

**Preliminary ecological appraisal  
(Internal /External Bat Survey)  
Agricultural Building and HIS for  
newts  
Love Lyne Lane barns  
Hunts End  
Redditch**



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Bat class license: Survey, level 2.

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## 1.0. Introduction

- Two mainly brick/breezeblock and corrugated metal roofed barns was subject to a pre-determinative bat survey at Love Lyne Lane, Hunts End, Redditch B97 5QD. This constitutes a survey in relation to the potential for presence of bat species and roost sites, in relation to a planning proposal for Class Q conversion. In addition, a Habitat Suitability Index assessment for great crested newt was made of the nearby water-body (those within 100m).

The brief of the survey was as follows;

- An External/Internal evaluation of the buildings for utilization signs by bat species.
- To determine whether any buildings and trees within the site had potential for use by bats for roosting or as a place of shelter, with consequent implication for development work with respect to Schedule 5 of the *Wildlife and Countryside Act 1981 and the conservation (Natural Habitats &c.) Regulations (and subsequent amendments)*.
- To determine the presence of any roosts within the site.
- To determine any use of the buildings concerned by bird species
- To make an overall assessment of the value of the site as foraging, feeding and commuting areas.
- To make recommendations for the development work to take place including any mitigation/ compensation required.

## 1.1. Background

### Bats and the Law

Prior to August 2007, all bat species in the UK were fully protected under the *Wildlife and Countryside Act 1981* (as amended) through an inclusion in Schedule 5. The amendment of the *Conservation (Natural Habitats) Regulations 1994*, in August 2007 now is the regulatory protection mechanism. In addition there are obligations within the Conservation of Species and Habitat Regulations (2017) and National Planning Policy Framework (2019) which replaced the former Planning Policy Statement 9 (PPS 9).

In England, Scotland, Wales and Ireland all bat species are fully protected by the Conservation (Natural Habitats &c.) Regulations, which defines 'European protected species of animals' (EPS). This gives protection to bats and their roosts.

The Regulations have slightly different amendments in the different countries. Under the regulations it is an offence to:

- a) Deliberately or recklessly to capture, injure, or kill a EPS.
- b) Deliberately or recklessly –
  - i. To harass a wild animal or group of wild animals of a EPS.
  - ii. To disturb while it is occupying a place of shelter (roosts).
  - iii. To disturb while it is rearing its young or caring for its young.
  - iv. To obstruct access to a breeding site or resting place, or otherwise deny the animal use of that site or resting place.
  - v. To disturb a EPS in a manner that is, or circumstances which are likely to significantly affect the local distribution or abundance of the species.
  - vi. To disturb a EPS in a manner that is, or circumstances which are likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for young.

In this interpretation, a bat roost is “*any structure or place which any bat uses for shelter or protection*”. As bats tend to reuse the same roosts, legal opinion is that the roost is protected whether or not the bats are present at the time.

### **Planning and Development**

All British bat species and their roosts are protected under the Wildlife and Countryside Act 1981, through inclusion on Schedule 5. They are also protected under the Conservation (Natural Habitats &c.) Regulations 1994 (which were issued under the European Communities Act 1972), through inclusion on Schedule 2.

The Act and Regulations include provisions making it illegal to:

- Intentionally or deliberately kill, injure or capture bats.
- Deliberately disturb bats.
- Damage, destroy or obstruct access to a roost.

Local Planning Authorities consult the Government’s guidance notes, National Planning Policy Framework (2018) and the Conservation of Species Habitat Regulations (2017) in England, and

equivalents in Scotland and Wales, before making a planning decision where there may be protected species on a site.

The presence of a protected species should be a material consideration when considering a development proposal which, if carried out, would be likely to result in harm to the species or its habitat. If bats use the site, appropriate Statutory Nature Conservation Organization (Natural England, Scottish Natural Heritage or Natural Resources Wales) must be consulted before any work is carried out. Where necessary, a bat expert should visit and assess the site.

If planning permission is being sought from the local authority, any observations of bats should be reported to them and they can be reminded of their obligations within the National Planning Policy Framework (2018). If a bat roost is present and is affected by a proposed development, licensing will be required from the Statutory Nature Conservation Body, in England this is Natural England.

### **The Legislative Process (England)**

In determining whether or not to grant a license Natural England must apply the requirements of Regulation 535 of the Regulations and, in particular, the three tests set out in sub-paragraphs (2)(e), (9)(a) and (9)(b)6 .

(1) Regulation 53(2)(e) states: a licence can be granted for the purposes of “preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment”.

(2) Regulation 53(9)(a) states: the appropriate authority shall not grant a licence unless they are satisfied “that there is no satisfactory alternative”.

(3) Regulation 53(9)(b) states: the appropriate authority shall not grant a licence unless they are satisfied “that the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.”

In determining applications for licenses under the Regulations Natural England is also aware of and, where appropriate, has regard to the following:-

☐ Planning Policy Statement 9 ☐ Circular 06/05 “Biodiversity and Geological Conservation – Statutory Obligations and their impact within the Planning System”

☒ Circular 2/2002 New Guidance for Local Planning Authorities on European Protected Species and Changes in Licensing Procedures

☒ the EU Guidance Document on the protection of animal species: February 2007, Managing Natura 2000, EU Guidance Document on Hunting under Council Directive 79/409/EEC on the conservation of wild birds (Chapter 3) and The Report of the Article 12 Working Group under the Habitats Committee “Contribution to the interpretation of the strict protection of species (Habitats Directive article 12)”.

Developers need to be aware that:

- Assessment of current use, likely effects and mitigation or habitat enhancement should be incorporated into development proposals at an early stage.
- Where changes in land use could affect bats, the implications to bats should be considered and advice sought.
- When considering planning applications, authorities are required to take account of protected species, including all bats, and their habitats.

Bat feeding habitats can be some distance from their roost sites, therefore, bats seen in flight may roost nearby or some miles away. Bats use a range of sites for roosting, including buildings and trees. Signs of roosts, which are visible from the outside, include bats emerging from the roost (timing varies from before sunset to up to about an hour after) and bat droppings on surfaces near emergence points.

## **1.2. Site Location**

Love Lyne Lane

Hunts End

Redditch

B97 5QD

All parts of the site and buildings were available for access. The site is shown below:



### 1.3. General Site Description and Status

The site comprises two open barns, currently used for storage, with a low base of brick and corrugated metal roof. The lower section is constructed of brick and the upper section of corrugated metal sheets. There is no roof-space or cavity wall. The buildings are shown below. The rest of the immediate area comprises the access track and the hard-standing of a yard, the rest of the site curtilage was not assessed for its ecological value, as it is understood not to be included in the proposal. There is a small spring running through, with a single 'pond' around 50m from the barns . See images below.









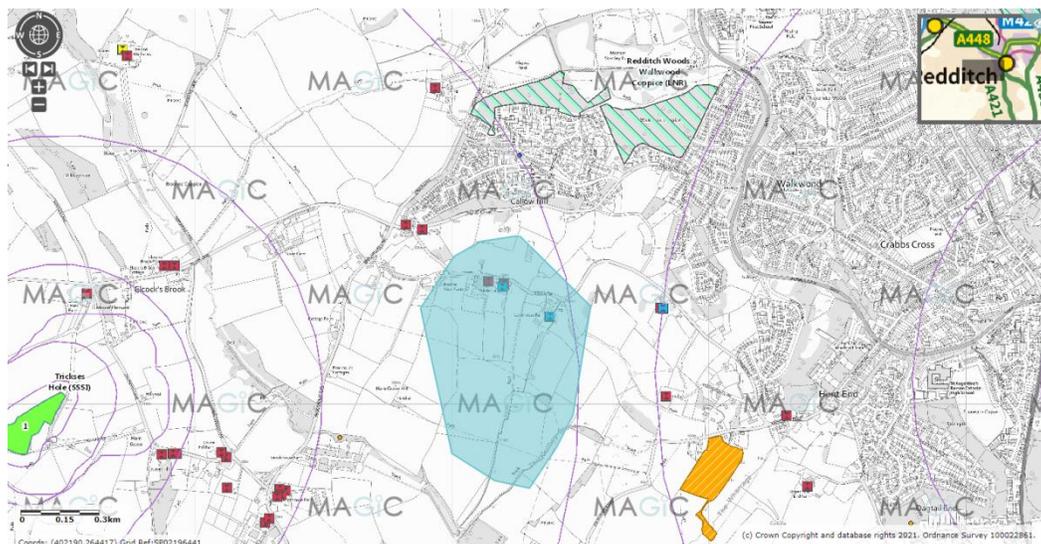
### 1.3.1. Immediate Surrounding Area and wider Landscape Context in Relation to Bats

The building is situated along Love Lyne lane, in Worcestershire. The immediate land-use is intensive agriculture, mainly pasture and horse grazing, with hedgerows and small woodlots being likely to provide the foraging and commuting areas for bats in the immediate landscape.



### Statutory Nature Conservation Sites

The map below shows all Statutory Nature Conservation Sites (this includes Sites of Special Scientific Interest, Local Nature Reserves, Special Areas of Concern) within 2km of the proposed development. In addition to the below, there is a non statutory designated Nature Reserve (Hunts end) under 200m E.



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A Natural England 'Magic' data search (shown below) reveals that the site lies within a Nitrate Vulnerable Zone for surface water though and within a SSSI impact zone, this should be considered in relation to any construction operations. The nearest site is Rookery Cottage Meadows SSSI which lies 700m SW.

*(Abbreviations: SSSI Special Scientific Interest, SAC special Area for Conservation, LNR Local Nature Reserve)*

#### **Table of Protected Sites in Vicinity**

<b>Site Name</b>	<b>Designation</b>	<b>Location</b>
Redditch Woods Wallwood Coppice	LNR	300m N

### **1.4. Bat Ecology (a Summary)**

#### **Where do bats build roosts?**

Different species of bat prefer different places; some creep into tiny spaces, cracks and crevices. Only occasionally do they hang free or are easily visible. Outside they may roost:

- Under weather boarding or hanging tiles
- Above soffits and behind fascia and barrage boarding
- Between window frame and wall brickwork
- In gaps behind cladding tiles or wood
- Between underfelt and boards or tiles
- Inside cavity walls

Inside roof spaces they may roost

- Along the ridge beam
- Around the gable end
- Around the chimney breast

#### **Looking for the evidence**

Bats do not make nests or cause structural damage. The most obvious sign of their presence is droppings.

- 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

- Bat droppings do not present any known health hazards.
- Droppings may not always be readily visible in a loft.
- Large accumulations may reflect use over a number of years rather than large numbers of bats at any one time.

**When do bats use buildings?**

Bats use buildings at any time, but are most often found in houses between May and August.

- Mother bats have only one baby a year, suckling it for several weeks. The mothers gather in maternity roosts to have their young in summer, and this is the time they are most likely to be seen using buildings.
- The bats move away when the young can fly and feed themselves, and have usually left by September.
- Immature individuals, adult males and non-breeding females will occupy a variety of roosts, individually or in small groups, at any time of year.
- Disturbance or the use of chemicals at maternity roosts in houses can have a major impact on bat populations gathered from a wide area.
- Bats do roost in houses in winter, usually individually, but are difficult to see.

**Which bats use buildings?**

All UK species have been recorded in houses, but some very rarely. Pipistrelles and Long-eared bats are the species most usually found.

**Pipistrelle bats**

There are three different species of Pipistrelle; the common Pipistrelle, Soprano Pipistrelle and the rarer Nathusius' Pipistrelle. They sometimes use houses as maternity roosts, choosing confined spaces. These are usually on the outside of buildings, such as under the soffits or behind barge boards or hanging tiles, where the bats can rarely be seen.

**Brown long-eared bats**

This species mostly prefers older houses with large roof spaces. Small clusters may be seen at junctions of roof timbers or under the ridge. It is the bat most frequently seen inside lofts, small numbers may stay longer than the other species.

### 1.5 Description of Works

The plan involves class Q conversion of the existing structures to residential (refer to Planning Application):

### 1.6 Bat Species Records

In relation to bat species the following were recorded from freely available web-based data (and in places, the authors own records) presented here with the approximate distances of the nearest record. In addition, a number of Ecological survey reports within the area have been interrogated for protected species records. All records are post-2000 unless otherwise stated.

Species (Latin Name)	Common Name	Approximate distance of nearest record from the survey site (km)
<i>Pipistrellus pipistrellus</i>	Common pipistrelle	Within 2 km
<i>Pipistrellus pygmaeus</i>	Soprano pipistrelle	Within 2 km
<i>Plecotus auritus</i>	Brown long eared	Within 2 km
<i>Myotis nattereri</i>	Natterer's bat	Within 2 km

### EPSM Search

The nearest granted EPSM licenses are over 2 for Great Crested Newt and 2 km for bat species. See below (green boxes are herpetiles, blue are bat species):



**Other Selected Species**

Species (Latin Name)	Common Name	Approximate distance of nearest record from the survey site (km)
<i>Tyto alba</i>	Barn owl	Within 5 km
<i>Triturus cristatus</i>	Great Crested Newt	Over 2 km N

**Interpretation of available biological data.**

The data search reveals that there are four bat species recorded within 1km radius of the survey site.

## **2.0. Methodology (bats)**

The survey consisted of two elements:

- A day-time visual external assessment of the buildings and their potential in relation to use by bats as roosts.
- A day-time visual internal assessment of the buildings and their potential in relation to use by bats as roosts

### **2.1. Personnel**

The survey was conducted by Dr. Stefan Bodnar, assisted by Dr. Louise Sutherland. Dr. Stefan Bodnar is a full time member of the Chartered Institute of Ecology and Environmental Management, an experienced ecologist with over 35 years experience of bat surveys, working under Natural England class license: Level 2, survey: bats.

### **2.2. Visual External Assessment**

The external building inspection (from the ground using binoculars) focused particularly on roof areas, soffits, areas of wall with cracks and apertures, vents, openings into the building and the overall structure of the buildings including any features such as crevices or cavities that may be suitable for bats to roost in. Evidence of roosting such as droppings or staining around entrances was also recorded. Where appropriate gaps and cavities were checked using an endoscope. The date of site visit was 25<sup>th</sup> April 2021

Methods of survey used have been based on those outlined in Joint Nature Conservation Committee's Bat Workers Manual (Mitchell-Jones & McLeish, 2004), Bat Surveys for Professional Ecologists (3<sup>rd</sup> Edition), BCT (2016), and English Nature's Bat Mitigation Guidelines (Mitchell-Jones, 2004).

### **2.3. Visual Internal Assessment**

There are no internal roof spaces to the structure

### 3.0. Results

The assessment was carried out using the guidance provided within the publication: **Bat Surveys for Professional Ecologists (3<sup>rd</sup> Edition), BCT (2016), which states:**

Table 4.1 Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape, to be applied using professional judgement.		
Suitability	Description Roosting habitats	Commuting and foraging habitats
Negligible	Negligible habitat features on site likely to be used by roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions <sup>a</sup> and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation <sup>b</sup> ).  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. <sup>c</sup>	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat.  Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions <sup>a</sup> and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.  Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions <sup>a</sup> and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge.  High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland.  Site is close to and connected to known roosts.

<sup>a</sup> For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

<sup>b</sup> Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten *et al.*, 2015). This phenomenon requires some research in the UK but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in large buildings in highly urbanised environments.

<sup>c</sup> This system of categorisation aligns with BS 8596:2015 Surveying for bats in trees and woodland (BSI, 2015).

#### 3.1 External and Internal Visual Assessment

The site comprises two open barns, currently used as storage, with a low base of brick and corrugated metal roof. The lower section is constructed of brick and the upper section of corrugated metal sheets. There is no roof-space or cavity wall. The buildings are shown below. The rest of the immediate area comprises the access track and the hard-standing of a yard, the rest of the site curtilage was not assessed for its ecological value, as it is understood not to be

included in the proposal. There is a small spring running through, with a single 'pond' around 50m from the barns . See images below.

The buildings have large open frontages which are often open for access and also makes the interior spaces well lit. Access from the exterior is also possible at numerous points along the roof/wall interface and around doors. For the building, there was no evidence of actual bats or signs of bats (droppings, feeding remains, urine staining, scratch marks, noise and the remains of dead bats etc.).

The main building themselves no cavities or features bats would use as roosts, being single skin brick/breezeblock and metal framed. The interior of the buildings were fully accessible and surveyed in detail. There are some cracks in the brickwork of the pillars that were given particular attention, and a small amount of wood cladding on the frontage of one building. All showed no signs of bat or bird use despite extensive checks.

The buildings were classified overall as high access/ negligible roost potential

### **3.2 Birds and other animals**

No evidence, though the barns have a moderate suitability. No evidence of barn owl was found.

The surrounding area was inspected for evidence of great crested newt or badger. As the development will involve primarily the buildings and hard-standing, this is of low suitability for great crested newts. It can be confirmed, that there are no badger setts within 30m of the buildings in any direction and no signs of presence on site at all.

### **3.3 Method: Habitat Suitability Index (Assessment)**

The survey method employed is determined by Natural England's Standing Advice for Great Crested Newt *Triturus cristatus* (refer to Natural England web-site), recommends the following generic advice:

Field survey

An initial survey of the terrestrial habitats and quality of the ponds within, and adjacent to, the development footprint is a useful starting point. This should ideally follow the Habitat Suitability Index (HSI) methodology developed by Oldham et al. 2000 which looks at a number of variables

including pond size, terrestrial habitat, pond shading and water quality to derive a probability of newts being present within a pond. This is a helpful tool for large schemes as it may help to „scope out“ some ponds for more detailed surveys. Please note that HSI assessments are not an alternative to carrying out a more detailed survey should one be required.

### 3.3.1 Habitat Suitability Assessment

Any ponds were then assessed for habitat suitability for great crested newts, utilising the modified Great Crested Newt Habitat Suitability Index (Oldham *et al*, 2000). The habitat suitability index provides a means of evaluating habitat quality. The Habitat Suitability Index (HSI) is a numerical index between 0 and 1, where 0 indicates suitable habitat and 1 represents optimal habitat. The HSI score is then utilised to define the suitability of the pond on a categorical scale (Table below). The system is not precise enough to allow the conclusion that a pond with a high score will support great crested newts whilst those with a low score will not. See Appendix 7 for reference document of the Great Crested Newt Habitat Suitability Index.

HSI Score	Pond Suitability
< 0.5	Poor
0.5 – 0.59	Below average
0.6 – 0.69	Average
0.7 – 0.79	Good
> 0.8	Excellent

**Table 2.1: HSI scoring for pond suitability**

### 3.3.2 : Great Crested Newts

The survey was undertaken by Dr. Stefan Bodnar MCIEEM, who holds a Natural England Class License CL08 1159, level 2 survey. Great crested newts are protected under Schedule 5 of the Wildlife and Countryside Act (1981) as amended and Schedule 2 of the Conservation (Natural Habitats etc) Regulations 1994 (Regulation 38). Because of their rarity they are also protected under Annexes IIa and IVa of the Habitats and Species Directive and under the Berne Convention. In 2007, the Conservation (Natural Habitats etc) Regulations 1994 was amended particularly in relation to designated European Protected Species (EPS) which includes great crested newt. In particular, the amendment removes the requirement for actions to be intentional or reckless in order for an offence to be committed.

Langton *et alia* (2001) make the point that:

*“The wording in the 1981 Act and 1994 Regulations is slightly different.” “Taken together, the Act and the Regulations (following the CROW Act 2000) make it illegal to:*

*Intentionally or deliberately capture or kill, or intentionally injure great crested newts.*

- *Deliberately disturb great crested newts or intentionally or recklessly \* disturb them in a place used for shelter or protection.*

- *Damage or destroy a breeding site or resting place.*
  - *Intentionally or recklessly damage, destroy or obstruct access to a place used for shelter or protection.*
  - *Possess a great crested newt, or any part of it, unless acquired lawfully.*
  - *Sell, barter, exchange or transport or offer for sale great crested newts or parts of them.*
- \*Reckless offences were added by the Countryside and Rights of Way Act 2000, which applies only to England and Wales”.*

### Habitat Suitability Assessment

The water course south of the buildings were evaluated. See appendix for site images:

HSI Indices	Pond 1	
	Attribute	Score
Name	75m	
S11 - Geographic location	A	1
S12 – Pond area to nearest 50m <sup>2</sup> (m <sup>2</sup> )	50m2	0.05
S13 - Pond drying (frequency)	Never	0.9
S14 – Water quality	good	1
S15 – Pond shading (%)	100%	0.2
S16 – Water Fowl	Absent	1
S17 - Fish	Absent	1
S18 – Pond density	5	1
S19 – Surrounding terrestrial habitat	Good	1
S110 – Macrophyte (aquatic plant) density(%)	0%	0.3
<b>HSI SCORE</b>		<b>0.554</b>
<b>CATEGORY</b>	<b>Below Average</b>	

The survey concluded that for the nearby pond is of below average quality category for great crested newts.

Using the available guidance in respect of survey effort, the classification reached using the HSI tool indicates that there is no need for further surveys in regard to great crested newts, though reasonable avoidance measures during construction operations should be adopted.

### **3.3.3 Recommendations in respect of Great Crested Newts**

**All pools are of low suitability for great crested newts. As such further surveys are not justified.**

Using the HSI in conjunction with Natural England's Rapid Assessment Tool in relation to great crested newts, it is determined that there is a very low possibility of great crested newts being damaged by this proposed development. See excerpt below from guidance:

#### **Guidance on risk assessment result categories**

"**Green: offence highly unlikely**" indicates that the development activities are of such a type, scale and location that it is highly unlikely any offence would be committed should the development proceed. Therefore, no license would be required. However, bearing in mind that this is a generic assessment, you should carefully examine your specific plans to ensure this is a sound conclusion, and take precautions (see **Non-licensed avoidance measures tool**) to avoid offences if appropriate. It is likely that any residual offences would have negligible impact on conservation status, and enforcement of such breaches is unlikely to be in the public interest. Particular note should be made of the development site, comprising mainly mown grassland which provides no suitable refugia or other features, such as ponds, which would be suitable for great crested newts to live in or breed within.

In addition the safeguards listed below are recommended:

#### **Recommendations for safeguarding newts**

Although the risk to great crested newts is minimal, there will be a need for appropriate safeguards to be employed during the development works. The main ones are summarized below:

1. Hand strip of any paved area and the gravel on which the development is to take place. There is a low chance that newts could use these structures as refugia
2. If great crested newts are discovered at any time during processes involved with the development, work should cease immediately and the advice of a licensed ecologist sought.
3. All site staff involved with site clearance and construction works are to be made aware of the potential for encountering great crested newts through a tool kit talk and the appropriate measures to be taken if great crested newts are encountered.
4. Keep duration of ground-works as short as possible.
5. Undertake during the day works that might only affect newts above ground.
6. Backfill trenches and other excavations before nightfall, or leave a ramp to allow newts to easily exit. Raise stored materials (that might act as temporary resting places) off the ground, e.g. on pallets
7. The trees and hedgerows on the site will be largely retained during the development

#### **4.0. Conclusion**

- The building overall was categorized as high opportunities for access negligible opportunity for roost formation by bats.
- No further surveys to determine the presence of bat roosts will be required.
- There were no signs of great crested newt or badger within the site
- Reasonable Avoidance measures should be employed to reduced the risk to any herpetiles that may be present.

#### **5.0. Mitigation/Compensation**

In relation to the National Planning Framework (2019) there is not likely to be a requirement for Mitigation/ Compensation measures for loss of bird nesting opportunity and bat roost potential, however the provision of one bird and one bat box on each building as a basic biodiversity enhancement measure is recommended.

- In order to conform with the protection afforded breeding birds, it is recommended that any demolition and conversion work is commenced outside of the recognized bird breeding season (end March - mid September of any year), or that the building is checked within these months by an ecologist to ensure no breeding birds are affected.
- There will be a need to provide mitigation in the form of 2 bat and 2 bird boxes placed on suitable locations on the converted buildings.
- Lighting: As the site is highly suitable for bat foraging and commuting, any external lighting should be restricted to low lux and directional/on PIR timers. Lighting is to be in accordance with BCT current guidance (see Artificial Lighting and Bats, BCT Guidance note, 2018), also refer to generic guidance (BCT) Appendix 2, at end of this document.

## **6.0. References**

Bats in Roofs. A guide for surveyors. English Nature, Peterborough, Mitchell-Jones, A.J. (2004).

Bat Mitigation Guidelines. English Nature, Peterborough, Mitchell-Jones, A.J.& Mcleish, A.P. (Eds)(2004).

Bat workers Manual, 3<sup>rd</sup> Edn. Joint Nature Conservation committee, Peterborough.

Bats and Trees, (2000), Bat Conservation Trust

Bat Survey guidelines (2016), Bat Conservation Trust

**Appendix 1: Site images from survey**













## Appendix 2: Bats and External lighting (general guidance)

### MITIGATION OF LIGHTING IMPACTS ON BATS

- **FORAGING AND COMMUTING** Type of lamp (light source) The impact on bats can be minimised by the use of low pressure sodium lamps or high pressure sodium instead of mercury or metal halide lamps where glass glazing is preferred due to its uv filtration characteristics.
- **Luminaire and light spill accessories** Lighting should be directed to where it is needed and light spillage avoided. This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only. Planting can also be used as a barrier or manmade features that are required within the build can be positioned so as to form a barrier. **Suitable examples shown below:**

#### Double Asymmetric Luminaire



#### Simple Hood



- **Lighting column** The height of lighting columns in general should be as short as is possible as light at a low level reduces the ecological impact. However, there are cases where a taller column will enable light to be directed downwards at a more acute angle and thereby reduce horizontal spill. For pedestrian lighting this can take the form of low level lighting that is as directional as possible and below 3 lux at ground level. **Aim for Lighting column of 5m or less, hooded and cowled to prevent light spill, for main lighting columns**
- **Light levels** The light should be as low as guidelines permit. If lighting is not needed, don't light. **Timing of lighting** The times during which the lighting is on should be limited to provide some dark periods. Roads or trackways in areas important for foraging bats should contain stretches left unlit to avoid isolation of bat colonies. These unlit stretches should be 10 metres in length either side of commuting route. **Direct lighting so that the hedgerow dark corridors to the northern edge and southern edge of the site remain unlit. So the lighting to be restricted to the main buildings and roadways in and out, and car parking areas only. Car parking areas angle lighting inwards.**
- **SECURITY LIGHTING Power** It is rarely necessary to use a lamp of greater than 2000 lumens (150 W) in security lights. The use of a higher power is not as effective for the intended function and will be more disturbing for bats.
- **Movement sensors** Many security lights are fitted with movement sensors which, if well installed and aimed, will reduce the amount of time a light is on each night. This is more easily achieved in a system where the light unit and the movement sensor are able to be separately aimed. **Timers** If the light is fitted with a timer this should be adjusted to the minimum to reduce the amount of 'lit time'.
- **Aim of light** The light should be aimed to illuminate only the immediate area required by using as sharp a downward angle as possible. This lit area must avoid being directed at, or close to, any bats' roost access

points or flight paths from the roost. A shield or hood can be used to control or restrict the area to be lit. Avoid illuminating at a wider angle as this will be more disturbing to foraging and commuting bats as well as people and other wildlife.

- **Suitable types shown below (note that these are wall mounted and directed downwards)**

**Circular Louvre**



**Cowl & Louvre**



**Cowl (or Hood)**



**References: Bats and lighting BCT guidance and Guidance notes for the reduction of obtrusive lighting.**