Charnia Ecology

Protected species and habitat surveys

Preliminary Roost Assessment

&

Bat and Bird Activity Survey Report



The Lodge, Mill Road, Oakamoor,

Staffordshire. ST10 3AG.

May 2015

Notice to readers

This report has been prepared by Charnia Ecology with all reasonable skill, care and diligence, within the terms of the contract with the client. The actions of the surveyor on site and during the production of the report were undertaken in accordance with the Code of Professional Conduct for the Chartered Institute of Ecology and Environmental Management (www.ieem.org.uk).

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Client: Mrs & Mr. Linda and Bryon Moore, The lodge, Mill Road, Oakamoor. ST10 3AG

Postcode/ OS Grid Ref: SK 0521 4451

SMDC Planning Ref: SMD/2014/0085; 0086 & 0087

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Non-technical summary

Report rationale

i. This report has been prepared at the request of the client, Mrs & Mr. Linda and Bryon Moore, in relation to the identification of protected bat and bird species at The lodge, Mill Road, Oakamoor. ST10 3AG (OS grid reference SK 0521 4451). The site is located on a north sloping woodland valley embankment, overlooking the River Churnet in the rural village of Oakamoor in North Staffordshire, and comprises of a steel frame, single concrete block bunk barn known as “The lodge”, and a large pre-fabricated, steel-frame agricultural shed building.

Background

ii. The proposed planning application considers the demolition of two existing buildings (B1 'Bunk House' and B2 prefabricated agricultural shed), and redevelopment of sustainable Ecobuild house/cookery school and two guest lodges.

Desk top study

iii. The application area is situated in woodland in the Churnet Valley, which is designated an Area of Outstanding Natural beauty (AONB). The surrounding habitat provide ample opportunities for foraging and roosting bats and birds, with excellent connectivity to the wider landscape considered. Pre-survey data search shows six locally protected designated sites within 1-2km of the survey area

Presence/absence activity surveys

iv. Two dusk emergence and one dawn re-entry bat activity survey were carried out during optimal survey periods in May 2015. Activity surveys combined an overall assessment of any *in-situ* roost onsite, and any other EVRs considered to be within the Zone of Influence of the development. All activity surveys were undertaken in accordance with the guidelines published by the BCT (2007) 2nd edition 2012 to ascertain the following:

Ecology of bat species onsite

v. Overall bat activity was considered as being low, with only a small number of bat passes (N=32) recorded intermittently foraging onsite, over short durations, during the entire survey period. Transient species recorded were Common Pipistrelle, Brown Long-eared bat and Noctule bat.

vi. **NO** bats were seen emerging from any roost areas within the the application area itself.

Ecological value of building unit(s)

vii. **BUILDING B1** was deemed as having **LOW TO MODERATE** ecological value overall, and considers an abandoned male summer roost that has formerly been utilized by a small population (N<10) of Common pipistrelle bat, and is now rendered defunct (due to potential re-roofing works undertaken prior to current ownership, or possible natural relocation by bats).

viii. **Building B2** was assessed as having **LOW** ecological value overall, being considered wholly unsuitable in fabrication, and lacking features for permanent roost uptake.

ix. Building B1 may have some potential as a transitional Satellite roost for individual Common pipistrelle, although **NO** bats were confirmed emerging or re-entering either of B1 or B2 during the entire survey period, and **NO** active roost(s) was recorded on-site.

x. No evidence of nesting birds including Barn Owl *Tyto alba* was recorded onsite or within buildings subject to demolition, thus **NO IMPACT** to birds is predicted and no further recommendations are considered.

Impact assessment

xi. Based on destruction rating of Buildings, impact to roosting bats is deemed as being **LOW TO MODERATE** for Building B1 (Bunk barn), and **NEGLIGIBLE** for Building B2.

xii. The application area is located within an ecologically sensitive AONB which provides good connectivity for commuting bats. Due to the scale of the proposed development however, overall impact on bat foraging and commuting paths is is considered as being **LOW**, although proposed works should be sensitive to potential disturbance of adjacent habitats (particularly the adjacent river corridor and woodland backing onto Oakamoor Railway tunnel which is a known bat roost).

Mitigation Licence

xiii. As **NO** bats were recorded roosting within Building B1 and Building B2, it will **NOT** be necessary to apply for a European Protected Species (EPS) licence from Natural England **subject to site safe-guard conditions,** which should be stringently adhered to, in-order to minimize any potential negative impact to individual bats that may utilize the site temporarily over time.

Recommendations & Conditions (see section 6.4)

- **Onsite supervision:**
- **Timing of works:**
- **Roost compensation;**
- **Lighting:**
- **Scaffolding:**
- **Biodiversity enhancement:**

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1. INTRODUCTION

1.1 Site description

1.1.1 This report has been prepared at the request of the client, Mrs & Mr. Linda and Bryon Moore, in relation to the identification of protected bat and bird species at The lodge, Mill Road, Oakamoor. ST10 3AG (OS grid reference SK 0521 4451). The site is located on a north sloping woodland valley embankment, overlooking the River Churnet in the rural village of Oakamoor in North Staffordshire, and comprises of a steel frame, single concrete block bunk barn known as "The lodge", and a large pre-fabricated, steel-frame agricultural shed building.

1.1.2 Further to requests by Staffordshire Moorland District Council (SMDC) a Preliminary Roost Assessment (scoping survey) of the proposed application area was initially undertaken on 6th May 2015, whereby evidence of bats was found inside the building. Subsequently, additional Stage 2 bat and bird activity surveys were carried out during May 2015 to fully establish presence or absence of protected bat and bird species within the application area.

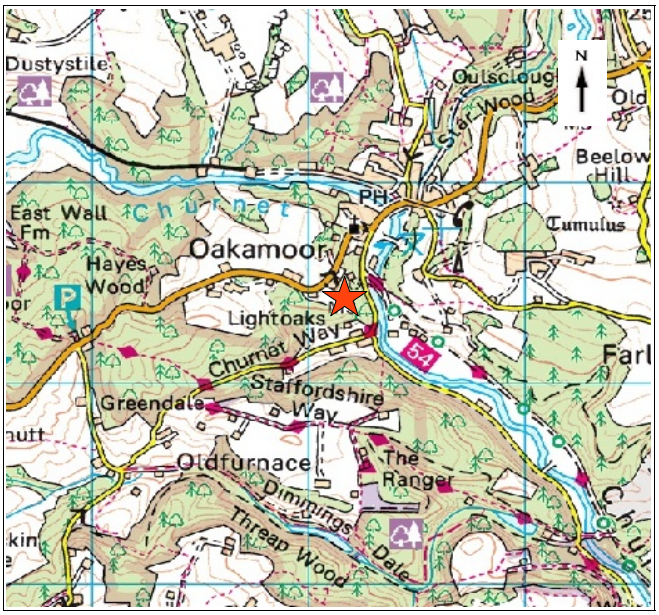

Figure 1. Location of "The Lodge" in context to the surrounding landscape (source:www.gridref.org.uk).

1.2 Proposed works

SMDC Planning application reference(s): SMD/2014/085; SMD/2014/0086; SMD/2014/0087

1.2.1 The proposed planning application considers the demolition of existing buildings and creation of sustainable Ecobuild of a house/cookery school and two guest lodges. It is understood that the proposed house/cookery school is to be retained within the existing footprint of the current bunk barn building.

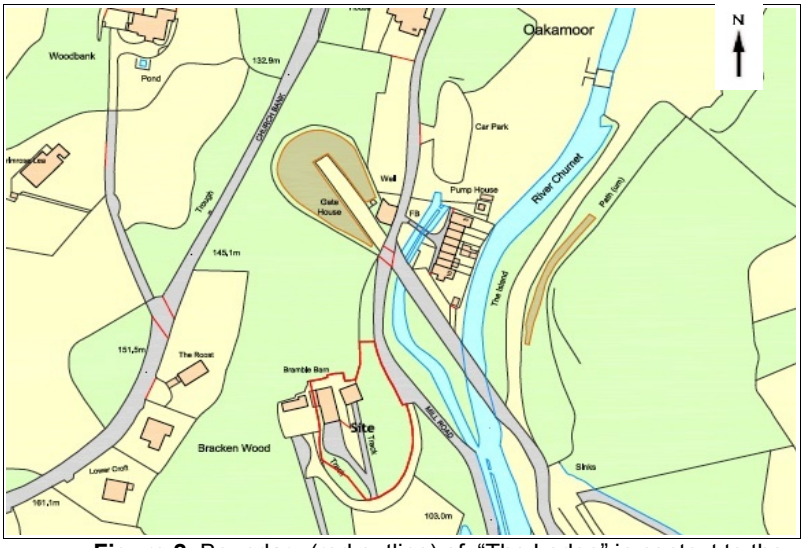

Figure 2. Boundary (red outline) of "The Lodge" in context to the surrounding landscape.

1.3 Aims of survey

1.3.1 The aims of the Preliminary Roost Assessment and bat and bird activity surveys was to provide an ecological evaluation of the following species within the proposed application area, in order to establish:

Bats
• Probability of bats and their roost sites being present at the proposed redevelopment site i.e. buildings and trees
• To assess the roost status should bats be present.
• To assess commuting and foraging habitat that may be subject to impact from proposed development.
• To provide an overall impact assessment.

Table 1. Aims of survey in relation to bats.

Birds
• Establish if birds are using the site.
• Locate nest sites, if present.
• Assess what types of activities were shown within the redevelopment site.
• Assess suitable food resources and habitat requirements.
• Provide an impact assessment, if nests are found.

Table 2. Aims of survey in relation to birds.

Barn Owl (*Tyto alba)*
• Establish presence onsite.
• Establish potential nest sites (PNS).
• Locate any active roost sites (ARS).
• Locate any temporary roost sites (TRS)
• Assess potential feeding and dispersal habitats (PFH)
• Provide an impact assessment, should barn owl(s) be present

Table 3. Aims of survey in relation to Barn Owl.

1.3.2 Assessment also considers potential effects on valued ecological receptors (VERs) and zones of influence (ZoI) during pre and post development, both onsite and off- site. The term Zone of Influence is used to describe the geographic extent of potential impacts of a proposed development. Should a likely significance of negative impacts be identified, further surveys, mitigation and enhancement measures will then be determined accordingly; to prevent, offset or reduce the degree of impact that may occur should development commence.

1.3.3 Should bats be present onsite, then a European Protected Species (EPS) development license issued by Natural England (NE) may be required prior to any works taking place. If required, further presence/absence survey should be undertaken and a mitigation strategy be implemented with Natural England and the Local Planning Authority. Should no further surveying effort be considered, then the PEA report will include full justification and evaluation.

2.0 SURVEY METHODOLOGY

2.0.1 The aims of this activity survey report is to provide an ecological evaluation of the site in relation to protected bats and birds and considered appropriate to achieve the aims and objectives discussed in this report. All surveys were conducted in accordance with BCT 2nd edition (2012) guidelines, and used to determine the following:

- What impact is the development likely to have on any protected species found at the site.
- The need for any Natural England development licence application to be made in respect of activities concerning protected species.
- Recommendations for any mitigation measure requirements.

2.1 Summary of survey methods

2.1.1 Due to evidence of bat droppings found in both building structures during the initial scoping survey on 6th May 2015, two dusk emergence and one dawn re-entry bat activity survey were undertaken during May 2015, to provide an ecological evaluation of the site in relation to it's suitability for bat and bird utilization. The surveys were carried out in full accordance to BCT 2nd edition (2012) guidelines for bat and bird activity surveys of buildings and built structures. No constraints were encountered during the survey period. The following survey methodology is considered appropriate to achieve the required aims and objectives:

2.2 Pre-survey data search

2.2.1 Ecological records were requested from the local ecological records centre (Staffordshire Ecological Record. Pre-survey data search provided historical records of any protected bat and bird species found within a 2km radius of the application area. Additional ecological data has been sourced to understand any constraints that the proposed planning application may have on species and habitat in the wider landscape. The National (UK) and local (Staffordshire Churnet Woodlands) Biodiversity Action Plans (BAPs) were also scrutinized for protected habitats and species relevant to this site.

2.2.2 A desktop study of the area using on-line resources was undertaken independently to corroborate the current over-view of the site and its importance in the landscape. A number of electronic sources sites were consulted including; www.magic.gov.uk; www.naturalengland.org.uk; Google Earth and www.ordinancesurvey.co.uk.

2.3 Surveyor Information

2.3.1 Ecological assessment on-site was conducted by a Natural England licensed bat ecologist (CLS00836 – Level 2) and member of the Chartered Institute of Ecology and Environmental Management (CIEEM). The principle ecologist onsite has specialized in bat ecology for over six years and is actively involved in scoping, presence/absence surveys, and method statement preparation with regard to planning and the law. He has a First Class Honours degree in Conservation of Biology and awarded the Vice-Chancellor prize for academic excellence. He is also an associate lecturer in ecological sciences at the University of Derby, and has undertaken a number of BCT training courses and conferences concerning bat ecology, bats and the law, mitigation and echolocation sound analysis. He is a member of the Bat Conservation Trust (BCT) and Derbyshire Bat Conservation Group (DBCG).

2.4 Field Surveys

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Inspection of Hibernation roosts- semi optimal survey			Limited activity-sub optimal	Summer roost emergence & re-entry surveys -Optimal survey period					Limited activity -sub optimal	Hibernation roosts - semi optimal survey	
Internal roost surveys are possible / Trees are best surveyed during Winter											

Table 4. Annual survey optimality for bats.

2.4.0 All field surveys were conducted during an optimal period of the bat surveying season and with sufficient intervals between surveys to allow for any stochasticity over space and time. Weather conditions were optimal throughout all survey periods (Temp: >8°C / dry conditions). Assessment incorporated the use of binoculars, torch, endoscope and ladders where necessary. There were no constraints encountered during the survey period

2.4.1 Habitat survey

2.4.1.1 A walkover survey assessed habitat both onsite and in the wider landscape with regard to suitable resources for any protected bat and bird species in the immediate area, giving consideration to roosting bats and/or any important bat commuting/foraging areas that may be affected by the proposed development..

2.4.2 Roost surveys

2.4.2.1 An initial Preliminary Roost Assessment (Scoping survey) was undertaken by Charnia Ecology on the 6th May 2015 in accordance to BCT survey guidelines. Any potential roost structures (i.e. buildings) onsite or within the Zone of Influence (ZoI) of the proposed development were assessed both externally and internally, based on standard methodologies set out by Natural England, the Bat Conservation Trust (BCT) and the Joint Nature Conservation Committee (JNCC). The survey criteria considered the following:

- Type and age of building
- Type and condition of construction
- Potential roost features (e.g. missing roof tiles, raised tiles, roof voids)
- Potential ingression points in-and-around the building(s) (e.g. broken windows, missing windows and doors / ridges and apex of the buildings)
- Evidence of bats (e.g presence of live or dead bats, droppings, grease marks, urine stains, feeding remains, characteristic odour
- Evidence of nesting birds (including Barn Owl).

Bat Roost Categories

2.4.2.2 A bat roost is interpreted as 'any structure or place, which any wild bat uses for shelter or protection' (i.e. buildings, trees, bridges, tunnels etc.). Bats tend to show a high fidelity to roosts. Subsequently, legal opinion regards a roost to be protected whether or not the bats are present at the time. There are many types of roost used by temperate bats during their annual cycle: Any structures found having evidence of bats will be further evaluated to assess which of the following roost categories may be present onsite (if any):

Status	Description
Maternity / Nursery Roost	*used by breeding bats, where pups are born and raised to independence (Anecdotal evidence may support this prospect despite sub-optimal survey period).*
Hibernation Site	*where bats may be found during the winter. (This is assessed within the context of this report).*
Satellite Summer Roost	*used by males and/or non-breeding females (Seasonal limitations prevent robust analysis of this).*
Night Roost	*where bats rest between feeding bouts during the night but are rarely present during the day.*
Feeding Roost	*where bats temporarily utilize feeding perches and stations to eat an item of prey.*
Transitional (or Swarming) Site	*where bats may be present during the spring or autumn (This can not be assessed within the context of this report).*

Table 5. Bat roost status definitions

Building Rating

2.4.2.3 In the absence of any evidence, trees and structures were assigned a rating of suitability from negligible to high potential for supporting bats. The rating is based on the number and type of features suitable for use by bats (such as rot holes, cavities and raised bark), location of the structure in the surrounding landscape and surveyor's experience. (For example; a structure with a high level of regular disturbance with few opportunities for access by bats, that is in a highly urbanised area with few or no mature trees, parkland, woodland or wetland would generally equate to having negligible potential. Conversely, a pre 20th century or early 20th century building with many features suitable for use by bats close to good foraging habitat would have high potential).

2.4.3 Activity surveys

2.4.3.1 Two dusk emergence and one dawn re-entry bat activity survey were considered appropriate based on the nature of the development (i.e. demolition), and evidence of roosting bats during the PRA scoping assessment. All surveys were carried out during optimal survey conditions. Activity surveys combined an overall assessment of any *in-situ* roost onsite, and any other EVRs considered to be within the Zone of Influence of the development. All activity surveys were undertaken in accordance with the guidelines published by the BCT (2007) 2nd edition 2012 to ascertain the following:

- Determine the presence/absence of bat species onsite
- Determine the intensity of bat activity both spatially and temporally
- Determine the type of activity i.e. foraging (by feeding buzzes); commuting (by high directional pass rates); mating (by mating social calls)
- Find roosts by tracking back bat flight paths or observing commuting range.

Dusk emergence bat survey

2.4.3.2 The object of this survey is to detect active bats leaving possible roost sites identified in the external and internal surveys. This was achieved by:

- Being at the site 1 hour before sunset.
- Listening for social calls at potential roost sites.
- Standing at different transect points around the buildings, to record any emerging bats and egress points.
- Standing at different transect points to assess foraging/commuting areas.
- Carrying out survey up to 1.5 - 2 hours after sunset to holistically consider interspecific differences between different bat species

Dawn re-entry bat survey

- Being at the site 2 hours before sunrise.
- Listening for social calls at potential roost sites.
- Standing at different transect points around the buildings, to record any swarming behaviour around potential re-entry points.
- Standing at different transect points to assess foraging/commuting areas.

2.4.3.3 Evidence will be used to determine whether a European Protected Species (EPS) licence will be required to ensure legal compliance during development. This will also include identifying which mitigation measures [if any] would be most appropriate.

Weather conditions and timing

2.4.3.4 All surveys were carried out during optimal survey conditions:

Survey 1: Dusk emergence			Date: 13.05.2015
Temp Start	11.7°C	**Cloud Cover Start**	85%
Temp Finish	10.2 °C	**Cloud Cover Finish**	85%
Humidity Start	67.7%	**Wind Speed Average**	Nil <1
Humidity Finish	69.2%	**Precipitation**	Nil
Survey 2: Dawn Re-entry			**Date:15.05.2015**
Temp Start	8°C	**Cloud Cover Start**	80%
Temp Finish	10.5°C	**Cloud Cover Finish**	60%
Humidity Start	69.5%	**Wind Speed Average**	Nil <1
Humidity Finish	68.9%	**Precipitation**	Nil
Survey 3: Dusk emergence			**Date: 20.05.2015**
Temp Start	10.8°C	**Cloud Cover Start**	55%
Temp Finish	8.5°C	**Cloud Cover Finish**	60%
Humidity Start	69.5%	**Wind Speed Average**	Nil <1
Humidity Finish	71.9%	**Precipitation**	Nil

Table 6. Abiotic variables during survey periods.

Surveyor location

2.4.3.6 Due to an elevated aspect to the rear (north) of the building(s), two surveyors were considered sufficient to assess roosting potential of bats within the application area, being situated to the front and rear of both buildings. Bat ultrasound data was gathered using a number of heterodyne units (Batbox Duet and SSF Bat2) and real-time recording devices (EcoObs Batcorder). Real time recordings were subsequently analyzed using BatSound v4.03 and statistical algorithm analysis was carried out using EcoObs BcAdmi, BatIdent and BcAnalyze software to provide an unbiased discrimination of species onsite.



Figure 3: Location of bat detectors/surveyors (yellow) around structures proposed for redevelopment (red).

3. RESULTS

3.1 Pre-survey data search

3.1.1 *Designated sites*

3.1.1.1 The land is considered as being in an environmentally sensitive location, being situated in the Churnet Valley which is designated an Area of Outstanding Natural beauty (AONB).Staffordshire Ecological Records highlighted the presence of six locally protected sites within 1-2km of the survey area, ie:

Whiston Eaves	Site of Special Scientific Interest (SSSI): Hawksmoor Nature Reserve: an SBI broadleaved woodland; North-west of the site
Dimmings Dale & The Ranger	(SSSI) south-west of the site
Little Eaves Farm	(SBI): south west of the site;
Churnet Valley Railway	(SBI): broadleaved woodland with a railway and stream;
Orchard Farm	(SBI): south of the site, semi-improved neutral grassland;
Oakamoor village	Village has a retained BAS with three fields of semi-improved neutral grassland and areas of unimproved acid grassland;
Cotton Dell:	Staffordshire Wildlife Trust Nature Reserve. North-east of site.
Bath Pasture	(SSSI), North-east of site.
Oakamoor Railway Tunnel **ca.58m to the south of the proposed development area**	(SBI): An important consideration should be given to the adjacent, former railway tunnel which is recognized as an important winter hibernacula for a number of local bat species, situated ca.58m south of the site.

Table 7. Designated conservation site.

3.1.2 *Protected species*

3.1.2.1 SERs show that Seven British bat species are currently given UK BAP (2007) Priority Species Status. National Biodiversity Network and Staffordshire Wildlife Trust (SWT) records show that 11 of the 17 resident UK bat species occur in the county with three UK BAP species being recorded within 2km of the proposed application area (highlighted in grey):

UKBAP	Common name	Species	Recorded in County
☑	Brown long-eared bat	*Plecotus auritus*	☑
☑	Barbastelle bat	*Barbastella barbastellus*	☒
☑	Bechstein's bat	*Myotis bechsteinii*	☒
☑	Noctule	*Nyctalus noctula*	☑
☑	Greater horseshoe bat	*Rhinolophus ferrumequinum*	☒
☑	Lesser horseshoe bat	*Rhinolophus hipposideros*	☒
☑	Soprano pipistrelle	*Pipistrellus pygmaeus*	☑

Table 8. UKBAP Bat species recorded in Staffordshire.

3.1.2.2 A further four/five bat species that are not currently given UK BAP consideration are also recorded within the county.

UKBAP	Common name	Species	Recorded within the county
☒	Natterer's bat	*Myotis Nattereri*	☑
☒	Daubenton's bat	*Myotis daubentonii*	☑
☒	Whiskered/ brandt bat	*Myotis mystacinus/brandtii*	☑
☒	Common pipistrelle	*Pipistrellus pipistrellus*	☑

Table 9. Non UKBAP Bat species recorded in Staffordshire.

3.1.2.3 Pre-survey data show no records of Barn Owl within a 2km radius of the application area, although the environment is considered as being highly suitable.

3.2 Field surveys

3.2.1 Habitat Description

3.2.1.1 The site is immediately situated within a rural landscape dominated by a mosaic of Ancient Woodland Inventory, semi-natural woodland and plantations. Both buildings are located at elevation on a south facing valley side adjacent to Mill Road. The bunk barn has a footprint of ca.120m^2, with the adjacent pre-fabricated agricultural barn being ca. 100m^2 in coverage. The River Churnet is situated immediately to the east, with Bracken Wood situated immediately to the north elevations of the two buildings. A residential house is located immediately adjacent to the western boundary.

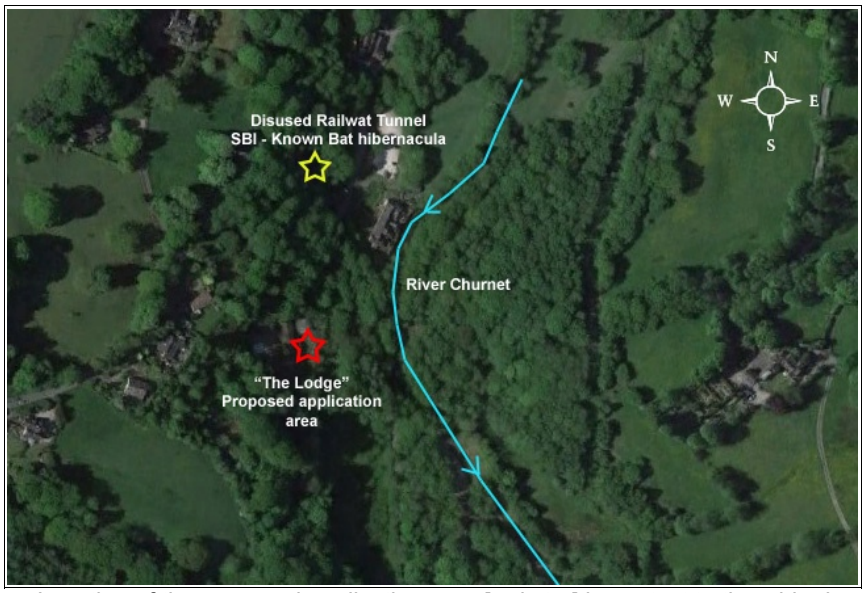

Figure 4. Location of the proposed application area [red star] in context to the wider landscape (A known bat hibernacula [yellow star] is recorded ca.100m due north

3.2.1.2 The surrounding environment beyond the development area comprises of a diverse range of habitats including pastureland, ancient woodland and deeply incised cloughs and valleys, with agricultural land and scattered trees. These habitats provide ample opportunities for foraging and roosting bats and birds, with excellent connectivity considered overall.

3.2.2 Roost survey

Roost suitability building rating: Building B1 - Bunk Barn ("The Lodge")

EXTERNAL INSPECTION



Figure 3. North-east elevation of Bunk Barn

The bunk barn (**Building B1**) is circa 1980's with a footprint of ca.120m^2. it is a single storey building constructed of single concrete block with wooden cladding around the exterior to give the appearance of a log-cabin. It has a pitched tiled roof and with wooden fascia boards, door and windows.

Whilst the roof appeared to be relatively well sealed with no major roofing tiles seen to be missing or lifted, the exterior wooden cladding provides an intermediate void behind the building, with numerous gaps evident. There was evidence of further gaps around the central apex area on gable ends which provide potential access into the internal roof void compartments.



Figure 4. Gaps present in upper apex region on northern gable-end, leading into roof void.

No evidence of bats or birds (including barn Owl) was recorded during the external inspection

INTERNAL INSPECTION



Figure 5. North facing roof void compartment

Internal inspection recorded a single roof void subdivided into two sub-compartments by a central supporting wall. Each roof void were comparable in dimensions (ca. 2.2m high x 9m x 8m) and found to be well ventilated, dry, with a degree of light ingress from sealed-over glass windows at gable-ends.

A breathable membrane is fitted to the underside of the roof and was found to be tight and well sealed, providing negligible ingress potential for bats. Conversely, there were a number of gaps around the upper apex area on the gable-end wall above a glazed window, which were partly blocked with polystyrene blocks.



Figure 6. Bat droppings in northern roof void

A number of bat droppings (N>50) were recorded liberally scattered across the majority of the floor level in the northern roof compartment. Droppings were considered as being relatively fresh (est. 2-3 seasons old). Samples were collected for further species analysis. Fewer droppings were recorded (<5) in the southern most roof void area.

ROOST RATING = BATS: MODERATE TO HIGH / BIRDS: LOW
- evidence of roosting bats confirmed in roof void compartment(s)

Roost suitability building rating: Building B2 'prefabricated agricultural building'	
EXTERNAL INSPECTION	**INTERNAL INSPECTION**
 **Figure 7.** South elevation of agricultural building	 **Figure 6. Bat droppings in northern roof void**
Building B2 is a former agricultural building ca.10m x 10m in overall dimension, and of a prefabricated steel-frame construction, with corrugated pitched roof and sheet-metal cladding. A large metal roll shutter is situated on the south gable-end. Apart from a side entrance door, there are no other doors or windows present. Due to the generally gappy nature of prefabricated builds, there were a number of potential ingression points recorded by way of broken/raised cladding + gaps around pinning points. NO evidence of nesting birds and/or Barn Owl was recorded.	Internal inspection finds a large, single ground-floor area which is open to roof height, with exposed steel frame brace work. The floor space is currently used for storage, and was seen to be well-illuminated by skylights to the roof area.. A small quantity of bat droppings (<4) were recorded on stored boxes towards the rear (north) of the building. Conversely, the overall fabrication of the building is not considered conducive to the thermoregulation requirements of bats in permanent summer roost, being prone to erratic temperature change, well-illuminated and lacking any noticeable roosting features. It is possible that bats may have entered the building when the roll shutter door has been left open during intervals. A possible satellite roost for low numbers of individual bats is tentatively speculated.
ROOST RATING = BATS: LOW / BIRDS: LOW Evidence of bats found / Low Potential for permanent roost uptake	

EVRs considered within the Zone of Influence

Bracken Wood

3.2.2.1 The application area is located in an environmentally sensitive Area of Outstanding Natural beauty (AONB). There are a number of mature trees and woodland blocks in close proximity to the proposed works area, that have potential for roosting bats and nesting birds. Whilst it is understood that no trees are to be removed during the course of the development, the proposed works should be sensitive to EVRs in the surrounding landscape (see recommendations).



Figure 5. "Bracken wood adjacent to rear (north) of buildings.

Oakamoor Railway Tunnel (SBI)

3.2.2.2 It is important to note that the former Oakamoor railway tunnel is located ca.100m due north-east. This 497yrds long, brick-lined tunnel is a designated Site of Biological Importance (**SBI**), and recognized as an important winter hibernaculum, with good potential for occasional summer-use/ Brown Long-eared bat, Natterer's bat and Daubenton's bat have been recorded overwintering within this structure in low numbers. Due to the scale of the proposed development, this SBI can be considered to be marginally outside the ZoI. Once again, proposed works should be sensitive to this and any commuting/foraging flight paths around adjacent habitat(s) (see recommendations).



Figure 6. The north-facing portal of the former railway tunnel and recognized bat hibernacula 100m due North.

3.2.3 Activity surveys

3.2.3.1 Activity surveys combined an overall assessment of any *in-situ* roost onsite, and any other EVRs considered to be within the Zone of Influence of the development. Particular focus was given to the buildings subject to demolition, whilst considering any important commuting and foraging routes used by bats.

Survey 1 – Dusk emergence

3.2.3.2 The first dusk transect survey was conducted half and hour before sunset and two hours thereafter. Low levels of activity were recorded transiently onsite, with a total of 16 bat passes recorded throughout the survey period. Peak activity occurred between 21:00 –21:50hrs, with Common pipistrelle recorded as the dominant species overall. A single bat was thought to have emerged from the northern gable-end section of bunk building at 21:24hrs, although this was **NOT** confirmed.

3.2.3.3 No echolocation was recorded/detected inferring a possible Brown long- eared bat (*Plecotus auritus*). However, due to low ambient light levels present, flight behaviour would suggest a potential non-echolocating Common pipistrelle. The bat was seen to vacate over the application area due south-east towards the River Churnet, which was noted as being the main conduit for commuting bats. All other bats activity was recorded as commuting and temporarily foraging in-and-around the application area but was not sustained. No pre-emergent flight bat species were recorded internally, and No evidence of Barn Owl was recorded.

Survey 1 – Dusk emergence				Date: 13.05.2015
Species	**Species discrimination Confidence**	**Bat passes recorded**	**Notes**	**Roost**
Noctule (*Nyctalus noctula*)	σ = 100%	*n* = 4	characteristically recorded commuting at height, shortly after dusk [21:00hrs]	NO
Common Pipistrelle (*Pipistrellus pipistrellus*)	σ = 100%	*n* = 12	observed foraging around the eastern boundary near to residential dwellings.	YES
Undetermined bat species	No data	No data	Single bat observed at 21:24hrs, around northern gable-end section. No echolocation detected. Possible emergence. Possible emergence from building but NOT confirmed. The bat was seen to vacate over site due south-east towards the River Churnet	YES
Number of species recorded	3	**Level of Commuting / foraging** (based on level of 'feeding buzzes')		MODERATE / TRANSIENT
Total number of bat passes recorded	N = 16	**Peak activity time**		21:00 – 21:50hrs

Table 10. Survey 1 bat activity results.

Survey 2 – Dawn Re-entry

3.2.3.4 The Dawn re-entry was conducted two hours before sunrise and 30minutes after. Low levels of activity were recorded transiently onsite during this period, with a total of only 12 bat passes being recorded overall. Peak activity occurred around sunrise whereby three Common pipistrelle bats were seen congregating around mature trees ca.80m north of the site in Bracken Wood and Oakamoor Railway tunnel. **NO** bats were seen swarming or re-entering any of the buildings subject to development, with only transient commuting and foraging recorded outside boundaries. **NO** evidence of Barn Owl was recorded.

Survey 2 – Dawn Re-entry				Date: 15.05.2015
Species	**Species discrimination Confidence**	**Bat passes recorded**	**Notes**	**Roost**
Noctule (*Nyctalus noctula*)	σ = 100%	*n* = 1	characteristically recorded commuting at height	NO
Common Pipistrelle (*Pipistrellus pipistrellus*)	σ = 100%	*n* = 11	2-3 individuals observed swarming ca.40m due north in bracken Wood.	YES (outside ZoI)
Number of species recorded	2	**Level of Commuting / foraging** (based on level of 'feeding buzzes')		LOW / TRANSIENT
Total number of bat passes recorded	N = 12	**Peak activity time**		04:28 – 04.38 hrs

Table 11. Survey 2 bat activity results

Survey 3 – Dusk emergence

3.2.3.5 The second dusk emergence transect survey was conducted half and hour before sunset and two hours thereafter. Very low levels of activity were recorded onsite, with a total of only four (N4) bat passes recorded throughout this period. All calls were assigned to Common Pipistrelle (*Pipistrellus pipistrellus*) [n = 4; σ = 100%] between 21:30- 21:42hrs. **NO** bats were visually recorded emerging from any of the buildings proposed for development. **NO** evidence of Barn Owl was recorded.

Survey 3 – Dusk emergence				Date: 20.05.2015
Species	**Species discrimination Confidence**	**Bat passes recorded**	**Notes**	**Roost**
Common Pipistrelle (*Pipistrellus pipistrellus*)	σ = 100%	*n* = 4	observed flying over site from west to east towards River Churnet	YES
Number of species recorded	1	**Level of Commuting / foraging** (based on level of 'feeding buzzes')		LOW / TRANSIENT
Total number of bat passes recorded	N = 4	**Peak activity time**		21:30 –21:42 hrs

Table 12. Survey 3 bat activity results

Foraging and commuting habitat

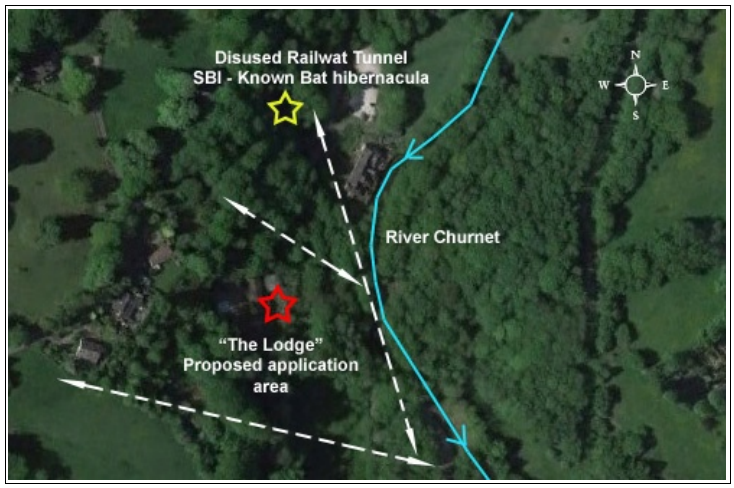

Figure 7. Diagram showing bat commuting flight-paths (white).

3.2.3.6 Although overall bat activity was seen as being low during the entire survey period, the surrounding area is considered as providing good foraging and commuting habitat for local bat populations. Relatively sustained activity was recorded off-site, down towards the River Churnet where the highest percentage of bat "feeding buzzes" were detected. Commuting activity was seen to occur along this river corridor on the eastern boundary, and in-an-around woodland blocks near to Oakmoor tunnel to the North.

4. IMPACT ASSESSMENT

4.1 Constraints on survey information

4.1.1 The activity surveys were conducted during May 2015 which is considered an an optimal surveying period for bats in summer roost (i.e. when females are in maternity roost and males can be found generally in smaller bachelor roosts). There were no constraints regarding assessment of the proposed application area, and the contents of this report are considered to be robust overall.

4.2 Constraints on equipment used

4.2.1 No constraints were present with regards to the equipment used during the scoping effort (i.e. bat detectors, endoscope, ladders and high powered binoculars).

4.3 Potential Impacts of development

4.3.1 *Designated sites*

4.3.1.1 As the proposed application is considered as being a small-scale development, **NO IMPACT** to designated sites in the surrounding landscape is predicted. However, the application area is located in an environmentally sensitive AONB,), thus the proposed works should be sensitive to EVRs in the immediate landscape (see recommendations).

4.3.2 *Roosts - Bats*

4.3.2.1 Overall assessment considers that Building B1 is an abandoned roost that has been formerly utilized by a small population of Common pipistrelle bat (estimate from droppings recorded <10), but is now rendered defunct. However, there is potential that this structure may still serve as a transient/satellite roost for individual bats, due to high-fidelity between bats and roost sites Furthermore, a small number (<10) of bat droppings were considered as being a relatively fresh (<4 seasons old), which supports this potential inference. However, **NO** bats were confirmed as emerging or re-entering B1 or B2 during the survey period, and **NO** active roost was recorded. One bat was tentatively recorded around the the north-gable end apex area, although emergence from the structure was not confirmed, nor was it supported during subsequent survey periods thereafter. Overall, bat activity was seen to be low onsite, despite optimal survey conditions, in optimal habitat.

4.3.2.2 It is speculated that the building has undergone re-roofing in recent times, resulting in overall depreciation as a bat roost. The roof was found to be in a good state of repair with a modern breathable roofing membrane *in situ.* It is understood that the clients have owned the property for four years, whereby no roofing works has been undertaken during this time, suggesting that the roof has therefore been renewed at some point, prior to current ownership. Whilst ingress potential for bats into the internal roof section would appear to have been compromised, there would still appear to be a number of ingression points around apex points, with potential roosting areas available between intermediate areas of brick and wooden cladding around the building. Consequently, structures have been assigned the following rating of suitability from negligible to high potential for supporting bats,

BATS : SUMMARY OF IMPACTS WITHIN THE APPLICATION AREA (Based on destruction of buildings)			
	SHORT-TERM: DISTURBANCE	**LONG-TERM: ROOST MODIFICATION**	**LONG-TERM: ROOST LOSS**
BUNK BUILDING (B1) "THE LODGE"	**LOW TO MODERATE** **ROOST STATUS: ABANDONED MALE SUMMER ROOST** Downgraded to potential transitional satellite roost for individual common pipistrelle bat	**LOW** Roost would appear to have already undergone modification previous to current ownership	**LOW**
BUILDING B2 'PREFABRICATED'	**NEGLIGIBLE** No evidence of roosting bats, although anecdotal evidence supports intermittent use as a a temporary shelter/feeding station	**NEGLIGIBLE**	**NEGLIGIBLE**

Table 13. Summary of impacts on birds.

Short-term impacts: Disturbance

4.3.2.2 Based on destruction rating of Building B1, short-term impact disturbance to roosting bats is deemed as being **LOW TO MODERATE.**

4.3.2.3 **NEGLIGIBLE** impact of disturbance to bats is considered for **Building B2**, and overall assessment considers **minimal** potential for permanent summer roost uptake, with low evidence as a temporary shelter / feeding station.

Long-term impacts: Roost modification

4.3.2.4 Long-term impact of disturbance is currently deemed as being **LOW** in **Building B1** due to the gregarious nature of the species determined on site i.e. Pipistrelle bats are less loyal to roosts than other synanthropic species and are known to alternate to different roosts (Dietz *et al.* 2009). Long- term impact of disturbance is deemed as being **NEGLIGIBLE** in **Building B2** overall.

Long-term impacts: Roost loss

4.3.2.5 The impact of loss of roosts on bat populations is poorly understood and difficult to study. There is variation in the impacts depending on the particular species of bat with some being more sensitive to disturbance than others. Synanthropic species (those which benefit from conditions created or modified by human activity) such as Pipistrelle bats for example are crevice roosters, and are known to move between roost sites (such as maternity roosts). These bats may find it easier to locate suitable new roosts as their requirements are not as specific as other species.

4.3.3 ***Foraging and commuting habitat***

4.3.3.1 The application area is located within an ecologically sensitive AONB which provides good connectivity for commuting bats. Due to the scale of the proposed development however, overall impact on bat foraging and commuting paths is is considered as being **LOW**, although proposed works should be sensitive to potential disturbance of adjacent habitats, particularly the adjacent river corridor and woodland backing onto Oakamoor Railway tunnel and recognized bat hibernacula during pre and post development (see recommendations).

Birds

BIRDS: SUMMARY OF IMPACTS WITHIN THE APPLICATION AREA		
Short-term: Disturbance	Long-term: Roost modification	Long-term: Roost loss
LOW	**LOW**	**LOW**

Table 14. Summary of impacts on birds.

4.3.3.2 No evidence of nesting birds including Barn Owl *Tyto alba* was recorded onsite or within buildings subject to demolition, thus **NO IMPACT** to birds is predicted and no further recommendations are considered.

4.4 Legislation and Policy Guidance

4.4.1 Unlike many smaller mammals, bats have low fecundity with a long and complex life cycle, which is played out over a large spatial landscape. Bats show a strong fidelity to different types of roosts throughout their annual cycle i.e. hibernacula, maternity, bachelor, satellite roosts and feeding perches. Linear features within the landscape such as hedgerows and tree lines are often used by bats for commuting, predator avoidance and foraging. Bats are highly social animals and loss of a single habitat alone can have a serious impact on populations. The status of many bat populations is tentative, being based on relatively few records and are highly susceptible to habitat loss and fragmentation. As such bats are given protected consideration within the following legislation and policy guidelines:

PAS 2010	The published 'PAS 2010' 'Planning to halt the loss of biodiversity' which is the government's new policy aimed at all authorities and developers involved in the planning process in the UK to halt biodiversity decline by 2010 and deliver net biodiversity gains as part of the green infrastructure provisions.
National Planning Policy Framework, Section 11:	The recently published framework in 2012, replaces the previous Planning Policy Statement 9. Section 11: Conserving and enhancing the natural environment, reaffirms the Governments commitment to maintaining green belt protections and preventing urban sprawl, retains the protection of designated sites and preserves wildlife, aims to improve the quality of the natural environment, and halt declines in species and habitats, protects and enhances biodiversity and promotes wildlife corridors.
Article 10 of the EC Habitats Directive:	The published Article requires government to develop features such as 'stepping stones' on the landscape, such as clusters of ponds, tracts of rough grassland or scrubland and vegetated railway line embankments.
Wildlife and Countryside Act 1981:	All species of bat are fully protected under the Wildlife and Countryside Act 1981, the European Conservation (Natural Habitats etc.) Regulations 1994, and the Countryside and Rights of Way Act 2000. This legislation makes it illegal to possess or control any live or dead specimens, to damage, destroy or obstruct access to any structure or place used for shelter, protection or breeding, and to intentionally disturb a bat while it is occupying a structure or place which it uses for that purpose.
Conservation of Habitats and Species Regulations (2010)	The Conservation of Habitats and Species Regulations 2010 consolidate all the various amendments made to the Conservation (Natural Habitats, &c.) Regulations 1994, in respect of England and Wales. It is an offence to possess, sell or offer, or transport for sale any European species of bat or any part derived from such a species. These Regulations also remove the 'incidental result defence'. In other words, it is no longer a defence to show that the killing, capture or disturbance of a species covered by the Regulations or the destruction or damage of their breeding sites or resting places was the incidental and unavoidable result of a lawful activity. Natural England can grant European Protected Species (EPS) licences in respect of

	development to permit activities that would otherwise be unlawful.
Natural Environment and Rural Communities Act (2006)	Under Section 40 of the Natural Environment and Rural Communities Act (2006), public bodies, including Local and Regional Planning Authorities, have a duty to 'have regard' to the conservation of biodiversity in England when carrying out their normal functions, which includes consideration of planning applications. In compliance with Section 41 of the Act, the Secretary of State has published a list of species considered to be of principal importance for conserving biodiversity in England. This is known as The England Biodiversity List, all of which make up the UK BAP Priority Species. Regional Planning Bodies and Local Planning Authorities will use it to identify the species that should be afforded priority to maintain, restore and enhance species and habitats.
Bird legislation	Most resident nesting birds are protected under the Wildlife and Countryside Act 1981, which protects birds, nests, eggs and nestling's. Some rarer species, such as barn owls, are afforded extra protection.

Table 15. Policy guidelines

PLEASE NOTE: If bat species are present at the site, the purpose of this report will only summarize the preliminary requirements for a bat mitigation package or project. A separate mitigation report and EPS licence should detail the necessary compensation measures to maintain the conservation status of the European Protected Species onsite.

5. RECOMMENDATIONS AND MITIGATION

5.1 Further survey

5.1.1 During the Preliminary Roost Assessment and bat activity surveys, which conform to the BCT guidelines 2nd edition (2012), all effort was made to establish the status of any bat and bird roost(s) onsite.

5.1.2 Assessment onsite was undertaken during an optimal survey period and the report findings are considered to be robust overall and representative of protected species currently onsite. **NO** further survey recommendations for bats are considered

5.1.3 **NO** further survey recommendations are also considered for protected bird species (including Barn Owl), on the proviso that care and vigilance is carried out during works. Ideally works should be programmed outside of the bird breeding season, which runs from March to October inclusive. If this is not possible, a check for active nests should be incorporated into site supervision when regarding bat mitigation, and be undertaken by an experienced ecologist.

5.2 Mitigation measures

5.2.1 Proposed mitigation for roost sites

5.2.1.1 Mitigation should be proportionate, justifiable and avoid or minimize any harm to species found during works.

- Type and scale of works and predicted impacts on bats
- Size, nature and complexity of the development site
- Likelihood of bats being present or affected
- Species and numbers of individuals concerned

5.2.1.2 Where necessary, timing of the works or changing the design or layout of the scheme to remove the impacts e.g. re-roofing of a summer nursery roost in the autumn/winter months, when the bats will not be using the building and providing the access points and environmental conditions are not altered (BCT 2011). Mitigation may also involve capture and removal or exclusion from a resting place or surrounding habitat. The second is to ensure that the project does not result in any long-term detrimental effect on any local population.

5.2.2 Proposed mitigation for foraging and commuting habitat.

5.2.2.1 As the proposed development is situated in prime habitat for foraging and commuting bats, proposed works should give careful consideration to excessive light-spill and disturbance (i.e. noise pollution) onto the adjacent woodland habitat(s) and River corridor during pre and post development. There are a number of veteran trees in close proximity to the application that may also have roost potential for bats and nesting birds.

5.3 Mitigation Licences

5.3.1 As **NO** bats were recorded roosting within Building B1 and Building B2, it will **NOT** be necessary to apply for a European Protected Species (EPS) licence from Natural England. However, as there is historic evidence of roosting bats in Building B1, a number of precautionary site safe-guard measures are recommended, in-order to minimize any negative impact to individual bats onsite. (see section 6.4).

6. SUMMARY

6.1 Bat presence/absence

6.1.1 In summary, Building B1 was assessed as being an abandoned male summer roost for a once, small population of Common pipistrelle bat, with minor evidence supporting possible use as a Transitional / Satellite roost for individual bats although this was not fully established. The report is however confident that **NO** notable bat roost is currently present within Building B1 and building B2.

6.2 Roost ecology of species recorded

Common pipistrelle: Male summer roost (N=<6) [Occassional]

6.2.1 The primary "crevice-dwelling" species recorded transiently onsite was that of Common pipistrelle, although **NO** notable roost(s) was recorded in either structure proposed for demolition.

6.2.2 Common pipistrelle *P. pipistrellus* is considered common and widespread across local, county and regional levels (Population Estimate: UK 2,430,000, Battersby *et al*. 2005). This species tends to have less roost fidelity overall and are known to switch between roost sites. This species may be regarded as being a generalist in behaviour and capable of enduring a greater spectrum of temperature regimes, compared to other crevice-dwelling species.

6.2.3 Common pipistrelle is generally sedentary in its nature and summer maternity colonies generally number 25-50 individuals (although colonies of as many as 200 have been recorded). Pipistrelle bats are less loyal to roosts than other synanthropic species and are known to alternate (Dietz *et al.* 2009).

Birds

6.2.4 **NO** evidence of Barn Owl was recorded in any of the buildings proposed for demolition, and **NO** proposed mitigation measures are considered for any birds protected under the Wildlife and Countryside Act,including Barn Owl.

6.3 Ecological value of building unit(s)

6.3.1 Ecological value of **BUILDING B1** was formerly considered as being **Moderate to high**, but has since depreciated (due to potential roofing works or natural relocation by bats), and is now deemed as having LOW TO MODERATE ecological value as a transitional Satellite roost for individual Common pipistrelle, although no bats were fully confirmed as being *in situ.*

6.3.2 **BUILDING B2** was assessed has having **LOW** ecological value with negligible potential for long-term roost uptake.

6.4 Recommendations

Bats

6.4.1 As **NO** bat roosts were recorded in Building B1 and B2, it **WILL NOT** be necessary to apply for an EPS licence from Natural England to disturb bat **subject to conditions**. As there is

historic evidence of a bat roost in Building B1, it is recommended that a number of **site safe-guard measures** are undertaken during the proposed development.

Onsite supervision

6.4.2 All building contractors should be made aware of the possible presence of bats, their legal protection and of working practices to avoid harming bats, before any work commences. A soft demolition approach should be carried out under the supervision of suitably qualified bat ecologist, in the event that individual bats may be present.

Timing of works

6.4.3 Although no physical evidence of roosting bats was recorded in either structures during the survey period (and therefore unlikely that bats will be encountered during the proposed development), it is considered prudent to undertake demolition works outside the optimal period when bats and young are established in maternity roost (May to mid August), as a further precautionary measure.

6.4.4 should any bats be discovered prior to, or during works (or suspicion arise about the possible presence of bats), then **all works must cease** immediately, and a licensed ecologist should be consulted, if not already present at that time. The use of standard capture and exclusion methods can then be deployed to prevent harm to any bats found which will be relocated to a suitable roof void should natural dispersal not occur. Mitigation may necessitate capture and removal of bats to a alternative receptor site for safe-guarding.

Roost compensation

6.4.5 Where possible, all sustainable developments should consider providing roost compensation / enhancement for bats, that may be inadvertently displaced or impacted upon during pre and post development. Despite no physical evidence of roosting bats in Building B1 and B2, anecdotal evidence was recorded to support existence of a former roost in Building B1, which is now unoccupied. As legal opinion regards a roost to be protected whether or not the bats are present at the time; any new-build(s) should (where possible) consider the following precautionary recommendations within the design of the proposed evelopment:

- **Create roost features into new build(s) for crevice-dwelling bats (i.e. Common pipistrelle)**

6.4.6 As there is historic evidence of a former bat roost in Building B1 (Bunk Barn), it is recommended that Schwegler 2FR bat tubes or Habibat˝ boxes are integrated into the fabric of the each new-build, and sited around apex areas on opposing gable-ends (2 x north and 1 x south). Alternatively, three external wall-fitted bat boxes (such as Schwegler 1FQ) should be incorporated into the design, and sited using the same configuration (see Appendices for bat box designs).

6.4.7 As low levels of transient bats were recorded commuting and foraging intermittently onsite, it is further recommended that additional roost boxes should should be incorporated into the landscaping of the development, being fitted to mature trees around the boundary edges where possible.

6.4.8 Bat boxes should be located along a north-east and a south-east elevation where possible. These should be sited ca. 4-6m in elevation. Recommended commercially available woodcrete Bat boxes, such as schwegler 1FFH and the improved treble crevice bat box (The Nest Box company) for example, are considered to be suitable receptors for crevice-dwelling bats.

6.4.9 Further information of increasing biodiversity prospects for roosting bats can be found on the Bat Conservation Trust website: http://www.bats.org.uk/pages/new_build.html.

Lighting

6.4.10 Particular consideration should be given to potential light spill that can affect the foraging and commuting strategy of many species and should be avoided onto nearby trees and hedges/shrubs and should not exceed 200 lumens (150 watts). Where possible, any security lighting should be on a timer setting and faced down to prevent spillage onto nearby habitats. Height of any lighting columns around the development should not exceed eight metres to further reduce any ecological impact of light pollution. Low-pressure sodium lamps (SOX) fitted with hoods are recommended to direct light below the horizontal plane to minimize upward light spill.

Scaffolding

6.4.11 As a further precautionary measure, and due to close proximity of the river corridor outside the planning area; it is recommended that no plastic sheeting or mesh be used on any scaffolding erection during housing developments, to prevent potential snaring and entanglement of volant bats.

Timber treatments

6.4.12 It is important to note that some wood treatments use pesticides that are harmful to bats. Vapours from treatments used on lower floors and joists, however, may also affect bats roosting at roof level. Treatments, which use petroleum products to spread the pesticide and aid its penetration, are especially likely to release vapours that could harm or disturb bats. Thus, Thus any treatment of wooden timbering should be done using chemicals approved by 29 Natural England for use in bat roosts. Natural England will provide advice upon which chemical is most suitable and the time of year in which it can be applied. Pesticides

containing the synthetic pyrethroids (permethrin, cypermethrin etc.) and boron compounds (Borester 7, disodium octoborate etc.) are considered as being relatively harmless to bats.

Birds

6.4.13 Consideration should be given to nesting birds which are protected under the Wildlife and Countryside Act 1981 (as amended). It is recommended that any ground clearance of established scrub-land vegetation within the application area is ideally undertaken outside the bird breeding season (mid March – August). Should this not be possible, it is recommended an ecologist surveys the area for nesting birds prior to any ground clearance onsite.

6.4.14 Should any active bird nests be found, then these should be left undisturbed until offspring have fully fledged. It may be necessary to enforce an exclusion work zone of 5m to reduce disturbance and minimize potential displacement.

6.4.15 It is also recommended, where possible, that three/four wooden nesting boxes suitable for different birds are placed at elevation within trees suitably mature to accommodate them. These may be ca. 2-4m above ground level.

Further information can be found on the RSPB website http://www.rspb.org.uk/advice/helpingbirds/nestboxes/smallbirds/siting.aspx

Biodiversity enhancement

6.4.16 It is understood that the planning application intends to incorporate a synthetic grass lawn into the design. Artificial grass provides no net benefit to wildlife overall, and should not be used unless absolutely necessary. It is encouraged that any landscaping relating to the proposed development should encompass native grasses, trees and shrub species to encourage trophic food webs and increase foraging potential for species. No plant species listed on Schedule 9 of the Wildlife and Countryside Act 1981 should be planted during any landscaping within this development. For further details of Schedule 9 plants visit the Defra website: www.defra.gov.uk/wildlife-pets/non-native.

7.0 REFERENCES

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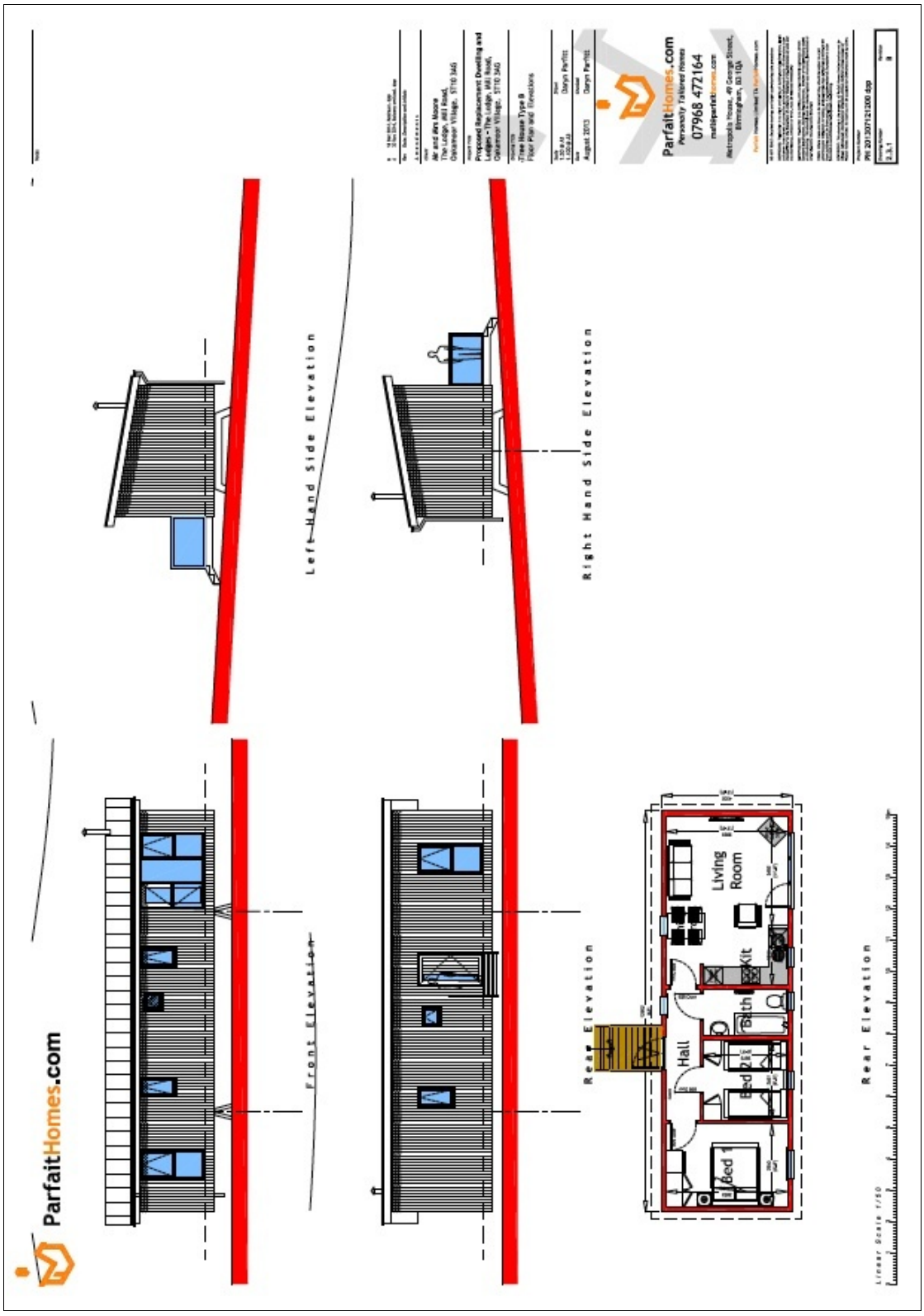
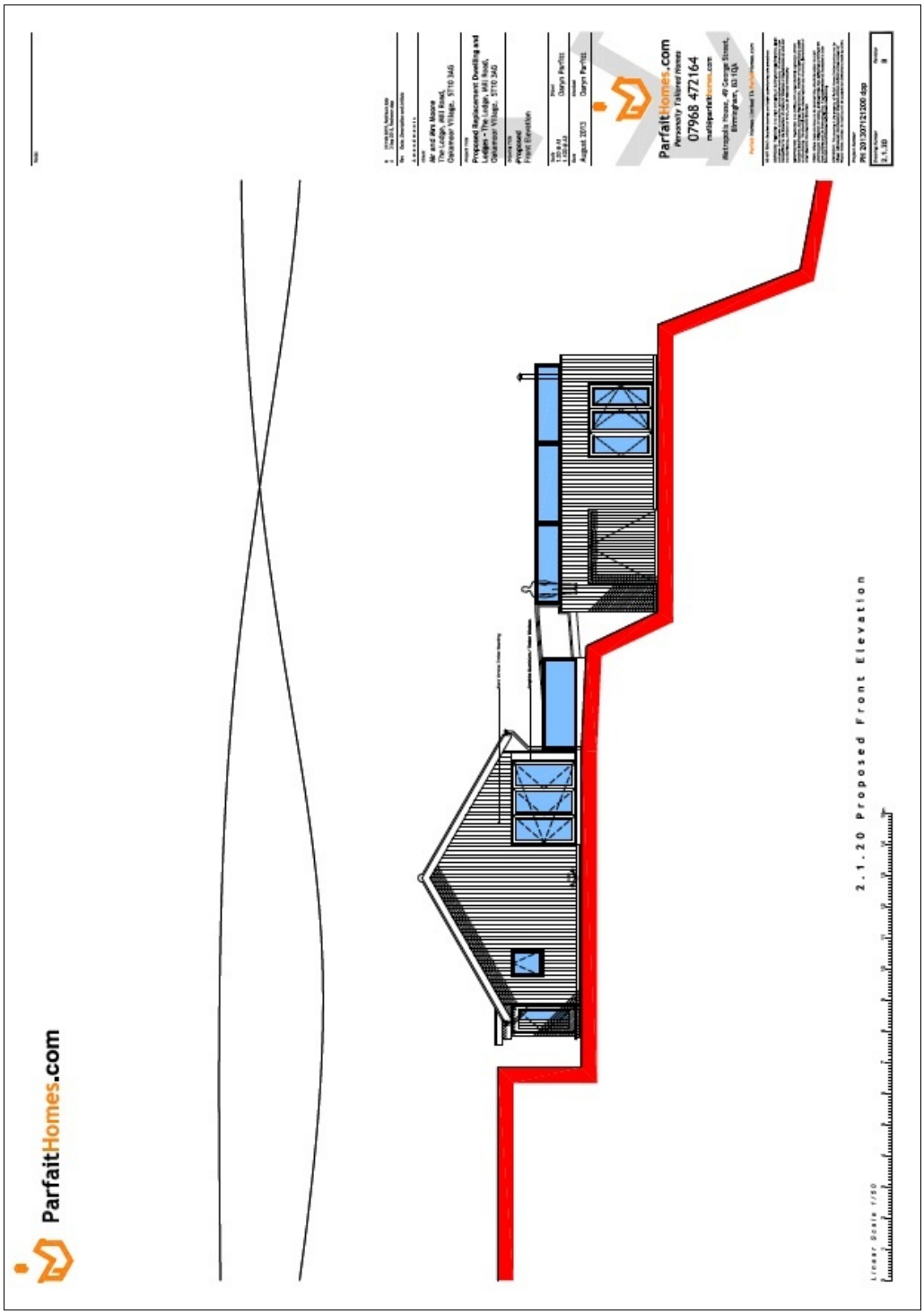
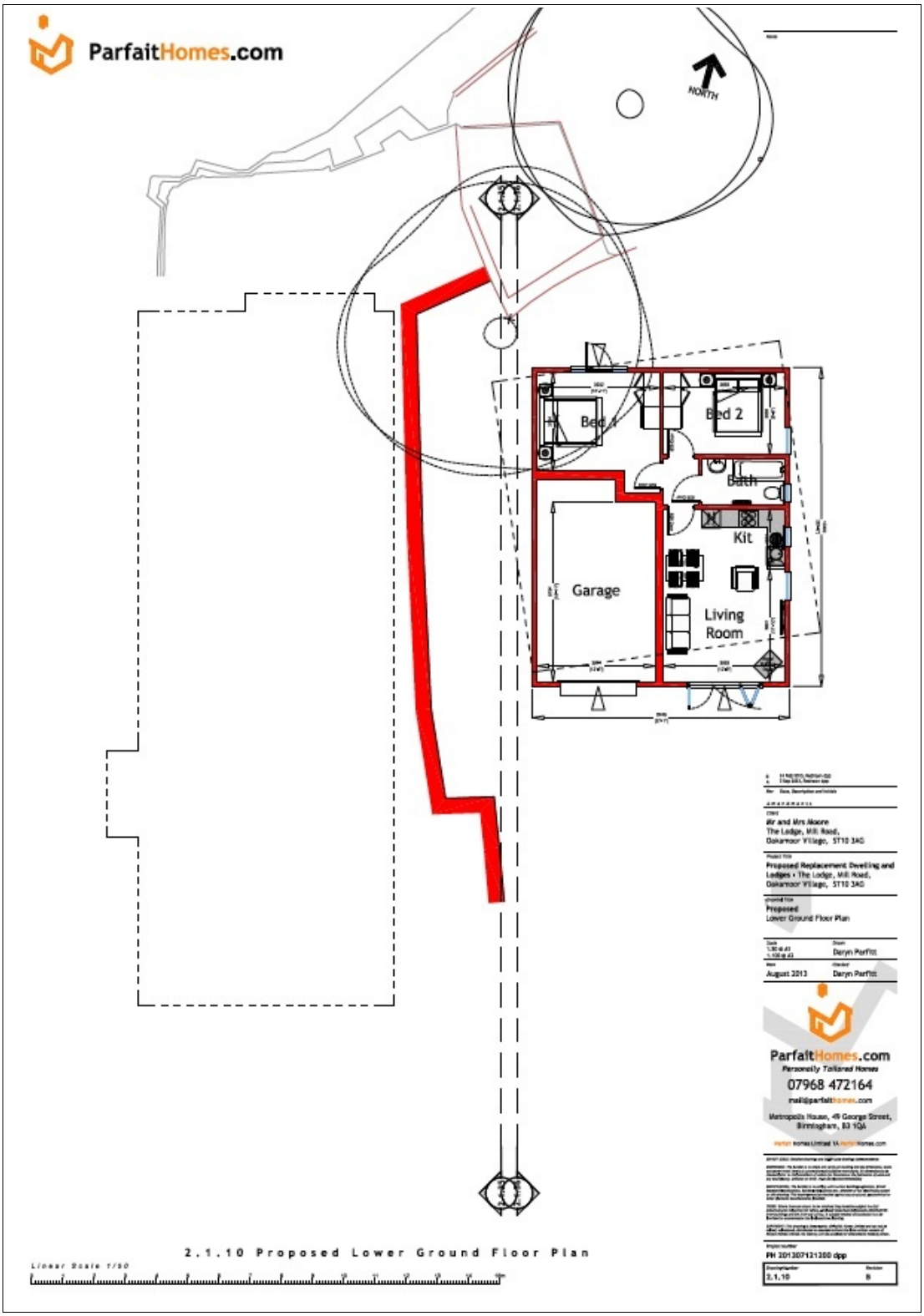
8. APPENDICES

Maps and Plans

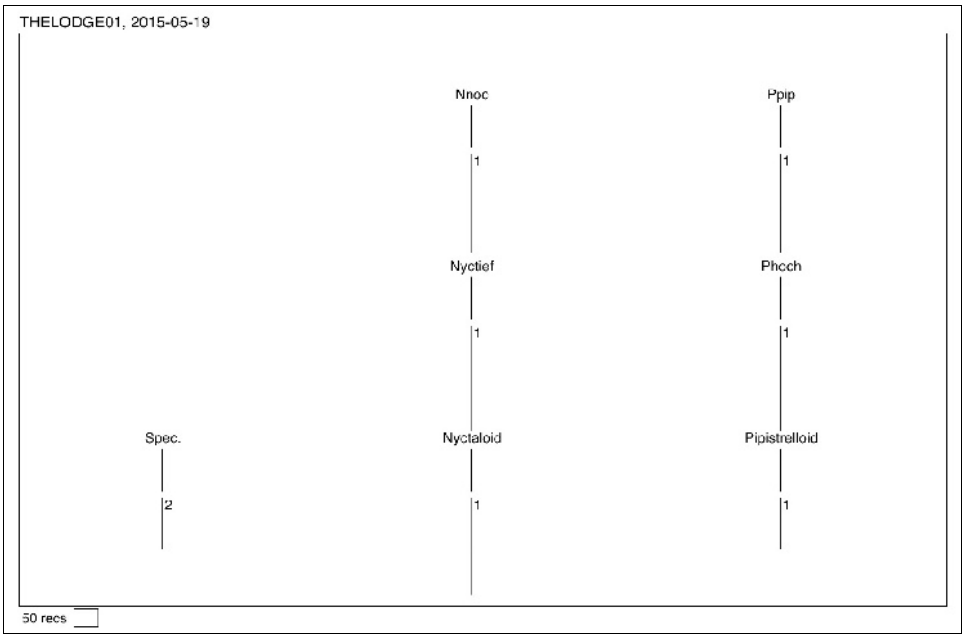


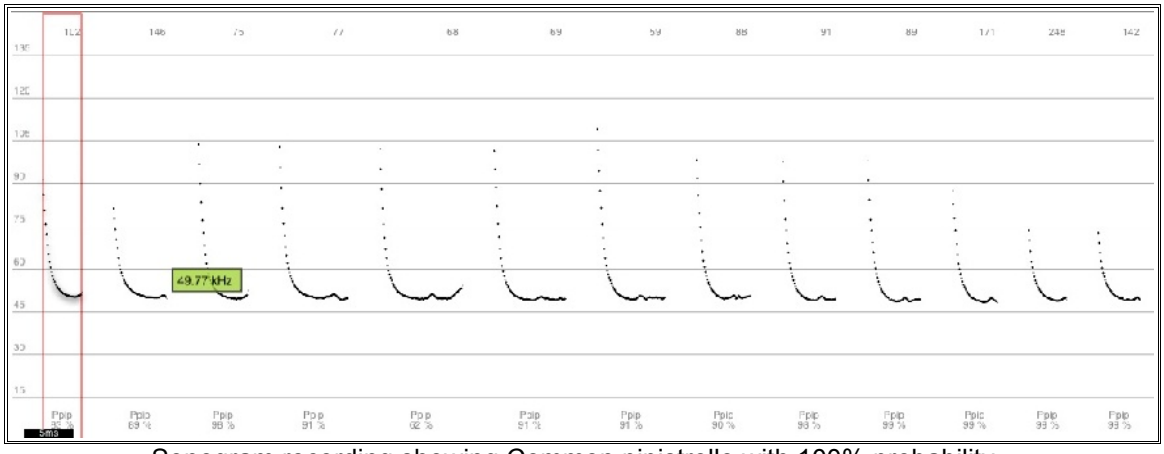

ParfaitHomes.com
2.1.20 Proposed Front Elevation
Linear Scale 1/50
ParfaitHomes.com
Personally Tailored Homes
07968 472164
Proposed Replacement Dwelling and Lodges - The Lodge, Mill Road, Oakamoor Village, ST10 3AG
Proposed Front Elevation
August 2013
Daryn Parfitt


ParfaitHomes.com
NORTH
Bed 1
Bed 2
Bath
Kit
Garage
Living Room
Mr and Mrs Moore
The Lodge, Mill Road,
Oakamoor Village, ST10 3AG
Proposed Replacement Dwelling and Lodges - The Lodge, Mill Road, Oakamoor Village, ST10 3AG
Proposed
Lower Ground Floor Plan
Daryn Parfitt
August 2013
Daryn Parfitt
ParfaitHomes.com
Personally Tailored Homes
07968 472164
Metropolis House, 49 George Street, Birmingham, B3 1QA
PH 20130712130D dpp
2.1.10
B
2.1.10 Proposed Lower Ground Floor Plan
Linear Scale 1:50

Data analysis

Species Discrimination table





Sonogram recording showing Common pipistrelle with 100% probability

Illustrated examples of Summer roost bat boxes

To integrate into walls:



Can be built with timber, brick or stone facing to match walls.

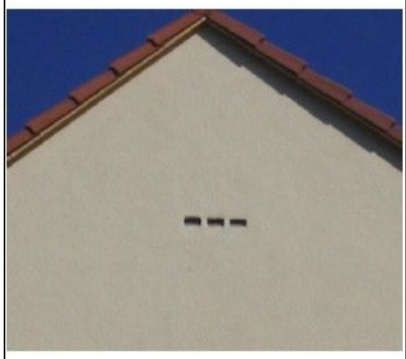
*BCT is using the Habibat as a research and monitoring tool.

Dimensions:
215 x 215 mm
Or
215 x 290 mm









Schwegler 2FR Bat Tube

The 2FR bat box is based on the same design as the 1FR, but with the addition of holes in the sides. This allows multiple tubes to be placed next to each other to form a much larger bat roost.



Schwegler 1FQ



Schwegler 2F-DFP.



Treble crevice bat box

Further information of these products can be be downloaded at:
www.bats.org.uk/publications...php /.../BCT_BatBoxProductList_v5.pdf

Annual life cycle of a temperate bat

January **February** **March**



Jan: Bats spend most of the winter hibernating, a state of inactivity characterised by lower body temperature, slower breathing, and lower metabolic rate. **Feb:** Bats are still hibernating. They have little fat left to live off of now. They may leave the roost on warmer nights to find food and a drink of water. **March:** Bats may begin to emerge and signs of limited activity can be seen. There are small numbers feeding as it gets warmer. In bad weather, they may become torpid.

April **May** **June**



April: Bats have mainly come out of hibernation and are hungry and active, feeding on most nights. They may be moving between several roost sites. They may become torpid (cool and inactive) again when cold. **May:** Bats are fully active and feeding. Females start forming maternity colonies and looking for suitable nursery sites, such as buildings or trees. Males will roost on their own or in small groups. **June:** Female bats usually give birth to a single pup, which they feed on their milk. Young bats are very small (less than an inch) with thin, slightly grey fur. Adult bats will catch thousands of insects each in a night.

July **August** **September**



July: Mothers continue to suckle young. Some young are growing fast and almost full-size; others are still very small. At around three weeks old, young bats are sometimes found on the ground as they learn to fly. **Aug:** At six weeks old, the young bats begin to catch insects for themselves and no longer need their mothers' milk. The summer maternity colonies begin to disperse and bats may move to mating roosts. **Sept:** Mating season begins, with males of most species using special mating calls to attract females, which can include purrs, clicks, and buzzing. Bats are also concentrating on building up fat stores for the coming months.



Oct: More mating is taking place, and building up fat reserves is becoming crucial to survive the winter season. Bats are seeking suitable hibernation sites, and beginning periods of torpor. **Nov:** Periods of torpor are lasting longer. Some begin hibernation, to save energy over the colder months, when insects are harder to find. They are using stored fat as fuel. **Dec:** Bats are hibernating. They may roost on their own or in small groups, often in cool, quiet places like disused buildings, old trees or caves, where they hopefully won't be disturbed. **(Source: Bat Conservation Trust).**

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