



**BJ Collins**  
PROTECTED SPECIES SURVEYORS

## 2021 - FOLLOW-UP BAT AND PROTECTED SPECIES SURVEYS

TRADITIONAL FARM BUILDINGS  
GRANGE FARM  
WISETON  
DONCASTER  
NOTTINGHAMSHIRE

A report to:

M D Langley and Sons  
Grange Farm  
Wiseton  
Doncaster  
South Yorks  
DN10 5AE.

By:

B J Collins – Protected Species Surveyors Ltd  
Elvina Cottage  
Wilson's Lane  
Morton  
Southwell  
Nottinghamshire  
NG25 0UF  
Tel: (01636) 830058  
[www.bjcollins.co.uk](http://www.bjcollins.co.uk)

January 2022

Report to:	M D Langley and Sons
Report Title:	2021 – Follow-up Bat and Protected Species Surveys

Survey Site/Job:	Grange Farm, Wiseton, Doncaster
OS Grid Reference:	SK 7179 8980

Survey Date(s):	11/06/2021, 01/07/2021, 13/09/2021
Surveyed by:	Helen Scarborough (Bat Licence 2015-12692-CLS-CLS) & Nick Clayton (Bat Licence 2020-49905-CLS-CLS)

Architect/Agent:	Derek Kitson Architectural Technologists Limited
Planning Reference:	NA

### Versioning and Quality Assurance

Report Status	Date	Author(s)	Reviewed by
Final version	12/01/2022	P A Collins BSc (Hons)	B J Collins MSc MCIEEM

## DISCLAIMER

This document has been prepared by B J Collins Protected Species Surveyors Limited. We accept no responsibility or liability for any use that is made of this document other than by the client for the purposes for which it was originally commissioned and prepared.

The evidence which we have prepared and provided is true and has been prepared and provided in accordance with the guidance of The Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct.

RELIANCE - The report describes the conditions and ecological features on the site (and possibly its environs) at the time of survey and that this may (is likely to) change over time. Reliance upon the findings of this report should be determined in accordance with the Chartered Institute of Ecology and Environmental Management guidance on the longevity of ecological surveys, see Advice Note (April 2019) On the Lifespan of Ecological Reports and Surveys CIEEM.

# Contents

SUMMARY.....	4
1 INTRODUCTION.....	5
1.1 Survey Site .....	5
1.2 Legislation applicable to bats .....	5
1.3 Legislation applicable to breeding birds.....	5
2 SITE DESCRIPTION.....	6
2.1 Situation of Grange Farm.....	6
2.2 Description of the survey buildings.....	6
3 SURVEY METHODOLOGY .....	9
3.1 Preliminary bat roost assessment .....	9
3.2 Bat emergence and activity and dawn re-entry surveys .....	9
3.3 Survey constraints .....	9
3.4 Weather conditions .....	9
3.5 Personnel .....	10
4 SURVEY RESULTS.....	11
4.1 Preliminary bat roost assessment results.....	11
4.2 Emergence and activity surveys.....	11
11 <sup>th</sup> of June 2021 .....	11
1 <sup>st</sup> of July 2021 .....	12
4.3 Dawn re-entry survey .....	12
13 <sup>th</sup> of September 2021 .....	12
4.4 Breeding bird results.....	12
5 CONCLUSIONS AND RECOMMENDATIONS.....	13
5.1 Bats .....	13
5.2 Birds .....	13
6 BAT MITIGATION STRATEGY .....	14
7 REFERENCES.....	17
8 Appendix 1 – Survey observations from the emergence and activity and dawn re-entry surveys....	18

## SUMMARY

This report has been prepared by B J Collins – Protected Species Surveyors Limited for M D Langley and Sons. The report provides the results of follow-up protected species surveys, focused on bats (Chiroptera), of the traditional farm buildings located at Grange Farm, Wiseton, Doncaster, Nottinghamshire.

Previous surveys were undertaken to the buildings at Grange Farm by this company in 2007, 2013 and 2016, which identified hibernation and maternity roosting of Brown Long-eared (*Plecotus auritus*) bats and day roosting by Common Pipistrelle (*Pipistrellus pipistrellus*) bats across the survey periods.

The 2021 protected species surveys consisted of a supplementary bat roost assessment and protected species scoping and a range of emergence and activity surveys and dawn re-entry surveys ahead of proposed development works.

A visual inspection of the buildings was undertaken by an experienced and licensed ecologist on the 1<sup>st</sup> of July 2021, in support of the previous inspections during the earlier survey periods. The objective of the survey was to inspect the buildings for evidence of bat-use as well as identifying features that could potentially support roosting bats, assess the likelihood of these features being used and further to locate any potential roost entrance/exit points. On completion, the buildings were ranked in accordance with the Good Practice Guidelines (Collins, 2016).

Approximately 20 Natterer's (*Myotis nattereri*) bats were discovered roosting along the ridge board of Building B. Droppings of the shape and size of those typically voided by Brown Long-eared (*Plecotus auritus*) and one of the Pipistrelle bats were found within other areas of the buildings.

During the following emergence and activity and dawn re-entry surveys, active day roosting by Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Brown Long-eared (*Plecotus auritus*) and one of the *Myotis* species was identified within the farm buildings A, B and C.

Due to the presence of a maternity roost of a common species, the roost and the threshing barn are categorised as being of "moderate conservation significance", as per the Bat Mitigation Guidelines (Mitchell-Jones, 2004).

It is therefore the conclusion of this report that the proposed works, which will include the conversion of the barns to residential dwellings, will require the submission for a European Protected Species Derogation Licence to remain lawful.

Full planning consent is required before an EPS licence can be applied for and all conditions relating to wildlife must be formally discharged. The application for any EPS licence must be supported with a mitigation strategy which will include actions to protect bats from harm during the works and provide permanent roosting habitat in the long-term in the same or similar location in the final design.

The mitigation strategy for this development proposal is outlined in Section 6.

Should the proposal require the use of roof membranes ONLY Bitumen type 1F felt with a hessian matrix must be used.

No evidence of breeding birds was identified during the survey. However, previous surveys have identified active nesting by Swallow's (*Hirundo rustica*) from within the majority of the farm buildings.

Swallows prefer to nest in cool dark outbuildings which provide protection from predators. They will construct a nest from mud beneath a beam or platform. It is suggested that a carport or garage be included within the plans with an alternative nesting habitat within the roofing frame.

A bird nest is protected by law from the moment of first construction until the young have fledged and left the nest. If any works are to affect the potential nesting habitats this work should be undertaken outside of the breeding bird season of March to September (inclusive). If there is any requirement for works within the breeding bird season then they must be informed by a breeding bird survey by a suitably qualified individual. The presence of nesting bird at this time could lead to constraints to the development programme.

No other protected species will be adversely affected by the development proposal.

# 1 INTRODUCTION

## 1.1 Survey Site

This report has been prepared by B J Collins – Protected Species Surveyors Limited for M D Langley and Sons. The report provides the results of follow-up bat surveys of the traditional farm buildings located at Grange Farm, Wiseton, Doncaster, Nottinghamshire, DN10 5AE. The survey area is located at Ordnance Survey grid reference, SK 7179 8980.

Previous surveys were undertaken to the buildings at Grange Farm by this company in 2007, 2013 and 2016, which identified hibernation and maternity roosting of Brown Long-eared (*Plecotus auritus*) bats and day roosting by Common Pipistrelle (*Pipistrellus pipistrellus*) bats across the survey periods.

The 2021 protected species surveys consisted of a supplementary bat roost assessment and a range of emergence and activity surveys and dawn re-entry survey ahead of proposed development works. The objective of the survey was to update the status of bat roosting within the array of farm buildings.

The legislation with regards to the protected species relevant to the site is listed below.

## 1.2 Legislation applicable to bats

All species of British bat and their roosts are protected under British law by the Wildlife and Countryside Act 1981 (as amended), and bats are classified as European Protected Species under the Conservation of Habitats and Species Regulations 2017 ('the 2017 Regulations'). This has recently been amended by the Conservation of Habitats and Species Regulations (Amendment) (EU Exit) Regulations (2019) which continue the same provision for European protected species, licensing requirements, and protected areas after Brexit.

The legislation makes it an offence to kill, injure or disturb a bat and/or to damage or destroy a breeding site or resting place for a bat. It is also an offence to disturb the animals such that it impairs their ability to survive, to reproduce, to nurture their young, or such that it impairs their ability to hibernate or migrate. Under this legislation development work that could affect a bat or bat roost can only be permitted under a licence from Natural England.

Licences in respect of European Protected Species affected by development can be granted under Section 55(2) (e) of The Conservation of Habitats and Species Regulations (Amendment) (EU Exit) Regulations (2019), for the purpose of preserving public health or public safety or other imperative reasons of overriding public interest including those of social or economic nature and beneficial consequences of primary importance for the environment.

Under Section see Regulation 55(9) of the Regulations licences can only be issued if Natural England is satisfied that:

- There is no satisfactory alternative to the work specification and
- The action authorised will not be detrimental to the maintenance of the population of the species at a favourable conservation status in their natural range.

Natural England aim to process EPS licence applications within 35 working days of receipt and Low Impact Class licenses are typically registered within 14 working days of receipt.

## 1.3 Legislation applicable to breeding birds

Under the Wildlife and Countryside Act 1981 (as amended), all native birds and their nests, whilst in use, are protected from harm, disturbance or destruction during the breeding season. To avoid conflict, development work that could affect breeding birds should be timed to take place outside of the breeding season, variable between March and September. Note that a nest is protected from the beginning of its construction until the young have fledged and have left the nest.

## 2 SITE DESCRIPTION

### 2.1 Situation of Grange Farm

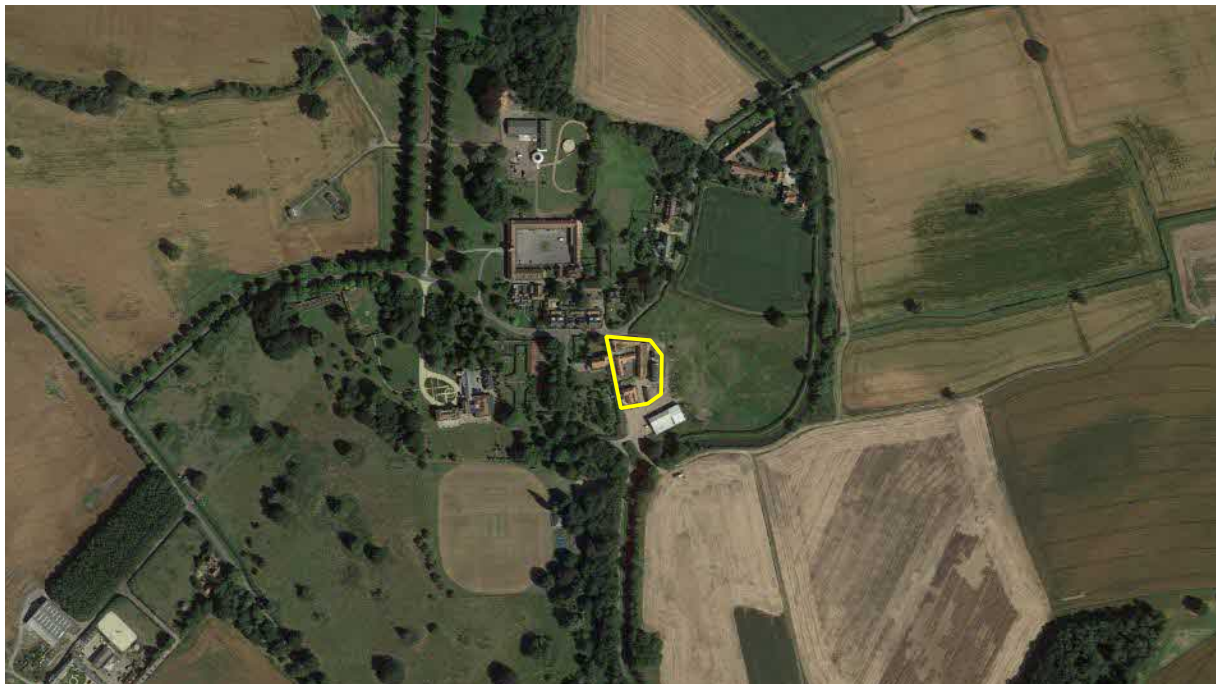


Figure 1: The situation of Grange Farm, enclosed in yellow, in relation to the landscape of the surrounding area, courtesy of Google Earth.

The farmstead is located in the village of Wiseton, North Nottinghamshire. The site consists of an array of farm buildings set within a large area of hardstanding. The surrounding area contains a mixture of agricultural farmland and residential dwelling, with an abundance of mature tree species and hedgerow. The proximity of a copse of deciduous woodland to the site provides cover during emergence for roosting bats, as well as a foraging resource and direct access to wider commuting pathways. The Chesterfield Canal passes by the southern boundary of the farmstead and then extends further east.

Within the wider surrounding area, the landscape use is dominated by agricultural farmland, with a mixture of arable and pastoral fields bounded by mature hedgerow and mature tree species. This network of abundant hedgerow and trees offers a high level of connectivity for commuting bats across the landscape. There are many areas of deciduous woodland less than 2.5 km from the site which offer a good foraging resource for most of the bat species found in Nottinghamshire. These landscape features and the canal are connected to the survey site and each other by the previously mentioned abundance of hedgerow and trees.

A search of the Magic Application database identified that the Chesterfield Canal to the east is also a Site of Special Scientific Interest.

### 2.2 Description of the survey buildings

The 2021 survey buildings consisted of the buildings previously labelled A, B, C and D.

Building A is a two-storey barn in the north-west corner of the site. It is constructed from solid brick with a pantile roof covering atop a timber purlin and rafter frame. The roof covering is not underlined and is covered by a climbing plant. The building is fitted with timber windows and doors, of which the ones on the first floor are open and give access internally.

Building B is a former threshing barn of two-storey height connected on its western end to Building A where they share a gable. Building B is a single open void from floor to roof apex internally. It is constructed from solid brick with a pantile roof covering atop a timber queen post roofing frame. The

building is fitted with timber windows and doors and has a large open cart doorway on its eastern gable end.

Building C is the former milking parlour to the south-east of building B. It is a single storey building constructed from solid brick with a pantile roof covering atop a timber roofing frame. The roof covering is unlined and there is a selection of roof lights along the eastern elevation of the pitch.

Building D is a two-storey machinery and seed store attached to the southern end of building C. The building is constructed from solid brick with a pantile roof covering atop a timber purlin and rafter frame. The roof covering is unlined, and the building is fitted with timber windows and doors. Access to the ground floor can be gained via an open doorway on the western elevation and the first floor is accessible to wildlife via ventilation slots on the southern gable and a hay door on the eastern elevation.



Figure 1a: The annotation of the farm buildings in this survey report, courtesy of Google Earth

The following photographs demonstrate the buildings construction.



Photograph 1: Building A and Building B taken from the north-west, showing the two-storey height and the climbing plant covering parts of the roof.



Photograph 2: Buildings A and B to the right and C and D to the left, taken from the north-east.



### 3 SURVEY METHODOLOGY

#### 3.1 Preliminary bat roost assessment

A visual inspection of the buildings was undertaken by an experienced and licensed ecologist on the 1<sup>st</sup> of July 2021, in support of the previous inspections during the earlier survey periods. Equipment used included a powerful torch, camera, and binoculars.

The objective of the survey was to inspect the buildings for evidence of bat-use as well as identifying features that could potentially support roosting bats, assess the likelihood of these features being used and further to locate any potential roost entrance/exit points. This comprised of searching for droppings, urine staining, worn surfaces, feeding remains and the bats themselves (alive or dead).

#### 3.2 Bat emergence and activity and dawn re-entry surveys

Previously, the visual inspections of the farm buildings have identified a maternity roost of Brown Long-eared (*Plecotus auritus*) bats in the ground floor and first floor of the two-storey section at the southern end of the buildings, and day roosting by Common Pipistrelle (*Pipistrellus pipistrellus*) was discovered during previous emergence surveys.

The supplementary search also identified maternity roosting by Natterers (*Myotis nattereri*) in the northern section of the buildings.

The findings concluded the buildings to be of “high bat roost potential” as per the Good Practice Guidelines (Collins 2016), and subsequently would require at least two emergence and activity surveys and at least one dawn re-entry survey.

The first emergence and activity survey was undertaken on the 11<sup>th</sup> of June 2021, with the second three weeks later on the 1<sup>st</sup> of July 2021. The dawn re-entry survey was then completed on the 13<sup>th</sup> of September 2021.

The surveys were completed by deploying four surveyors for the emergence and activity, and three for the dawn re-entry, comprising licenced and experienced bat ecologists and assistant bat workers. The surveyors used a range of equipment including two Anabat Scout full spectrum bat detector and recording units, a Pettersson D240x time expansion detector, an Echometer Touch Pro full spectrum bat detectors, two Echometer Touch 2 full spectrum bat detectors. Night vision cameras supported by infra-red floodlighting were used to focus upon potential bat roosting features. Ambient temperature was measured with an ETI Hygro-Therm hygrometer.

The emergence and activity surveys commenced prior to sunset and lasted for 105 minutes each. The dawn re-entry survey began 90 minutes before sunrise and last until 5 minutes after.

All bat activity detected by the surveyors was documented.

#### 3.3 Survey constraints

The surveyors did not experience any significant constraints upon the survey effort. The weather was dry with good daylight allowing full observations of the survey buildings and the surveyor was able to access all areas of the survey buildings

#### 3.4 Weather conditions

Date	Sunset/ Sunrise	Temperature (°C)		Wind (Beaufort)		Cloud Cover (%)	
		Start	End	Start	End	Start	End
11/06/2021	21:31	15.8	12.5	1	0	10	5
01/07/2021	21:34	14.2	12.8	0	0	50	100
13/09/2021	06:34	15	12.8	0	1	100	100

Table 1: The weather data from the emergence and activity and dawn re-entry surveys undertaken in the 2021 active season.

### 3.5 Personnel

The visual inspection on the 1<sup>st</sup> of July 2021 was carried out by Mrs H Scarborough (Bat Licence 2015-12692-CLS-CLS).

The surveyors for the emergence and activity and dawn re-entry surveys and relevant licence numbers are shown in table 2 below.

Date	Survey Type	Surveyor	Bat Licence Number (If applicable)
11/06/2021	Emergence/Activity	H Scarborough D Muriénova MEnvSci A Williamson S Vinters	2015-12692-CLS-CLS
01/07/2021	Emergence/Activity	H Scarborough D Muriénova MEnvSci A Williamson S Vinters	2015-12692-CLS-CLS
13/09/2021	Dawn Re-entry	N Clayton C Ward M Evans	2020-49905-CLS-CLS

Table 2: The surveyors deployed for each of the emergence and activity and dawn re-entry surveys and they relevant licence numbers.

## 4 SURVEY RESULTS

### 4.1 Preliminary bat roost assessment results

During the visual inspection on the 1<sup>st</sup> of July, approximately 20 Natterer's (*Myotis nattereri*) bats were discovered roosting along the ridge board of Building B. Droppings of the shape and size of those typically voided by Brown Long-eared (*Plecotus auritus*) were identified within Building C, and droppings of the shape and size of those typically voided by one of the pipistrelle bats were found on the wall around a large gap in the brickwork within Building A.



Photograph 3: The roosting Natterer's bats along the ridge board of Building B.

### 4.2 Emergence and activity surveys

#### 11<sup>th</sup> of June 2021

For the first emergence and activity survey, four surveyors were deployed positioned around the buildings ensuring all elevations were under observation simultaneously. A night vision camera with infrared floodlighting was positioned facing the open cart doorway on the eastern elevation of the former threshing barn.

There was a total of 45 observations of bat activity documented by the surveyors. This included the emergence of two Common Pipistrelle (*Pipistrellus pipistrellus*) bats, one from inside the large threshing barn, and another from the gable apex of the south facing gable of building A, a bat of the genus *Myotis* from the left side of the south facing gable of building A, a Brown Long-eared (*Plecotus auritus*) out from the window on the south facing gable of building A, and multiple Natterer's (*Myotis nattereri*) bats emerging from within the threshing barn, building B.

The first recording during the survey was an echolocation call of a Brown Long-eared bat at 21:58 hours detected by the surveyor to the south-west of buildings C and D. Bats of this species were then recorded a handful of times throughout the survey, including the emergence from the southern gable of building A at 22:36 hours.

The most abundant species during the survey was Natterer's, with multiple bats observed emerging from and foraging in and out of the large threshing barn, first recorded at 22:30 hours. Due to the abundance of bats entering and leaving the doorway the surveyor could not specify the exact number of bats that emerged from the barn from that location.

Other observations recorded during the survey included multiple passes by Common Pipistrelle bats, including periods of continuous foraging around the courtyard and in and out of the barn, and individual passes by Brown Long-eared, Noctule (*Nyctalus noctula*) and one of the *Myotis* species.

A full table of results is included in Appendix 1 of this report.

#### **1<sup>st</sup> of July 2021**

For the second emergence and activity survey, four surveyors were deployed positioned around the buildings ensuring all elevations were under observation simultaneously. A night vision camera with infrared floodlighting was positioned facing the open cart doorway on the eastern elevation of the former threshing barn.

There was a total of 48 observations of bat activity documented by the surveyors. This included multiple emergences from the southern facing extension of building A, and the cart doorway on the eastern elevation of building B by Natterer's (*Myotis nattereri*) bats, a two emergence by a Common Pipistrelle (*Pipistrellus pipistrellus*) bat, one from the wall plate on the south facing gable and one from the open cart door, and a single emergence by a Soprano Pipistrelle (*Pipistrellus pygmaeus*) from the ground floor window of the southern gable.

The first bat recorded during the survey was the Common Pipistrelle which emerged from the threshing barn through the open cart door at 21:50 hours. Bats of this species were then recorded multiple times throughout the survey including periods of continuous foraging.

The most abundant species during the survey was the Natterer's, recorded emerging multiple times from the south facing gable of building A and continuously foraging in and out of the threshing barn.

Other observations included foraging inside of building C by Brown Long-eared (*Plecotus auritus*) bats, the emergence of a single Soprano Pipistrelle from the ground floor of the southern extension at 22:13 hours and high commuting passes by Noctule (*Nyctalus noctula*) bats.

A full table of results is included in Appendix 1 of this report.

### **4.3 Dawn re-entry survey**

#### **13<sup>th</sup> of September 2021**

For the dawn re-entry survey, three surveyors were deployed focused upon buildings A, B and C ensuring all key elevations were under observation simultaneously. A night vision camera with infrared floodlighting was positioned facing the open cart doorway on the eastern elevation of the former threshing barn.

There was a total of 55 observations of bat activity documented by the three surveyors. This included multiple recordings of Natterer's (*Myotis nattereri*) bats entering, foraging and flying within the threshing barn. This species was the most abundant during the survey with multiple passes recorded by all surveyors.

Other species recorded during the survey included foraging and commuting activity by Common Pipistrelle (*Pipistrellus pipistrellus*) and Brown Long-eared (*Plecotus auritus*) bats and high passes overhead by bats of the *Nyctalus* genus, most often Noctule (*Nyctalus noctula*). There was also one confirmed sonogram from Nathusius pipistrelle (*P. nathusii*).

A full table of results is included in Appendix 1 of this report.

### **4.4 Breeding bird results**

No evidence of breeding birds was identified during the survey of 2021. All of the surveys were undertaken at a time when nesting birds could have returned to roost for the evening.

## 5 CONCLUSIONS AND RECOMMENDATIONS

### 5.1 Bats

The preliminary bat roost assessment discovered a maternity roost of Natterer's (*Myotis nattereri*) bats alongside the ridge board at the apex of Building B, the threshing barn. Evidence of day roosting of Pipistrelle bats and Brown Long-eared bats was also identified within buildings A, B and C.

The array of emergence and activity and dawn re-entry surveys further confirmed active day roosting of Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Brown Long-eared (*Plecotus auritus*) and one of the *Myotis* species from within the farm buildings, later confirmed as Natterer's bat.

The discovery of a maternity roost and further day roosting of at least three species, categorises the buildings as being of "high bat roosting potential" as per the Good Practice Guidelines (Collins 2016). Due to the presence of a maternity roost of a common species, the roost and the threshing barn are categorised as being of "moderate conservation significance", as per the Bat Mitigation Guidelines (Mitchell-Jones, 2004).

It is therefore the conclusion of this report that the proposed works, which will include the conversion of the barns to residential dwellings, will require the submission for a European Protected Species Derogation Licence to remain lawful. Full planning consent is required before an EPS licence can be applied for and all conditions relating to wildlife must be formally discharged.

The application for any EPS licence must be supported with a mitigation strategy which will include actions to protect bats from harm during the works and provide permanent roosting habitat in the long-term in the same or similar location in the final design.

The mitigation strategy for this development proposal is outlined in Section 6.

### 5.2 Birds

No evidence of breeding birds was identified during the survey, the surveys were mostly undertaken at dusk when many birds have returned to roost. However, previous surveys have identified active nesting by Swallow's (*Hirundo rustica*) from within the majority of the farm buildings.

Swallows prefer to nest in cool dark outbuildings which provide protection from predators. They will construct a nest from mud beneath a beam or platform. To address the loss of nesting habitat offered by the roofing frame of the eastern extension, it is recommended a second roof void is set aside for nesting swallows.

It is suggested that a carport or garage be included within the plans with an alternative nesting habitat within the roofing frame.

The roofing frame should be a timber structure that offers an unobstructed flying space. A floor should be installed with the roof void to catch droppings. Access to the void should be provided via two letter box slots 50mm high by 200mm wide installed in the middle of a gable end to allow birds to enter and then swoop up to the nest site.

Note that whilst this feature offers nesting provision for Swallows it is recognised that the same structure may appeal to roosting bats and consequently the roof liner of this designated roof void should be underlined with traditional bitumen 1F felt to prevent the risk of entanglement (Waring et al., 2013).

A bird nest is protected by law from the moment of first construction until the young have fledged and left the nest. If any works are to affect the potential nesting habitats this work should be undertaken outside of the breeding bird season of March to September (inclusive).

Any future work undertaken within the breeding bird season that will directly affect any potential nesting habitats on site will need to be done under supervision of a suitably licenced ecologist. Note that the discovery of a nest at this time will require the need for the works to stop and a 5 m buffer zone around the nest being implemented until the young have fledged and left.

## 6 BAT MITIGATION STRATEGY

An EPS licence application must be supported by a mitigation strategy. The fundamentals of the mitigation strategy are to safeguard roosting bats from harm during works and to provide permanent alternative roosting habitat proportionate to the species and roosts identified during the surveys.

The mitigation strategy will include timings when work in and adjacent roost areas can safely take place. Due to the presence of a maternity roost the optimum period for completing the works is from 1<sup>st</sup> October – 1<sup>st</sup> May.

Upon the award of an EPS licence temporary roosting habitat in the form of timber bat boxes will need to be installed on trees outside the area of works. The purpose of these boxes is to provide a temporary roost environment for any bats found during the works.

Roost features and potential roost features will need to be removed by hand under the supervision of a licensed bat ecologist. Any bats found will need to be transferred by hand to the timber bat boxes by the licensed bat ecologist.

Permanent roosting habitat will need to be installed within the redeveloped building. Furthermore, safeguards with regards to exterior lighting will also need to be implemented so that roost entrances and commuting routes remain free from light pollution.

Note again that the building cannot be underlined with a modern roofing membrane, the traditional matrix-based hessian and bitumen under felt is required in all buildings covered under EPS licenses.

### Permanent roost provisions

It is recommended that a single bat attic be installed within the redeveloped roof void of building B. In order for this space to be sufficient for replacing the lost habitat, the dimensions must be of at least 5m in length, the width of the barn and 2.8m in height with a completely unobstructed void to allow for pre-emergence flight. The position of the bat attic is shown in the annotated image Figure 2 below.

The requirements for an unobstructed roof void should be delivered by retaining the existing purling and rafter roof frame. The proposed location for the bat attic is shown in Figure 3.

Access into this roof void must be in a similar area in relation to the access cart doorway on the eastern gable of building B. This access point will be achieved by installing a slot like access through the flat face of the gable, an example of this is shown in Figure 4 below.



Figure 2: The position of the proposed bat attic within the roof void of the threshing barn.



Figure 3: an example of the access slit to be installed within the eastern gable.

For the day roosting bats which emerged from the south facing gable of building A, an enclosed bat tube is to be installed in one of the exterior walls of the redeveloped barn.

The enclosed bat tubes are to be installed within the exterior walls as such that the access slot to the box fits flush with the wall to allow a bat to land below and crawl up into the box. An example of an installed Habitat box is provided in figure 4 below.



Figure 4: Examples of bat tubes fitted within the brickwork of an exterior wall

In order to comply with best practice mitigation a total of three of these boxes are required, to replace day roosting habitat on a like-for-like basis.

### Breathable Roofing Membranes

Scientific investigations (Waring et al., 2013) into bats roosting against non-bitumen roofing membranes have found that bats become entangled in the loose fibres of the membrane resulting in death. ALL modern roofing membranes represent a threat to roosting bats in this way. Consequently, if it is necessary to underline the new roof this must be with either with bitumen 1F felt or timber sarking. Non-bitumen roofing membranes are not permitted in bat roosts, the use of roof membranes Bitumen type 1F felt with a hessian matrix must be used.

### Light Pollution Control

To comply with the criteria of any EPS licence it is important the new access features are not illuminated by exterior lighting.

Scientific studies have shown artificial lighting has a detrimental impact on bats in a variety of ways particularly on slow flying and rarer species causing them to modify their behaviour, thereby reducing their fitness and ability to survive. Potential negative impacts of artificial lighting in relation to the site should be considered and if exterior lighting is to be installed this should be done in collaboration with a bat ecologist.

Any proposed scheme should not encourage the continuous illumination of nearby gardens or the site boundaries.

The following recommendations for mitigation of artificial lighting have been extracted from the Guidance note 08/18: Bats and Artificial Lighting in the UK produced by the Bat Conservation Trust and Institution of Lighting Professionals (2018).

Lighting units should use LED which emit a warm white light (less than 2700K) to reduce the blue light component known to attract insects.



Lighting units should feature peak wavelengths 550nm to avoid the component of light that is most disturbing to bats

Lighting units should be mounted horizontally as such there is no upward tilt

External security lighting should be motion sensitive on a short timer (1 min)

Lighting should be directed to where it is needed, and efforts made to reduce light spill, if necessary, by using accessories such as hoods and louvres.

## 7 REFERENCES

Collins, J. (ed) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines*, 3<sup>rd</sup> Edition, Bat Conservation Trust, London.

Mitchell-Jones, A.J. (2004) *Bat Mitigation Guidelines*, English Nature, Peterborough.

Stone, E. L., Jones, G., & Harris, S. (2009). Street lighting disturbs commuting bats. *Current biology*, 19(13), 1123-1127.

Waring S.D., Essah E.A, Gunnell K., and Bonser R.H.C., (2013) Double Jeopardy: The Potential for Problems when Bats Interact with Breathable Roofing Membranes in the United Kingdom. *Architecture & Environment*, 1 (1): 1-13.

## 8 Appendix 1 – Survey observations from the emergence and activity and dawn re-entry surveys

N°	Time	Surveyor	Species	Activity	Notes
1	21:59	H Scarborough	Common Pipistrelle	Commute	West to east over building
2	22:02	H Scarborough	Common Pipistrelle	Echolocation	Brief pass
3	22:03	H Scarborough	Common Pipistrelle	Foraging	Up to two bats looping to the north-east and along east of barn
4	22:15	H Scarborough	Common Pipistrelle	-	Continuous foraging since 22:03, stopped
5	22:17	H Scarborough	Common Pipistrelle	Commute	East to west over buildings
6	22:19	H Scarborough	Common Pipistrelle	Echolocation	Unseen pass
7	22:23	H Scarborough	Common Pipistrelle	Echolocation	Unseen pass
8	22:38	H Scarborough	Brown Long-eared	Foraging	Bat inside the old milking parlour building
9	22:45	H Scarborough	Brown Long-eared	Foraging	Still inside the old milking parlour
10	22:50	H Scarborough	Natterer's	Foraging	Inside the larger northern barn, multiple passes
1	21:58	S Vinters	Brown Long-eared	Echolocation	Unseen pass
2	22:08	S Vinters	Noctule	Echolocation	Unseen pass
3	22:37	S Vinters	Common Pipistrelle	Commute	From north-east over the building
4	22:48	S Vinters	Myotis sp.	Commute	From north-east over the building
1	22:03	A Williamson	Common Pipistrelle	Emerge	Left side of the south facing gable apex of the single storey section
2	22:07	A Williamson	Common Pipistrelle	Foraging	Around the courtyard
3	22:14	A Williamson	Common Pipistrelle	Foraging	Around the courtyard
4	22:24	A Williamson	Common Pipistrelle	Foraging	Along the driveway
5	22:29	A Williamson	Common Pipistrelle	Foraging	Around the courtyard
6	22:30	A Williamson	Natterer's	Foraging	Multiple passes along the driveway
7	22:36	A Williamson	Myotis sp.	Emerge	From the south facing gable apex of the single storey section
8	22:36	A Williamson	Brown Long-eared	Emerge	Out from window on south facing single storey gable
9	22:42	A Williamson	Natterer's	Foraging	Multiple passes around the courtyard and trees
10	22:48	A Williamson	Common Pipistrelle	Foraging	Multiple passes around the courtyard and trees
11	22:49	A Williamson	Common Pipistrelle	Foraging	Multiple passes around the courtyard and trees
12	22:54	A Williamson	Common Pipistrelle	Foraging	Multiple passes around the courtyard and trees
1	22:02	D Murienova	Common Pipistrelle	Emerge	Emerges out from within the barn
2	22:04	D Murienova	Common Pipistrelle	Foraging	2 bats continuous foraging in and out of the barn until 22:15
3	22:19	D Murienova	Common Pipistrelle	Foraging	In and out of large open fronted barn and then away northward
4	22:22	D Murienova	Brown Long-eared	Commute	Comes from the west of the surveyor and enters the large barn via the open doorway
5	22:23	D Murienova	Common Pipistrelle	Foraging	In and out of large open fronted barn
6	22:33	D Murienova	Myotis sp.	Commute	Possibly two myotis species in the vicinity
7	22:38	D Murienova	Natterer's	Emerge	Bats foraging in and out of the large barn, appeared from inside
8	22:40	D Murienova	Natterer's	Foraging	Multiple passes and possibly multiple bats in and out of barn

9	22:42	D Murienova	Natterer's	Foraging	At least 4 bats foraging inside and through doorway of barn
10	22:46	D Murienova	Natterer's	Foraging	One seen exiting the barn and away to the north
11	22:47	D Murienova	Natterer's	Foraging	Multiple bats still foraging in and out of the barn
12	22:48	D Murienova	Natterer's	Foraging	Multiple bats still foraging in and out of the barn
13	22:49	D Murienova	Natterer's	Foraging	Multiple bats still foraging in and out of the barn
14	22:50	D Murienova	Noctule	Commute	High pass overhead
15	22:53	D Murienova	Natterer's	Foraging	Still at least two bats foraging inside barn
16	22:54	D Murienova	Common Pipistrelle	Foraging	Multiple passes ahead
17	22:55	D Murienova	Natterer's	Foraging	Singular bat still foraging in the large barn
18	22:56	D Murienova	Common Pipistrelle	Foraging	Unseen ahead
19	23:00	D Murienova	Common Pipistrelle	Foraging	Unseen ahead

Table 3: Survey results from the emergence and activity survey on the 11<sup>th</sup> of June 2021.

N°	Time	Surveyor	Species	Activity	Notes
1	21:50	H Scarborough	Common Pipistrelle	Emerge	Emerging from open eastern end of northern barn
2	21:54	H Scarborough	Common Pipistrelle	Commute	Flew west to east alongside the northern barn
3	21:58	H Scarborough	Common Pipistrelle	Emerge/Commute	In and out of northern barn and alongside of northern barn
4	22:05	H Scarborough	Common Pipistrelle	Foraging	Continuous foraging alongside the eastern elevation of the barns
5	22:16	H Scarborough	Brown Long-eared	Foraging	Flying inside the single-storey old milking parlour
6	22:26	H Scarborough	Common Pipistrelle	Echolocation	Unseen pass
7	22:41	H Scarborough	Brown Long-eared	Commute	Single pass along the eastern edge of the barns
8	22:44	H Scarborough	Natterer's	Emerge/Forage	Up to 4 bats at any one time, possibly exiting out the open end
9	22:48	H Scarborough	Brown Long-eared	Commute	Single pass along the eastern edge of the barns
10	22:50	H Scarborough	Common Pipistrelle	Commute	Single commuting pass
1	21:56	S Vinters	Common Pipistrelle	Commute	Pass NW to SW
2	21:56	S Vinters	Myotis sp.	Echolocation	Unseen pass
3	22:08	S Vinters	Common Pipistrelle	Commute	Pass East to West
4	22:13	S Vinters	Soprano Pipistrelle	Echolocation	Unseen pass
5	22:14	S Vinters	Common Pipistrelle	Commute	Pass NE to SW
6	22:16	S Vinters	Common Pipistrelle	Echolocation	Unseen pass
1	21:59	A Williamson	Myotis sp.	Commute	Single pass over the ridge
2	22:05	A Williamson	Natterer's	Emerge	2 bats from the gable window, 1 from the window facing the courtyard
3	22:06	A Williamson	Natterer's	Emerge	Emerged from the south facing gable
4	22:06	A Williamson	Common Pipistrelle	Emerge	Out from the wall plate to the left of the chimney on the small barn
5	22:08	A Williamson	Natterer's	Emerge	5 bats out of the south facing gable
6	22:10	A Williamson	Common Pipistrelle	Foraging	Three foraging passes
7	22:13	A Williamson	Soprano Pipistrelle	Emerge	Emerged from the lower window on the southern gable
8	22:14	A Williamson	Natterer's	Emerge	2 bats emerging out into the courtyard from the northern barn
9	22:15	A Williamson	Natterer's	Emerge	3 bats emerging out into the courtyard from the northern barn

10	22:17	A Williamson	Natterer's	Emerge	Single emerge from the south facing gable window
11	22:19	A Williamson	Common Pipistrelle	Foraging	Foraging around the courtyard
12	22:21	A Williamson	Natterer's	Foraging	Foraging alongside the large barn toward the trees to the west
13	22:24	A Williamson	Natterer's	Foraging	Foraging alongside the large barn toward the trees to the west
14	22:30	A Williamson	Common Pipistrelle	Foraging	Up and down the driveway
15	22:52	A Williamson	Noctule	Commute	Commuting passes overhead
16	22:58	A Williamson	Common Pipistrelle	Foraging	Up and down the driveway
1	21:51	D Murielova	Common Pipistrelle	Commute	From behind surveyor into the barn
2	21:52	D Murielova	Common Pipistrelle	Foraging	Multiple passes in and out of the large barn, continuous for 3 minutes
3	21:52	D Murielova	Soprano Pipistrelle	Foraging	Multiple passes in and out of the large barn
4	21:58	D Murielova	Common Pipistrelle	Echolocation	Unseen pass
5	22:05	D Murielova	Common Pipistrelle	Foraging	Multiple passes in and out of the large barn
6	22:07	D Murielova	Brown Long-eared	Commute	Visual only, commute left to right
7	22:07	D Murielova	Common Pipistrelle	Foraging	Multiple passes in and out of the large barn
8	22:15	D Murielova	Myotis sp.	Echolocation	Unseen pass
9	22:21	D Murielova	Common Pipistrelle	Foraging	2 bats continuous foraging until 22:27
10	22:28	D Murielova	Natterer's	Echolocation	Unseen pass
11	22:34	D Murielova	Natterer's	Echolocation	Unseen pass
12	22:51	D Murielova	Common Pipistrelle	Commute	Left to right ahead of surveyor
13	22:52	D Murielova	Noctule	Foraging	High overhead
14	22:56	D Murielova	Natterer's	Foraging	In and out of large barn
15	23:01	D Murielova	Natterer's	Foraging	In and out of large barn
16	23:02	D Murielova	Natterer's	Foraging	In and out of large barn

Table 4: Survey results from the emergence and activity survey on the 1<sup>st</sup> of July 2021.

N°	Time	Surveyor	Species	Activity	Notes
1	05:11	N Clayton	Natterer's	Echolocation	Unseen pass
2	05:13	N Clayton	Common Pipistrelle	Echolocation	Unseen pass
3	05:15	N Clayton	Natterer's	Echolocation	Unseen pass
4	05:15	N Clayton	Noctule	Echolocation	Unseen pass
5	05:17	N Clayton	Natterer's	Foraging	Over the corner of the two barns
6	05:18	N Clayton	Brown Long-eared	Commute	South to North alongside eastern barn
7	05:19	N Clayton	Brown Long-eared	Foraging	Over the corner of the two barns
8	05:19	N Clayton	Natterer's	Foraging	Over the corner of the two barns
9	05:20	N Clayton	Natterer's	Echolocation	Unseen pass
10	05:22	N Clayton	Natterer's	Echolocation	Unseen pass
11	05:22	N Clayton	Nyctalus sp.	Echolocation	Unseen pass
12	05:24	N Clayton	Natterer's	Echolocation	Unseen pass
13	05:26	N Clayton	Natterer's	Echolocation	Unseen pass
14	05:27	N Clayton	Natterer's	Foraging	In and out of northern barn and overhead
15	05:28	N Clayton	Natterer's	Echolocation	Unseen pass
16	05:29	N Clayton	Natterer's	Echolocation	Unseen pass
17	05:31	N Clayton	Common Pipistrelle	Echolocation	Unseen pass
18	05:31	N Clayton	Natterer's	Echolocation	Unseen pass

19	05:32	N Clayton	Natterer's	Foraging	In and out of northern barn and overhead
20	05:33	N Clayton	Brown Long-eared	Echolocation	Unseen pass
21	05:34	N Clayton	Nyctalus sp.	Echolocation	Unseen pass
22	05:37	N Clayton	Common Pipistrelle	Echolocation	Unseen pass
23	05:39	N Clayton	Natterer's	Foraging	Inside the northern barn
24	05:42	N Clayton	Natterer's	Commute	East to west over the eastern barn
25	05:44	N Clayton	Nyctalus sp.	Echolocation	Unseen pass
26	05:45	N Clayton	Brown Long-eared	Echolocation	Unseen pass
27	05:55	N Clayton	Soprano Pipistrelle	Echolocation	Unseen pass
1	05:11	C Ward	Myotis sp.	Echolocation	Unseen pass
2	05:12	C Ward	Noctule	Echolocation	Unseen pass
3	05:31	C Ward	Common Pipistrelle	Echolocation	Unseen pass
4	05:35	C Ward	Noctule	Commute	Pass overhead
5	05:40	C Ward	Noctule	Commute	Pass overhead
1	05:00	M Evans	Bat sp.	Audio	Bats heard chattering from within the barn
2	05:03	M Evans	Natterer's	Echolocation	Unseen pass
3	05:03	M Evans	Natterer's	Echolocation	Unseen pass
4	05:04	M Evans	Myotis sp.	Echolocation	Unseen pass
5	05:05	M Evans	Natterer's	Echolocation	Unseen pass
6	05:07	M Evans	Natterer's	Echolocation	Unseen pass
7	05:12	M Evans	Myotis sp.	Echolocation	Unseen pass
8	05:12	M Evans	Common Pipistrelle	Commute	Pass left to right
9	05:13	M Evans	Myotis sp.	Echolocation	Unseen pass
10	05:21	M Evans	Noctule	Echolocation	Unseen pass
11	05:22	M Evans	Noctule	Echolocation	Unseen pass
12	05:22	M Evans	Myotis sp.	Echolocation	Unseen pass
13	05:25	M Evans	Noctule	Commute	High pass overhead
14	05:26	M Evans	Myotis sp.	Echolocation	Unseen pass
15	05:28	M Evans	Myotis sp.	Echolocation	Unseen pass
16	05:31	M Evans	Common Pipistrelle	Commute	To the right of surveyor
17	05:31	M Evans	Myotis sp.	Echolocation	Unseen pass
18	05:34	M Evans	Noctule	Echolocation	Unseen pass
19	05:36	M Evans	Natterer's	Echolocation	Unseen pass
20	05:52	M Evans	Common Pipistrelle	Echolocation	Unseen pass
21	06:01	M Evans	Natterer's	Commute	Briefly seen to the left near the south facing barn
22	06:02	M Evans	Natterer's	Echolocation	Unseen pass
23	06:07	M Evans	Natterer's	Echolocation	Unseen pass

Table 5: Survey results from the dawn re-entry survey undertaken on the 13<sup>th</sup> of September 2021.