Cubex-Land commissioned Middlemarch Environmental Ltd to undertake a Preliminary Ground Level Bat Roost Assessment of Trees on land off Newlands Road in Wentloog, Cardiff.

Middlemarch Environmental Ltd previously completed a Preliminary Ecological Appraisal at this site in October 2021 (Report RT-MME-155392RevB). Following the results of this survey it was recommended that a Preliminary Ground Level Bat Roost Assessment of trees on site was undertaken.

In addition, Middlemarch Environmental Ltd have been commissioned to undertake an Otter and Water Vole Survey at the site. The results of these surveys will be detailed in report RT-MME-157553-02 once complete.

To fulfil the above brief to assess the potential for the existing trees on site to support roosting bats, a Preliminary Ground Level Roost Bat Assessment of Trees was undertaken on 11th April 2022.

All UK bat species are legally protected and they are capable of being material considerations in the planning process. A summary of the legislation protecting bats is included within Appendix 1. This section also provides some brief information on the ecology of British bat species.

1.2 SITE DESCRIPTION AND CONTEXT

The site comprised an irregularly shaped parcel of land located in Wentloog, Cardiff. It measured approximately 1.75 ha in size and centred at National Grid Reference ST 23742 79423.

The survey area was dominated by tall ruderal vegetation, scattered and dense scrub and willow woodland. A wet ditch was present along the northern site boundary and had heavily vegetated banks. The ditch was bordered by a semi-improved neutral grassland road verge.

The site was bordered by Newlands Road to the north and west and hardstanding carparks/yards to the south and east. A pond was located immediately adjacent to the south-western corner. The wider landscape was dominated by a mixture of built development and large areas of semi-natural habitat. The site falls within Gwent Levels – Rumney and Peterstone SSSI which extends off site to the north and south.

1.3 DOCUMENTATION PROVIDED

The conclusions and recommendations made in this report are based on information provided by the client regarding the scope of the project. Documentation made available by the client is listed in Table 1.1.

Document Name / Drawing Number	Author
Site Layout Plan / 21166 F0006 A	UMC Architects
Newlands Road, Wentloog, Cardiff CF3 2EU	Knight Frank

Table 1.1: Documentation Provided by Client

2. METHODOLOGY

2.1 DESK STUDY

As part of the Preliminary Ecological Appraisal Report RT-MME-155392RevB) an ecological desk study (which included a search for records of bats) was undertaken within a 1 km radius of the site. The consultee for the desk study was Aderyn - LERC Wales' Biodiversity Information & Reporting Database.

Middlemarch Environmental Ltd then assimilated and reviewed the desk study data provided by this organisation. Relevant bat data are discussed in Chapter 3. In compliance with the terms and conditions relating to its commercial use, the full desk study data are not provided within this report.

The desk study included a search for statutory nature conservation sites designated for bats within a 10 km radius of the site.

2.2 FIELD SURVEY

In line with the specifications detailed in Bat Mitigation Guidelines (English Nature, 2004) and Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016), a Preliminary Ground Level Bat Roost Assessment of the trees was conducted during daylight hours. A visual assessment of the trees was undertaken to determine the presence of any Potential Roost Feature (PRF) within the trees, together with a general appraisal of the suitability of the site for foraging and commuting. Table 2.1 provides examples of PRFs in trees. Any accessible PRFs were inspected using binoculars, a torch and endoscope for evidence of possible bat presence. For reasons of health and safety, the survey was only undertaken in areas accessible from 3.5 m ladders.

Based on the PRF's present, the trees within the survey area were assessed using the suitability classes detailed within Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016), as detailed in Table 2.2. Trees with features present that are suitable to support roosting bats (high and moderate suitability) are discussed more fully in the report.

A summary of the trees within the survey area without suitable features to support roosting bats (low and negligible suitability) is provided within the report. Due to their negligible potential to support roosting bats, the Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016) recommend no further survey work is required for these tree classes.

Example of Potential Roost Features
• Bat, bird and dormouse boxes on trees; • Cankers (caused by localized bark death) in which cavities have developed; • Compression forks with included bark, forming potential cavities; • Cracks/splits in stems or branches (both vertical and horizontal); • Crossing stems or branches with suitable space between for roosting; • Ivy stems with diameters in excess of 50 mm with suitable roosting space behind (or where a roosting space can be seen where a mat of thinner stems has left a gap between the mat and the trunk); • Man-made holes (e.g. cavities that have developed from flush cuts); • Natural holes (e.g. knot holes) arising from naturally shed branches, or cavities created by branches tearing out from parent stems; • Other hollows or cavities, including rot holes and butt rots; • Partially detached or loose, platy bark; • Woodpecker holes; or, • Other features that offer a place of shelter.

Table 2.1: Potential Roost Features (Adapted from Collins 2016 and BSI 2015)

Suitability	Description
High	A tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.
Moderate	A tree 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).
Low	A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.
Negligible	Negligible habitat features on site likely to be used by roosting bats.

Table 2.2: Classification of Trees with Bat Potential (Adapted from Collins, 2016)

3. DESK STUDY

3.1 NATURE CONSERVATION SITES

The site is located within 7 km of Ruppera Castle & Woodlands SSSI. This site supports a maternity colony of rare greater horseshoe bats.

3.2 SPECIES RECORDS

The data search was carried out in July 2021 by Aderyn. Records of bat species within a 1 km radius of the survey area provided by the consultee are summarised in Table 3.1. It should be noted that the absence of records should not be taken as confirmation that a species is absent from the search area.

Species	No. of Records	Most Recent Record	Proximity of Nearest Record to Study Area	Species of Principal Importance?	Legislation
Pipistrelle *Pipistrellus* sp.	1	2001	520 m north-west	#	ECH 4, WCA 5, WCA 6
Nathusius's Pipistrelle *Pipistrellus nathusii*	1	2014	810 m north	-	ECH 4, WCA 5, WCA 6
Common pipistrelle *Pipistrellus pipistrellus*	2	2014	890 m north	-	ECH 4, WCA 5, WCA 6
Unidentified bat *Chiroptera* sp.	4	2008	890 m north	#	#
Noctule *Nyctalus noctula*	1	2014	910 m north	✓	ECH 4, WCA 5, WCA 6

Key:
#: Dependent on species.

ECH 2: Annex II of the European Communities Council Directive on the Conservation of Natural Habitats and Wild Fauna and Flora. Animal and plant species of community interest whose conservation requires the designation of Special Areas of Conservation.
ECH 4: Annex IV of the European Communities Council Directive on the Conservation of Natural Habitats and Wild Fauna and Flora. Animal and plant species of community interest in need of strict protection.
WCA 5: Schedule 5 of Wildlife and Countryside Act 1981 (as amended). Protected animals (other than birds).
WCA 6: Schedule 6 of Wildlife and Countryside Act 1981 (as amended). Animals which may not be killed or taken by certain methods.

Species of Principal Importance: Species of Principal Importance for Nature Conservation in Wales.

Table 3.1: Bat Species Records Within 1 km of Survey Area

4. SURVEY RESULTS

4.1 INTRODUCTION

The Preliminary Ground Level Bat Roost Assessment of Trees was conducted on 11th April 2022 by Sophie Meredith (Principal Ecological Consultant and Natural Resources Wales Licensed Bat Surveyor: Licence Number SO88879/1) and Becky Holmes (Ecological Consultant). Drawing C157553-01-01, illustrating the results of the survey is provided in Chapter 7.

Weather conditions were recorded and are presented in Table 4.1.

Parameter	Conditions
Temperature (°C)	10
Cloud Cover (%)	100
Precipitation	Nil
Wind Speed (Beaufort)	F2

Table 4.1: Weather Conditions During the Preliminary Ground Level Bat Roost Assessment

4.2 CONSTRAINTS

The southern aspect of T1 could not be fully visually assessed due to dense vegetation and lack of access to the adjacent plot of land.

4.3 SURVEY RESULTS

4.3.1 Trees with Moderate Potential to Support Roosting Bats

Most of the trees on site were assessed as having low or negligible potential for roosting bats. The exception was a semi-mature oak *Quercus* sp., tree located on the southern boundary (Plate 4.1). This tree, hereinafter referred to a T1, was approximately 12 m in height and had moderate to dense ivy *Hedera helix* coverage. Ivy stems against the main trunk offered potential roosting opportunities for crevice dwelling species of bats in places. No evidence of bats (e.g droppings, feeding remains, scratch marks or urine staining) was identified during the assessment but the majority of the ivy could not be fully assessed.

Plate 4.1: Tree T1

4.3.2 Trees with Low or Negligible Potential to Support Roosting Bats

A linear stretch of scrub and young trees were present along the southern and eastern boundary and scattered scrub and young trees were present throughout the site (Plates 4.2 and 4.3). Species present included *prunus* sp., hawthorn *Crataegus monogyna*, willow *Salix* sp., hazel *Corylus avellana*, dogwood *Cornus sanguinea* and field maple *Acer campestre*. A group of young willow trees with occasional birch *Betula pendula* were present in the north-west corner of the site. The scrub and young trees on site were all assessed as having either negligible or low roosting potential.

Plate 4.2: Young Trees

Plate 4.3: Scrub Habitat

4.4 SITE AND SURROUNDING HABITATS

The site comprises a mosaic of habitats including woodland, standing and running water, scrub and grassland which provide suitable foraging and commuting habitat for bats, with links to additional roosting, foraging and commuting habitat in the surrounding landscape.

Habitats within 1 km of the site suitable for roosting, commuting and foraging include:

- Residential houses and associated gardens;
- Running water and standing waterbodies;
- Pockets of woodland; and,
- Agricultural fields with tree and hedge lined boundaries.

5. DISCUSSION AND CONCLUSIONS

5.1 SUMMARY OF PROPOSALS

It is understood that the development proposals involve the construction of a warehouse with associated hard and soft landscaping.

5.2 ASSESSMENT OF TREES

Most trees on site were assessed as having either low or negligible potential for roosting bats. The exception was T1 which was a semi-mature oak tree located on the southern boundary. This was assessed as having moderate potential for roosting bats. Whilst no evidence of bats (e.g droppings, feeding remains, scratch marks or urine staining) was identified during the survey a full assessment of the ivy could not be completed given the height that it extended up the tree. The ivy stems against the trunk of the tree offer potential cavities for crevice dwelling species of bats such as pipistrelles *Pipistrellus* sp.

5.3 POTENTIAL IMPACTS ON BATS

The Site Layout Plan provided by the client indicates that whilst tree T1 is to be retained it is located immediately adjacent to the proposed service yard. Due to the proximity of the tree to the proposed works area there is potential for indirect disturbance impacts (e.g. increases in noise, vibrations and lighting). As a result, roosting bats are a notable consideration and further survey work is required in line with the Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016) to establish presence/absence.

The mosaic of habitats on site including woodland, running water, grassland and trees also provide suitable foraging and commuting habitat for bats. The Site Layout Plan indicates that most of the site will be cleared to facilitate the new warehouse and associated service yard. Extensive areas of alternative habitat are located immediately adjacent to the site, extending into the wider landscape and existing vegetation along the site boundaries will be retained. However, any additional lighting installed on site has the potential to reduce the value of retained vegetation for bats. Recommendations regarding sensitive lighting and habitat enhancement are made in Chapter 6.

Ruppera Castle & Woodlands SSSI is located 7,040 m north-west. This site supports a maternity colony of rare greater horseshoe bats. Given the large distance between this SSSI and the proposed application site and the nature of the intervening habitat (urban development) the risk of the any adverse impacts on greater horseshoe bats (for which the site is designated) is considered negligible.

6. RECOMMENDATIONS

All recommendations provided in this section are based on Middlemarch Environmental Ltd's current understanding of the site proposals, correct at the time the report was compiled. Should the proposals alter, the conclusions and recommendations made in the report should be reviewed to ensure that they remain appropriate.

R1 **Dusk / Dawn Surveys of T1:** Tree T1 has been identified as having moderate potential to support roosting bats. Bat Surveys: Good Practice Guidelines published by the Bat Conservation Trust (Collins, 2016) recommends that for trees with moderate bat roosting potential two separate survey visits (consisting of one dusk emergence and a separate dawn re-entry survey) be undertaken during the bat activity season to determine the presence/absence of roosting bats within the tree. The bat activity season extends from May to September. At least one of the surveys should be undertaken during the peak season between May and August. Should either survey confirm the presence of roosting bats, it will be necessary to undertake additional surveys in order to inform a Natural Resources Wales licence application. In addition, should the survey identify the presence of significant levels of bat activity at the site, it may be necessary to undertake further survey visits to comprehensively assess the value of the site to bats.

R2 **Remaining Trees**: The other trees on site were considered to have negligible potential for roosting bats. The survey data obtained for the site is valid for 12 months from the survey date. If proposed site works have not commenced within this timeframe it will be essential to update the survey effort to establish if the trees have developed features that could be used by roosting bats in the interim. In the unlikely event that a bat is found during works to the trees all works must immediately cease and a suitably qualified ecologist should be contacted.

R3 **Lighting**

In accordance with best practice guidance relating to lighting and biodiversity (Miles et al, 2018; Gunnell et al, 2012), any new lighting should be carefully designed to minimise potential disturbance and fragmentation impacts on sensitive receptors, such as bat species. Examples of good practice include:

- Avoiding the installation of new lighting in proximity to key ecological features, such as retained vegetation and water features.
- Using modern LED fittings rather than metal halide or sodium fittings, as modern LEDs emit negligible UV radiation.
- The use of directional lighting to reduce light spill, e.g. by installing bespoke fittings or using hoods or shields. For example, downlighting can be used to illuminate features such as footpaths whilst reducing the horizontal and vertical spill of light.
- Where the use of bollard lighting is proposed, columns should be designed to reduce horizontal light spill.
- Implementing controls to ensure lighting is only active when needed, e.g. the use of timers or motion sensors.

R4 **Habitat Enhancement**

In line with the National Planning Policy Framework, the development should aim to enhance the site for bats. Bat boxes should be installed to provide roosting habitat for species such as pipistrelle. In general, bats seek warm places and for this reason boxes should be located where they will receive full/partial sun, although installing boxes in a variety of orientations will provide a range of climatic conditions. Position boxes at least 4 m above ground to prevent disturbance from people and/or predators. The planting of species which attract night flying insects is encouraged as this will be of value to foraging bats, for example: evening primrose *Oenothera biennis*, goldenrod *Solidago virgaurea*, honeysuckle *Lonicera periclymenum* and fleabane *Pulicaria dysenterica*.

7. DRAWINGS

Drawing C157553-01-01 – Preliminary Ground Level Bat Roost Assessment of Trees

C157553-01-01

Legend

- Site Boundary
- Tree with moderate potential for roosting bats

Phase 1 Habitats

- Scattered scrub
- Other habitat
- Scrub
- Semi-natural broad-leaved woodland
- SI — Semi-improved (neutral) grassland
- Standing Water
- Tall ruderal
- Wet Ditch

N

Project	Land off Newlands Road, Cardiff
Drawing	Preliminary Roost Assessment
Client	Cubex Land
Drawing Number	C157553-01-01
Revision	00
Scale @ A4	1:1,300
Date	May 2022
Approved By	BH
Drawn By	BD

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APPENDIX 1

LEGISLATION

Bats and the places they use for shelter or protection (i.e. roosts) receive legal protection under the Conservation of Habitats and Species Regulations 2017 (Habitats Regulations 2017) and the Conservation of Habitats and Species Regulations (Amendment) (EU Exit) Regulations 2019 (Habitats Regulations 2019). They receive further legal protection under the Wildlife and Countryside Act (WCA) 1981, as amended. This protection means that bats, and the places they use for shelter or protection, are capable of being a material consideration in the planning process.

Regulation 41 of the Habitats Regulations 2017, states that a person commits an offence if they:

- deliberately capture, injure or kill a bat;
- deliberately disturb bats; or
- damage or destroy a bat roost (breeding site or resting place).

Disturbance of animals includes in particular any disturbance which is likely to impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or in the case of animals of a hibernating or migratory species, to hibernate or migrate; or to affect significantly the local distribution or abundance of the species to which they belong.

It is an offence under the Habitats Regulations 2017 for any person to have in his possession or control, to transport, to sell or exchange or to offer for sale, any live or dead bats, part of a bat or anything derived from bats, which has been unlawfully taken from the wild.

Changes have been made to parts of the Habitats Regulations 2017 so that they operate effectively from 1st January 2021. The changes are made by the Habitats Regulations 2019, which transfer functions from the European Commission to the appropriate authorities in England and Wales.

All other processes or terms in the 2017 Regulations remain unchanged and existing guidance is still relevant.

The obligations of a competent authority in the 2017 Regulations for the protection of species do not change. A competent authority is a public body, statutory undertaker, minister or department of government, or anyone holding public office.

Whilst broadly similar to the above legislation, the WCA 1981 (as amended) differs in the following ways:

- Section 9(1) of the WCA makes it an offence to *intentionally* kill, injure or take any protected species.
- Section 9(4)(a) of the WCA makes it an offence to *intentionally or recklessly** damage or destroy, *or obstruct access to*, any structure or place which a protected species uses for shelter or protection.
- Section 9(4)(b) of the WCA makes it an offence to *intentionally or recklessly** disturb any protected species *while it is occupying a structure or place which it uses for shelter or protection*.

*Reckless offences were added by the Countryside and Rights of Way (CRoW) Act 2000.

As bats re-use the same roosts (breeding site or resting place) after periods of vacancy, legal opinion is that roosts are protected whether or not bats are present.

The reader should refer to the original legislation for the definitive interpretation.

The following bat species are listed as Section 7 Priority Species in Wales: barbastelle bat *Barbastella barbastellus*, Bechstein's bat *Myotis bechsteinii*, noctule *Nyctalus noctula*, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared bat *Plecotus auritus*, greater horseshoe bat *Rhinolophus ferrumequinum* and lesser horseshoe bat *Rhinolophus hipposideros*. Section 7 of the Environment (Wales) Act 2016 identifies a list of the living organisms of principal importance for the purpose of maintaining and enhancing biodiversity in relation to Wales.

ECOLOGY

At present, 18 species of bats are known to live within the United Kingdom, of which 17 species are confirmed as breeding. All UK bat species are classed as insectivorous, feeding on a variety of invertebrates including midges, mosquitoes, lacewings, moths, beetles and small spiders.

Bats will roost within a variety of different roosting locations, included houses, farm buildings, churches, bridges, walls, trees, culverts, caves and tunnels. At different times of the year the bats roosting requirements alter and they can have different roosting locations for maternity roosts, mating roosts and hibernation roosts. Certain bat species will also change roosts throughout the bat activity season with the bat colony using the site to roost for a few days, abandoning the roost and then returning a few days or weeks later. This change can be for a variety of reasons including climatic conditions and prey availability. Bats are known live for several years and if the climatic conditions are unfavourable at a particular roost, they may abandon it for a number of years, before returning when conditions change. Due to the matriarchal nature of bat colonies, the locations of these roosts can be passed down through the generations.

Bats usually start to come out of hibernation in March and early April (weather dependent), when they start to forage and replenish the body weight lost during the hibernation period. The female bats then start to congregate together in maternity roosts prior to giving birth and a single baby is born in June or July. The female then works hard to feed her young so that they can become independent and of a sufficient weight to survive the winter before the weather gets too cold and invertebrate activity reduces. Males generally live solitary lives, or in small groups with other males, although in some species the males can be found living with the females all year. The mating season begins in the autumn. During the winter bats hibernate in safe locations which provide relatively constant conditions, although they may venture outside to forage on warmer winter nights.