DARWIN ECOLOGY
integrating nature conservation

Unit 6, The Wincombe Centre,
Wincombe Business Park, Shaftesbury,
SP7 9QJ
Email: info@darwin-ecology.co.uk
www.darwin-ecology.co.uk

Preliminary Roost Assessment

Berrybrook Farm
Sedgehill
Wiltshire
SP7 9QJ

June 2023

Darwin Ecology Ltd
Registered Office: 8 Layton Lane, Shaftesbury, Dorset SP7 8EY
Company No. 07654823

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QUALITY CONTROL		
The information which we have prepared and provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct.		
Prepared by	Assistant Ecologist Elen Peel MSc BSc (Hons)	31/05/23
Approved by	Consultant Ecologist Jessie Forster BSc (Hons)	6/6/23

This report remains valid for 12 months from date of issue.

Survey data are valid for 12-18 months from the date the survey was undertaken.

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Whilst every effort has been made to guarantee the accuracy of this report, it should be noted that living creatures are capable of migration and whilst protected species may not have been located during the survey duration, their presence may be found on site at a later date.

The views and opinions contained within the document are based on a reasonable timeframe between the completion of the survey and the commencement of any works. If there is any delay between the commencement of works that may conflict with timeframes laid out within this document, or have the potential to allow the ingress of protected species, a suitably qualified ecologist should be consulted.

It is the duty of care of the landowner/developer to act responsibly and comply with current environmental legislation if protected species are suspected or found prior to works.

1. EXECUTIVE SUMMARY

1.1. Darwin Ecology Ltd was commissioned by Mr M Haley to undertake an Preliminary Roost Assessment (PRA) on Barns D, F and K at Berrybrook Farm, Sedgehill, Wiltshire SP7 9JQ[1]. The assessment was required to support planning applications for the installation of solar panels on Barn D, conversion of Barn F and and the demolition of Barn K. It was informed by a desk study and internal / external building inspection. This report is an inspection of the barns only and does not assess any of the other habitats on site.

1.2. The structures assessed during the survey consist of three separate Barns (D, F and K). All buildings are in frequent use for various farm activities on site. The buildings were predominantly constructed of a single skin of bricks, breeze blocks with corrugated metal roofs. High internal light levels were present in all of the buildings.

1.3. No droppings or evidence of bats were recorded within the Barns D, F and K, and these barns were classed as having **negligible** suitability for roosting bats.

1.4. Previous surveys carried out by Darwin Ecology on other buildings within the same site have confirmed the Farmhouse building to support low level roosts for serotine (*Eptesicus serotinus*), brown long-eared bat (*Plecotus auritus*), common pipistrelle (*Pipsitrellus pipsitrellus*) and whiskered bats (*Myotis mystacinus*), which have subsequently been subject to licensable works under the first phase of a European Protected Species (EPS) licence (2022-60545-EPS-MIT). Previous surveys have also confirmed Barn B to support low level roosts for brown long-eared, lesser horseshoe (*Rhinolophus hipposideros*) and soprano pipistrelle bats (*Pipistrellus pygmaeus*).

1.5. Two birds nests were found within the barns during the PRA survey, therefore it is recommended that works take place outside of nesting bird season (February to August inclusive), or that a pre-works check by a suitably qualified ecologist is carried out to ensure no active nests are present at the time of works.

1.6. Enhancements for the site include the addition of bat and bird boxes to site and wildlife beneficial landscaping scheme.

[1] Ordnance Survey (OS) grid reference ST861278.

2. INTRODUCTION AND BACKGROUND

2.1. Darwin Ecology Ltd was commissioned by Mr M Haley to undertake an Preliminary Roost Assessment (PRA) on Barns D, F and K at Berrybrook Farm, Sedgehill, Wiltshire SP7 9JQ[2]. The assessment was required to support planning applications for the installation of solar panels on Barn D, conversion of Barn F and and the demolition of Barn K. It was informed by a desk study and internal / external building inspection.

2.2. This report is an inspection of Barns D, F and K only and does not assess any of the other habitats on site. No proposed plans have been provided to inform this assessment, therefore a full ecological impact assessment has not been provided.

2.3. The internal / external building inspection followed the Bat Conservation Trust (BCT) Good Practice Guidelines (2016).

Site Overview

2.4. The site is to the west of the village of Sedgehill, approximately 4.7 km from Shaftesbury town centre.

2.5. The site comprises an agricultural unit comprising a collection of barns and outbuildings surrounding the original Farmhouse. Areas of hardstanding are present throughout the site, Amenity grassland is present to the south and east of site, with sheep grazed fields to the north (see **Figure 1**).

2.6. The immediate surrounding landscape comprises of rural villages and farm buildings. The A350 trunk road runs north to south across the landscape to the east of the site and the village of Sedgehill. Small areas of scattered woodland surround the site with the large wooded area of Fonthill Abbey Wood to the east of the site, on the opposite side of the A350.

2.7. The wider landscape comprises agricultural fields, including both pastural and arable. The woodland at Fonthill Abbey Wood provides a landscape level connecting green corridor to the east, although this is on the adjacent side of the A350, which is somewhat of a landscape barrier for bats due to road lighting. Areas of woodland throughout the landscape are connected by a network of hedgerows and tree-lines (see **Figure 2**).

2.8. Previous surveys by Darwin Ecology in 2021 at the Farmhouse within the same site confirmed low level bat roosts, which have subsequently been subject to licensable works under the first phase of a European Protected Species (EPS) licence (2022-60545-EPS-MIT). Roosts recorded at the Farmhouse comprised day roosts for serotine (*Eptesicus serotinus*), brown long-eared bat (*Plecotus auritus*), common pipistrelle (*Pipsitrellus pipsitrellus*) and whiskered bats (*Myotis mystacinus*). All roosts recorded at the Farmhouse have been reinstated or compensatory features created, following licensable works.

[2] Ordnance Survey (OS) grid reference ST861278.

Previous surveys have also been carried out by Darwin Ecology at Barns B and C within the same site during 2022, during which Barn B was confirmed to support low level roosts for brown long-eared, lesser horseshoe (*Rhinolophus hipposideros*) and soprano pipistrelle bats and Barn C was assessed to have negligible potential for roosting bats.



Figure 1: Barn locations within the local landscape (Copyright Google Maps, 2023)



Figure 2: Barn locations within the wider landscape (Copyright Google Maps, 2023)

3. LEGISLATION & POLICY

General Wildlife Legislation

3.1. Wildlife in the United Kingdom (UK) is protected through European and national legislation, supported by national and local policy and guidance. Development can contribute to conservation and enhancement goals outlined by these various legislation and policy by retaining and protecting the most valuable ecological features within a site and incorporating enhancements to provide biodiversity net gain.

3.2. This section provides a brief summary of the principle legalisation and policy that triggers the requirement for preliminary and further ecological assessments in the UK. The presence of protected species within a site are a material consideration during the planning process. Preliminary and any necessary further ecological assessments provide an ecological baseline for a site and evaluation of the potential impact of proposals.

3.3. It is the responsibility of those involved with development works to ensure that the relevant legislation is complied with at every stage of a project. Such legislation applies even in the absence of related planning conditions or projects outside the scope of the usual planning process (i.e. permitted development projects or projects requiring Listed Building Consent only).

Bat Legislation

3.1. In England and Wales, all bat species and their roosts are legally protected under the European *Habitats Directive (1992)*; the *Conservation of Habitats and Species Regulations (2017)*; the *Wildlife and Countryside Act (1981) (as amended)*; the *Countryside and Rights of Way Act, 2000*; and the *Natural Environment and Rural Communities Act (NERC, 2006)*.

3.2. Barbastelle (*Barbastella barbastellus*), Bechstein's (*Myotis bechsteinii*), greater horseshoe (*Rhinolophus ferrumequinum*), lesser horseshoe, brown long-eared (*Plecotus auritus*), soprano pipistrelle, and noctule (*Nyctalus noctula*) bats are all species of principal importance in England under *Section 41* of the *Natural Environment and Rural Communities Act 2006*.

3.3. You will be committing a criminal offence if you:

- Deliberately capture, injure or kill a bat;
- Intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats;
- Damage or destroy a bat roosting place (even if bats are not occupying the roost at the time);
- Possess or advertise/sell/exchange a bat (dead or alive) or any part of a bat; or
- Intentionally or recklessly obstruct access to a bat roost.

3.4. The government's statutory conservation advisory organisation, Natural England, is responsible for administering EPS licenses that permit activities that would otherwise lead to an offence.

3.5. A licence can be obtained if the following three tests have been met:

- Regulation 53(9)(a) - there is "no satisfactory alternative" to the derogation, and;
- Regulation 53(9)(b) - the derogation "will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range" and;
- Regulation 53(2)(e) - the derogation is 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".

National Planning Policy

3.1. The *National Planning Policy Framework (2021)* aims to minimise impacts on biodiversity and provide net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity. Chapter 15 'Conserving and enhancing the natural environment' details what local planning policies should seek to consider with regard to planning applications.

3.2. Planning policies and decisions should contribute to and enhance the natural and local environment by:

> *174 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);
>
> *174 b)* Recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and eosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
>
> *174 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;
>
> *175)* Plans should: distinguish between the hierarchy of international, national and local designated sites; allocate land with the lease environmental or amenity value, where consistent with other policies in this Framework; 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;

176) 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 Broads. The scale and extent of development within all these designated areas should be limited, while development within their settings should be sensitively located and designed to avoid or minimize adverse impacts on the designated area.

4. Specific policies regarding habitats and biodiversity comprise:

179) To protect and enhance biodiversity and geodiversity, plans should:

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 biodiversity, wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation 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.

180) When determining planning applications, local planning authorities should apply the following principles:

a) if significant harm to biodiversity resulting from a development cannot be avoid (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 of Sites 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 feature 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 r deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and

d) development whose primary objective is to conserved or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around development should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.

Local Planning Policy

4.1. The local planning policy for the site is the Wiltshire Core Strategy (2015) In particular Core Policy 50 (Biodiversity and Geodiversity) provides guidelines for protection and enhancement of the natural environment and refers to the planning guidance for Special Areas of Conservation (SACs) in Wiltshire, designated for the presence of nationally important bat species.

4.2. Wiltshire County Council (WCC), Natural England (NE) and local experts and researchers have jointly prepared the Bat Special Areas of Conservation (SAC) Planning Guidance for Wiltshire (2015). It is aimed at applicants, agents, consultants and planners involved producing and assessing development proposals in the landscapes surrounding Wiltshire's most sensitive bat roosting sites, which are protected by European wildlife legislation and applies to all types of developments that are subject to planning control.

4.3. The guidance gives details on how to mitigate any potential impacts on Wiltshire Bat SACs and to ensure that any potential issues are identified as early in the planning process as possible to prevent unnecessary delays to development projects. The guidance also outlines the ecological documents and plans, which should be submitted in support of planning applications, so as to ensure that the council has all the information required to undertake a reliable Habitats Regulations Assessment (HRA) should one be required.

4.4. In addition to policies relating to bat SACs, the Wiltshire Core Strategy (2015) includes Core Policy 51 (Landscape), which provides guidance for protecting, conserving and where possible, enhancing landscape character, including locally distinctive patters and species composition of natural features (such as trees, hedgerows, woodland, field boundaries, watercourses and waterbodies). Core Policy 69 (Protection of the River Avon SAC) provides guidelines for the incorporation of measures during construction and operations to avoid and prevent pollution and to minimise disturbance effects.

Wiltshire Biodiversity Action Plan

4.5. The Wiltshire Biodiversity Action Plan was published in 2002 and reviewed in 2008 by the Wiltshire Wildlife Trust and over 40 delivery partners who make up the Wiltshire Biodiversity

Action Plan Partnership. It includes habitat action plans for 11 of the most significant of the UK Priority Habitats in Wiltshire, which include woodland, wood-pasture, parkland and ancient trees, hedgerows, calcareous grassland, neutral grassland, traditional orchards, farmland habitats, built environment, standing open water and rivers, streams and associated habitats. In addition, a bat species action plan has also been included, covering all bat species found in Wiltshire, while other priority species have been included under the appropriate habitat action plans.

4.6. The Wiltshire Biodiversity Action Plan species list includes species that have national priority and also specie having local importance in Wiltshire including county notables. A total of 260 species have been included on the Wiltshire Biodiversity Action Plan species list.

4.7. The Wiltshire Biodiversity Action Plan aims to achieve the following:

4.7.1. Enable prioritisation and define actions for priority habitats and species in Wiltshire;

4.7.2. Create a plan of action that can be delivered through a partnership of statutory, private and third sector organisations;

4.7.3. Provide a baseline of current knowledge and a tool to help monitor key habitats and species; and

4.7.4. To link objectives, targets and actions to report nationally and enable conservation work carried out in Wiltshire to contribute to national targets and reporting.

4.8. In 2012, a landscape scale framework for conservation in Wiltshire was developed, identifying 11 Landscape Biodiversity Areas across Wiltshire and Swindon, made up of a number of priority habitats, designated sites and other areas of conservation significance. This aims to encourage landscape scale planning for species and habitat conservation across Wiltshire.

5. METHODOLOGY

Desk Study

5.1. A desk study was undertaken for designated sites and bat species and habitat records within 1 km of the site:

- The MagicMap website was reviewed, to obtain information on any designated sites of nature conservation interest within 1 km of the site and details of any EPS licences issued within 1 km;
- The Wiltshire Planning Portal was searched for past and pending planning applications that may have associated ecological documents detailing results of bat surveys; and
- A data search was requested from Wiltshire and Swindon Biodiversity Records Centre for non-statutory designated sites, and protected and notable species within 1 km; and
- Google Maps and Ordnance Survey (OS) Leisure Maps was utilised to view aerial photographs, maps and mapnik data, and to assess the ecological context of the site within the wider landscape.

Building Inspection

5.2. Consultant Ecologist Jessie Forster and Assistant Ecologist Elen Peel conducted a building inspection at the site at Berrybrook Farm on 06/04/2023 in accordance with the following methodology:

External Survey

5.3. An investigation was carried out of external features with potential for use by roosting bats, such as gaps under roof and ridge tiles, gaps at soffit boxes or fascias. A search for bat droppings was made beneath each potential entry/exit point identified where accessible. The surveyor used binoculars and powerful, low-heat LED torch.

Internal Survey

5.4. An investigation was carried out of the roof void (including the floor and walls) for signs of bats roosting and the access potential into the roof void for bats. The surveyor looked for bats, bat droppings, likely access points, signs of feeding, dead bats, scratch marks and staining, and made a suitability assessment of the structure of the roof.

6. SURVEY RESULTS

Desk Study

6.1. There is one statutory designated site within 1 km of the site. There are three non-statutory sites within 1 km of the site.

Table 2: Statutory designated sites within 1 km of the site at Berrybrook Farm.

Designated sites	Name and designation type	Reason for designation	Approximate distance from site
Within Site Boundaries	There are no designated sites within the site boundaries		
Within 5km of Site	Cranborne Chase & West Wiltshire Downs (AONB)		1 km East
	Hayes Copse (Local Wildlife Site)	A small stand of ancient semi-natural broadleaved woodland.	200 m South
	Dewdown Copse (Local Wildlife Site)	A small stand of ancient semi-natural broadleaved woodland.	500 m South West
	Semley Common (Local Wildlife Site)	Habitat mosaic; includes hay meadows, other neutral grasslands, scrub woodland, small wet areas and ponds.	1 km East

6.2. The site is not present within a SSSI impact zone.

6.3. There are two records of EPS licences recorded on Magic Maps for licensable works impacts bat roosts within 2 km of the application site.

- EPS mitigation licence onsite (2022-60545-EPS-MIT).
- EPS licence (2020-45141-EPS-MIT) to allow damage to a resting place of brown long-eared bats, common pipistrelles and serotines and brown long-eared bats in their roosts approximately 850 m north west of site.

6.4. There are two areas of priority deciduous woodland site at Hays Copse (225 m south) and. Deadown copse (450 m south east), these areas of woodland are also Ancient Woodland and registered on the National Forest Inventory (Woodland - Broadleaved).

6.5. There are no further priority habitats present within 1 km of the site.

Building Inspection

Barn D

6.6. This structure is a brick built barn, with a steel frame and steel beams. The western wall is composed of breeze blocks, it is well mortared with no gaps present. The western wall has climbing plants growing against it. Wood piles were found to the north of the barn. The barn is used to store machinery (diggers and tractors) which are used regularly.

6.7. An old bird nest was recorded under the corrugated roof in the barn, and thus it has confirmed suitability for breeding birds.

6.8. Overall, this building is considered to have **Negligible** suitability for roosting bats.

Barn F

6.9. Barn F is an open fronted agricultural barn. Composed of a single skin of breeze blocks, with a steel frame, and has a pitched corrugated, composite panelled roof. Rat droppings were found on the floor of barn. The barn is very exposed to light, this is due to it being open fronted and light coming through the open front and light panels in the ceiling.

6.10. A birds nest was found on a wooden beam inside the barn, and thus it is confirmed suitability for breeding birds.

6.11. Overall, this building is considered to have **Negligible** suitability for roosting bats.

Barn K

6.12. This barn is composed of two halves of an open fronted barn. The lower section of the barn is composed of breeze blocks, the top section is composed of a single skin of wood panelling with gaps present. The roof is comprised of corrugated composite panelles. Piles of wood are present within the barn.

6.13. Overall, this building is considered to have **Negligible** suitability for roosting bats.

Limitations

6.14. Full access was provided to external and internal areas of Barns D, F and K during the survey.



Barn K



Barn K



Barn D



Barn D



Barn D



Barn D



Barn F



Barn F



Barn F



Barn F



Barn F



Barn F



Barn K



Barn K

7. DISCUSSION AND RECOMMENDATIONS

Designated Sites

7.1. The proposals are not anticipated to impact any nearby designated sites, as they are sufficiently well separated from the site.

Status of Bats on Site

7.2. The buildings surveyed (Barns D, K and F) offer **negligible potential** for roosting bats, during the PRA no bat droppings were recorded in these barns and no evidence of bats was recorded. Therefore no further surveys pertaining to bats are required for these buildings.

7.3. Previous surveys carried out by Darwin Ecology on site have confirmed roosts are present in other buildings onsite; Surveys in 2021 confirmed the Farmhouse to support low level day roosts for serotine, brown long-eared bat, common pipistrelle, and whiskered bats. Works have since been carried out under licence on the Farmhouse building (2022-60545-EPS-MIT). Surveys in 2022 confirmed Barn B to support low level day roosts for brown long-eared, lesser horseshoe and soprano pipistrelle bats.

Mitigation Recommendations

7.4. *Lighting:* Due to the presence of confirmed roosts within other buildings on site, any new external lighting should be directed to avoid light spillage onto vegetation, particularly linear habitat features such as woodland edges or potential roosting sites within trees and buildings. Bats are sensitive to light and could potentially avoid the area if access points or the surrounding areas become lit. Appropriate lighting options will prevent a negative impact on bats potentially using the habitats on site and should be approved by a suitably qualified and licensed bat ecologist. Lighting plans should be approved and signed off by a licensed bat ecologist prior to submission, to ensure the scheme is suitable for bats. If appropriate measures are taken to reduce light spillage from the development, it is likely that there will be no negative impacts on local bat populations.

7.5. See **Appendix 3** for further information on designing lighting to minimise impacts on bats.

Status of Breeding Birds on Site

7.6. During the PRA an old bird nest was recorded under the corrugated roof in the Barn D, and a birds nest was recorded on a wooden beam inside the Barn F, therefore these two barns have suitability for nesting birds.

7.7. The local records returned four records for two species; red kite and house martin. None were recorded to be breeding.

Mitigation Recommendations

7.8. Any works to the roof of the Barns D or F, or clearance of the vegetation on the exterior of Barn D have the potential to impact breeding birds should they be present at the time of works. Therefore it is recommended that works to these barns take place outside of breeding bird season if possible.

7.9. If works must take place during the breeding bird season (February - August inclusive), a pre-works check by a suitability qualified ecologist must be conducted to ensure that no active nests are present. If active nests are recorded, a suitable buffer will be retained around these until all chicks have fledged (to be confirmed by a suitably qualified ecologist).

8. ENHANCEMENT RECOMMENDATIONS

8.1. National planning policy states that all developments should seek to enhance onsite biodiversity whether impacts on protected species are recorded or not. Incorporating enhancement features into new or renovated buildings should be carefully considered. These features can be simple and inexpensive, please see below for specific recommendations.

Bats and Birds

8.2. The addition of tree mounted bat and bird boxes to mature trees or other buildings on site would provide additional opportunities for roosting bats and nesting birds.

Wildlife Beneficial Landscaping Scheme

8.3. Any future landscape planting should seek to enhance biodiversity, improve connectivity to the surrounding habitats and provide food and shelter for a wide range of wildlife. All amenity planting and formally landscaped areas should be designed using a variety of plant species beneficial for wildlife. These do not necessarily have to be native but should be chosen for their ability to provide nectar or fruit and should be non-invasive species. There are a number of specialist seed mixes available specific to certain soil types, growing conditions and designed to benefit different groups of species such as bees or butterflies and moths.

8.4. All habitats should be managed in a suitable way to encourage a wide variety of insects and other wildlife to use the site.

8.5. Further information regarding habitat creation, enhancement and management can be provided on request and submitted with further survey results for the final planning application.

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APPENDICES

APPENDIX 1 - SURVEY LIMITATIONS

Appendix 1:
SURVEY AND REPORTING LIMITATIONS AND EXCEPTIONS

This report and its survey results should be considered in conjunction with the terms and conditions proposed and scope of works agreed between Darwin Ecology Ltd and the client.

This report has been produced in the context of the proposals stated in the Introduction & Background section of this report (Section 2) and should not be used in any other context.

Darwin Ecology Ltd have endeavoured to identify the likely presence / absence of protected species wherever possible on site, where this falls within the agreed scope of works. Current standard methodologies have been used, which are accepted by Natural England and other statutory conservation bodies. No responsibility can be accepted where these methodologies fail to identify all species or significant species on site.

Extended Phase 1 and Preliminary Ecological survey techniques provide a preliminary assessment of the likelihood of protected species occurring on the development site, based on the suitability of the habitats and any field signs found during the site visit. A Phase 1 survey should not be taken as providing a full and definitive survey of any protected species group.

Extended Phase 1 and Preliminary Ecological Appraisals represent a snapshot of conditions at the time of survey and are limited by factors which affect the presence of plants and animals such as the time of year, migration patterns and behaviour. Surveys should therefore not be considered a comprehensive list of all plant species or as conclusive proof that certain protected species are not present or will not be present in the future.

Where the presence/absence of a certain species is in question our ecologists must apply a precautionary approach until further survey data can be sought to better inform the decision.

Darwin Ecology Ltd will advise on the optimum survey season for a particular habitat or protected species prior to undertaking the survey work. Darwin Ecology Ltd cannot accept responsibility for the accuracy of surveys undertaken outside this period.

The potential impacts, mitigation and enhancement sections of the report provide an overview and is for guidance only. This section should not be solely relied upon, but should be considered in the context of the whole report.

Interpretations of survey results and recommendations outlined in the report represent our professional opinions, expressed in accordance with recognised industry practices and current legislation at the time of reporting. The results of survey work undertaken by Darwin Ecology Ltd are representative at the time of surveying.

Where the client had supplied us with data from previous reports, it has been assumed that this information is valid. No responsibility can be accepted by Darwin Ecology Ltd for inaccuracies within any previous data supplied.

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Amendments to this report after its submission may be necessary in light of new, relevant information and / or legislation. This report should be referred to us for re-assessment if any such amendments are necessary or after the expiry of one year from the date of the report.

APPENDIX 2 - BATS & LIGHTING

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Bats & Lighting



THE IMPACT OF LIGHTING ON BATS

Bats favour a dark environment for both roosting and foraging as they are adapted to low-light conditions. Artificial lighting will disturb bats if the lighting covers roost access points, flight paths or foraging habitats.

The main peak of nocturnal insect abundance occurs at dusk and a delay in emergence results in a lower foraging rate for bats.

Artificial lighting creates a 'vacuum effect' for nocturnal insects. During the night nocturnal insects use the light of the moon* to navigate. However, artificial lighting and even sky glow above cities obscures the natural moonlight as it is closer and radiates light in multiple directions.

Some species of bats have been recorded foraging around street lights such as Pipistrelle species and Nyctalus species. However, species that are less tolerant of artificial light are at a disadvantage when foraging as insects are drawn away from these species usual foraging grounds into the zones of artificial light.

Lighting must be considered in context to any development as increased lighting may cause roost abandonment, reduced reproductive success, and reduced foraging. Mitigation to reduce the impacts of lighting for bats is therefore of great importance in bat conservation.

Table 1: Summary of predicted impact of lighting for each species/genus

Impact / Behaviour	High	Medium	Low
Maternity roost	All species	-	-
Night roost	*Rhinolophus hipposideros* *Rhinolophus ferrumequinum* *Myotis* spp. *Plecotus* spp.	*Pipistrellus* spp. *Nyctalus* spp. *Eptesicus serotinus* *Barbastella barbastellus*	-
Emergence	All species	-	-
Foraging	*Rhinolophus hipposideros* *Rhinolophus ferrumequinum* *Myotis* spp. *Plecotus* spp.	-	*Pipistrellus* spp. *Nyctalus* spp. *Eptesicus serotinus* *Barbastella barbastellus*
Commuting	*Rhinolophus hipposideros* *Rhinolophus ferrumequinum* *Myotis* spp. *Plecotus* spp.	-	*Pipistrellus* spp. *Nyctalus* spp. *Eptesicus serotinus* *Barbastella barbastellus*
Swarming	All species	-	-
Hibernation	All species	-	-

*For more information see Warrant, E., and Dacke, M. (2016) Visual Navigation in Nocturnal insects. *Physiology*, 31, 182-196.

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Bats & Lighting

Sources of light that can disturb bats include; light spill via windows, sport floodlighting, car headlights, roadside lighting, security lighting, aesthetic lighting of waterways, and aesthetic illumination of buildings. Glare will affect bats over greater distance than the target area directly illuminated.

Avoidance is the most effective method, but if this is not possible the following measures should be considered.

What lighting should I use?

- Low pressure sodium lights or 'warm' LEDs
- Wavelength above 540nm
- Colour temperature below 2700K
- Shielded lights that prevent light spill above a 70 degree angle
- Passive infrared (PIR) motion sensors





What to avoid:

- Lighting roost entrances, flightpaths, and foraging or commuting routes
- Reflective surfaces beneath lighting
- High level lights
- Non-directional lighting

Lighting should be considered at an early stage allowing impacts to be minimised through the design of the site.

Key Points

- Keep lighting intensity to the minimum level required
- Limit the times that lights are on to provide some dark periods (e.g. switching installations off between midnight and 5am)
- Dim lighting according to demand
- As an alternative to lighting pathways use paving materials that reflect moonlight
- Low level lighting allows darkness to be retained within higher vegetation
- Set dark habitat buffers - lighting should always be a minimum of 25m from vegetated margins and 40m from waterbodies
- Incorporate dark corridors within the site
- Compensate for the loss of dark areas by enhancing other dark areas
- Consider building design - install internal lighting away from windows

Bat Conservation Trust guidance note 08/18 'Bats and artificial lighting in the UK & http://www.cost-lonne.eu/recommendations/

T: 01252 413221 / 07748 843842 E: info@darwin-ecology.co.uk

APPENDIX 3 - ENHANCEMENTS

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External Bat Boxes



TYPES OF BAT BOXES



Schwegler 2F Double Front Panel

- Manufactured from long-lasting woodcrete
- Lifetime - 20-25 years
- Suitable for pipistrelle and Myotis species
- A second inner wooden panel is fitted adjacent to the front panel imitating a cavity wall



Schwegler 1FD Double Front Panel

- Manufactured from long-lasting woodcrete
- Lifetime - 20-25 years
- Suitable for pipistrelle and Myotis species
- A second inner wooden panel is fitted adjacent to the front panel imitating a cavity wall
- Small entrance hole discourages birds from using the box



Vincent Pro Bat Box

- Manufactured from timber and recycled plastic
- The front and the top of the box is black, which helps heat absorption
- Suitable for a range of species including pipistrelle species, Myotis species, and brown long-eared bats.
- No maintenance required



Schwegler 2FN

- Manufactured from long-lasting woodcrete
- Lifetime - 20-25 years
- Suitable for pipistrelle species, Myotis species, serotine, brown long-eared, noctule and Leisler's bats
- Dual entrance
- Birds and dormice have also been found using this box
- A newer model is now available, Schwegler 3FN, designed with smaller entrance holes which discourage birds and dormice

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External Bat Boxes



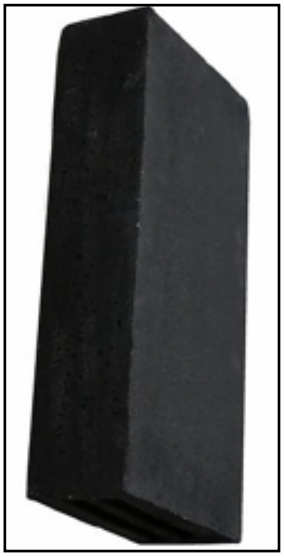
Schwegler 1FS Large Colony Box

- Manufactured from long-lasting woodcrete
- Lifetime - 20-25 years
- Suitable for a range of bats including pipistrelle species, Myotis species, Noctule, and brown long-eared bats
- Three grooved inner wooden panels are connected to the front panel, which are ideal for bats to cling to.
- Accommodates large summer colonies



Schwegler 1FF Colony Box

- Manufactured from long-lasting woodcrete
- Lifetime - 20-25 years
- Suitable for a range of crevice dwelling bats including pipistrelle species, barbastelle, noctule, and brown long-eared bats
- Rough wooden surface for bats to cling onto and climb



Greenwoods Ecohabitats Small Hollow Bat Box

- Manufactured from long-lasting ecostyrocrete
- Lifetime - 20-25 years
- Suitable for a range of bats preferring a cavity space, including pipistrelle species, myotis species, noctule, and brown long-eared bats
- Suitable for hibernating bats

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Bird Boxes



TYPES OF BIRD BOXES



Vivar Pro Seville 32mm WoodStone Nest Box

- Manufactured from woodstone - increases longevity and provides a consistent internal temperature
- The nest box compensates for the lack of natural cavities that are found in trees
- Suitable for blue tits, tree sparrows, house sparrows, great tits, crested tits, nuthatches, coal tits and pied flycatchers
- Should be installed between 1.5m and 3m high



House Martin Nest Cups



Swallow Nest Bowl

- Suitable nest building mud is difficult for house martins and swallows to find
- Alterations to house construction and roof design have resulted in a decrease of suitable nesting sites
- Install swallow nest bowls within an outbuilding or garage that has flight access - 6cm below the ceiling
- Install house martin nest cups under the eaves of a house - minimum of 2m high



“Universal’ Swift Nest Box

- Swift numbers are declining partly due to a loss of nesting sites
- Install a minimum of 5m high with unobstructed airspace in front of the nest
- Non- Integrated models of swift nest boxes are also available
- Can be used by a wide variety of migratory birds

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Bird Boxes



5KL Schwegler Nuthatch Nest Box

- Manufactured from woodcrete
- Nuthatches prefer nest boxes with larger cavities. They will often occupy owl nest boxes and fill the entrance hole with mud reducing the size to approximately 32mm
- Nuthatches plaster mud on the internal walls of the cavity and line the floor with wood chipping and leaves to nest
- To discourage nuthatches from using owl nest boxes try installing the 5KL immediately adjacent



Open-fronted Nest Box

- Manufactured from woodstone - lifetime of 20-25 years
- Suitable for robin, wren, spotted flycatchers, and black redstart
- Best installed hidden from view on the wall of a building or hidden within ivy/honeysuckle as the boxes open-front may attract predators
- Install at a height of 1-3m



Sparrow Terrace Next Box

- Sparrow populations are decreasing due to a lack of nesting sites
- Sparrows are a sociable species and prefer to nest in a colony
- Likelihood of uptake is increased if more nesting chambers are available (the example nest box shown contains three nesting chambers)
- Various other nest box designs are available
- Install at a minimum of 2m high



Tawny Owl Nest Box

- Install on a mature tree within a woodland (not on the outskirts)
- Install a minimum of 3m high
- Face the box entrance away from prevailing wind (generally avoiding west/south-west)



Little Owl Nest Box

- Prefer areas of mixed farmland and orchards
- Essential features; small entrance hole (70mm), narrow tunnel, and a dark nesting chamber
- Install on a horizontal tree branch/wall top or beam so that owlets can walk in/out prior to fledging
- Can be installed on any tree species apart from cherry - the cherry harvest coincides with the little owl breeding season
- Entrance hole should face the tree trunk
- Install at a minimum height of 3m

T: 07748 843842 E: info@darwin-ecology.co.uk