I&G Ecological Consulting

Barns at Old Burfa, Evenjobb, Presteigne, Powys, LD8 2SH

Bat Survey Report for Mr C. Duffgordon

A European Protected Species Licence <u>will be required</u>

for works to be undertaken on the ***Barns***

Report type	Bat Survey Report
Report reference	IG2023OldBurfaBarns
Site	Barns at Old Burfa, Evenjobb, Presteigne, Powys, LD8 2SH
Grid reference	SO 27920 61406
Client	Mr C. Duffgordon
Date(s)/time(s)/type(s) of survey(s)	**Scoping survey:** 26th May 2023 **Dusk emergence survey:** 29th May 2023 between 21:00 and 23:20 **Dawn re-entry survey:** 18th June 2023 between 02:50 and 04:55
Surveyor details	**Scoping survey:** Mr Iestyn Evans, Natural Resources Wales Licence number S090746/1 **Activity surveys:** as above with assistance from Mr Greg Evans, Ms Sharon Doherty, and Ms Bonnie Illingworth
Architect	Nidus Architects

Version	Status	Changes	Name	Position	Date
1	**Draft**	Sent for review on 20/09/2023	Ceri Daugherty	Author	19/09/23

	Name	Position	Date
Reviewed by	Iestyn Evans	Author	20/09/2023
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Executive summary

- At Old Burfa (the property) the 18th/19th century Grade II listed **Barns** are subject to proposed plans for conversion. The **Barns** form a T-shape with the southern section and part of the eastern section (**Barns 1 to 4**) being constructed of stone walls (some brickwork) with a pitched slate roof, timber framed windows and timber doors – the large openings on the corner of the southern and eastern section are currently covered with plastic/fabric sheeting. The eastern end of the eastern section (**Barns 5 & 6**) has horizontal timber cladding with a curved corrugated metal sheet roof and part metal/part timber doors while the northern section (**Barn 7**) has corrugated metal sheet walls on its western side, is open on the eastern side and has a curved, corrugated metal sheet roof. There are potentially exploitable gaps within the stone walls as well as vent holes in the walls which could facilitate internal access as well as small gaps under the timber cladding. In addition, there are numerous wall top gaps as well as gaps around the door frames while the roofs have a small number of raised slates and ridge tiles.
- On 26th May 2023, I&G Ecological Consulting Ltd undertook a daytime bat scoping survey of the buildings at the property. A dusk emergence survey was undertaken on 29th May 2023 followed by a dawn re-entry survey on 18th June 2023. The weather conditions present were conducive to bat activity and access was available to all areas.
- This report confirms the findings of these surveys, completed in accordance with current best practice (Collins, J. (Ed.) 2016) and conducted by experienced, licensed ecologists and assistants. A previous withdrawn application refers to a 2018 Bat Survey Report (no copy available) which confirmed the presence of **Lesser horseshoe** in the **Barns (specifically Barns 1 & 2).**
- The property is situated in a rural position 1.8km south-east of the village of Evenjobb, 4.5km south-west of the Welsh market town of Presteigne, and 5km north-west of the English market town of Kington. **It is within favourable bat habitat but is not within 10km of any site designated for its bat interest.**
- During the scoping survey droppings were found within the **Barns** which DNA confirmed were from **Soprano pipistrelle**. The **Barns** therefore have **confirmed** potential to support roosting bats and a **confirmed** risk of bats using the features present. During the surveys up to 25 **Soprano pipistrelle** emerged/re-entered the **Barns**, and this species as well as **Common pipistrelle, Noctule** and **Myotis species** were detected foraging and commuting within the surroundings.
- In relation to **Roost Characterisation Assessment,** from the evidence gathered it is considered that the **Barns** are being used by **Soprano pipistrelle (25 confirmed) as a small maternity roost. In addition, Lesser horseshoe were previously confirmed to be present, although roost status was not confirmed.**
- **Mitigation measures will need to be implemented for bats and nesting birds, but no evidence of Owl was found**. However, biodiversity enhancement measures are also required to ensure the development complies with the Environment (Wales) Act 2016, Future Wales 2040, and PPW (Edition 11, February 2021). Recommendations are as follows (all nests are to be confirmed vacant before works commence). See appendix 5 plans and appendix 9 for examples and siting advice. **The final plans are to show all bat and bird mitigation/enhancement measures as well as any proposed external lighting. The location of any trees for bat/bird boxes are also to be shown.**
  - ***Recommendation 1 (Site Bat Enhancement):*** Prior to works commencing, x 2 Harlech Woodstone (or similar) and x 1 Improved Maternity (or similar) bat boxes to be affixed to mature trees to be retained within the curtilage of the property. See Putting up your box - Bat Boxes - Bat Conservation Trust (bats.org.uk)
  - ***Recommendation 2 (Bat Mitigation):*** The loft space within **Barns 1 & 2** is to be retained as a dedicated roost space. No dimensions have been provided so length, width, and height (full height to apex)) are required to be added to the final plans, along with any proposed external lighting. Access (subject to listed building consent) for **Lesser horseshoe** will be via a cowled 'letterbox' (300mm wide x 200mm high) to be cut into the timber door on the southern gable end. Access for Soprano pipistrelle (and all crevice/cavity dwelling species) will be v2 x wall top gaps on each of the east and west elevations. Any lining must be Type 1F bitumastic felt.
  - ***Recommendation 3 (Bat Enhancement):*** subject to listed building consent, retain at least 10 holes in the stonework to offer hibernation opportunities for crevice dwelling bats.
  - ***Recommendation 4 (Passerine Bird Mitigation)***: Prior to works commencing 2 x Small-holed nest boxes and 2 x Open-fronted nest boxes to be affixed to mature trees within the curtilage of the property (or other buildings on site). See Where To Put A Bird Box | Nestboxes - The RSPB
  - ***Recommendation 5 (Swallow Mitigation)***: x 2 Swallow nest cups to be affixed internally within a building on site with access or an area where there is a 200mm+ overhang. All nests must be confirmed vacant prior to works commencing. See Attracting Swallows to Nest Sites in Outbuildings - The RSPB
  - ***Recommendation 6 (Broadscale Site Enhancement)*:** Wider ecological benefit could be gained by retaining any mature hedgerow/tree boundaries that are the responsibility of the property owner and ensuring any future planting is with native species of wildlife value to increase connectivity to the surrounding habitat. See 17_bats_&_hedges_leaflet.pdf (hedgelink.org.uk). In addition, any garden areas are to include measures to enhance the site for Hedgehogs. See developers-1.pdf (britishhedgehogs.org.uk)

Contents

1. Introduction

1.1 Scope and purpose of survey

1.1.1 Any sign of use of a site by bats is enough to confirm that the space has 'bat interest' and is enough to confirm the importance of the location to bat species. All species, as well as their resting places, are protected by law and the site is protected even when bats are not present. See appendix 1 for an introduction to bat surveys, including the aims of the scoping survey, appendix 2 for an overview of the legislation, and appendix 3 for information on roost types and survey timings. Appendix 4 lists all surveyors who undertake work for I&G Ecological Consulting Ltd and includes their experience.

1.1.2 This report confirms the results of, and conclusions and recommendations from, the surveys undertaken. It aims to provide the local planning authority with sufficient information to enable a full assessment of the potential ecological impacts of the proposed development. The CIEEM Guidelines for Ecological Report Writing (2017) state that it is important that the structure and content of a report should be proportionate to the predicted degree of risk to biodiversity and to the nature and scale of the proposed development. This report has therefore been written in line with these guidelines.

1.1.3 For the purposes of this survey report, the site boundary is defined as the buildings and surfaces within the overall site footprint.

1.2 Site characteristics and proposed works

1.2.1 Old Burfa (the property) is situated within favourable bat habitat in a rural position 1.8km south-east of the village of Evenjobb, 4.5km south-west of the Welsh market town of Presteigne, and 5km north-west of the English market town of Kington. The property itself has grassland bordered by mature trees (including the ancient woodland of Middler Wood) and beyond its curtilage are agricultural fields which while predominantly improved do have some mature hedgerows providing good connectivity. There are also further small areas of woodland – including ancient woodland – within 2km in all directions while just to the south is the Iron Age hillfort of Burfa Bank. In relation to waterbodies and watercourses, the confluence of Summergil Brook and Hindwell Brook is 640m to the south, 920m to the south-east is Riddings Brook, and there are lakes/ponds within 2km.

1.2.2 The **Barns** at the property are subject to proposed plans for conversion (excluding **Barn 7**). Figure 1 shows an aerial view of the property, figure 2 on the following page shows the wider environment and figure 3 is a block and location plan. Additional plan drawings are included in appendix 5.

Figure 1: Aerial view of the **Barns** at the property which are outlined in red (from Apple® Maps)

Figure 2: Map showing the wider environment. The property is indicated by a blue dot. (from Apple® Maps)

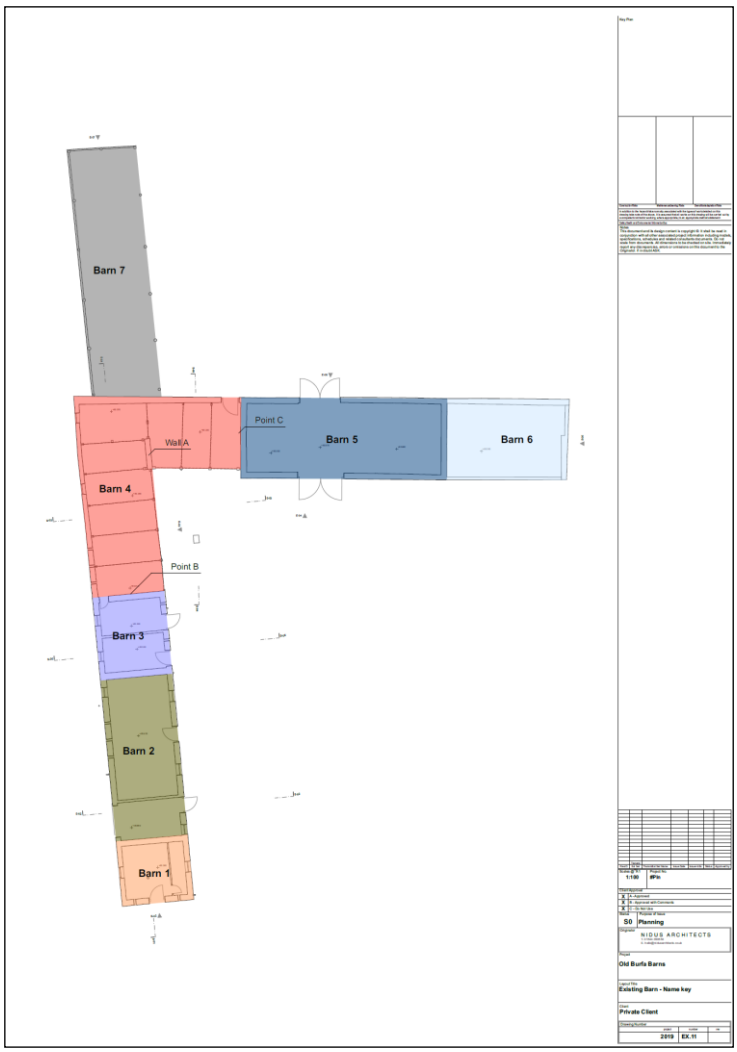


Figure 3: Block plan – existing name key (provided by the architect)

2. Desk study methods and results

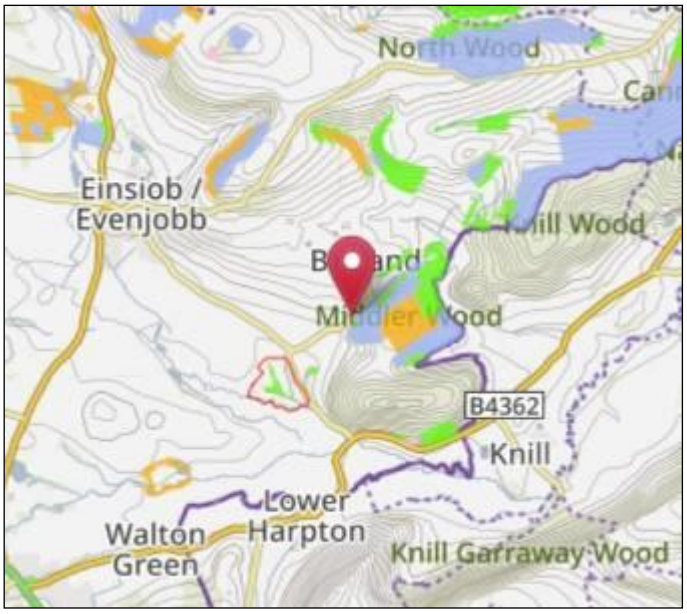
2.1 Methods

2.1.1 A 2km search area is used which covers the predicted zone of influence of the proposed development. Where bats are found to be present, any sites within 10km which are designated for their bat interest will also be noted. The reasons for the site designations have also been considered when discussing potential impacts on the biodiversity of these sites. DataMapWales is used to establish the proximity of National and International Statutory Designations, particularly in relation to designations for bat interest. Species searches are also conducted through the Local Records Centre (LRC) where appropriate. An online search of planning applications at the property is undertaken to understand its planning history, especially relating to bats.

2.2 Results

2.2.1 The property is not within nor adjacent to any designated sites. Within 2km, 430m to the west is Burfa Boglands Site of Special Scientific Interest (SSSI) which is also a Wildlife Trust Reserve and a Roadside verge Nature Reserve. This site is not designated for its bat interest and there are no designated sites within 10km which are designated for their bat interest. It is also within 2km of 15 areas of Ancient Semi Natural Woodland, five Restored Ancient Woodland Sites, six Plantations on Ancient Woodland Sites (PAWS), and one Ancient Woodland Site of Unknown Classification; the closest being a PAWS 40m to the north-east of **Barn 7**. There are no Local or National Nature Reserves while Sites of Importance for Nature Conservation within Powys can only be secured through an LRC search (designated sites were not covered by the search undertaken). See Figure 4 for sites within 2km with the location of the property's postcode being shown by a red dot.

Figure 4: Designated sites within 2km.
(Taken from DataMapWales)



2.2.2 The data search conducted in September 2023 reported 92 records for bats of eight species within 2.5km, as follows:

- **Common pipistrelle (*Pipistrellus pipistrellus*):** 23 records, the closest being two 1986 records for a roost at the farmhouse on site.
- **Unidentified bat (*Chiroptera*):** three records, the closest being a 1988 record from 550m away.
- **Brown long-eared (*Plecotus auritus*):** eight records, the closest being three 1988 roost records from 1.3km away.
- **Whiskered (*Myotis mystacinus*):** one 1983 record for droppings from 1.3km away.
- **Brandt's (*Myotis brandtii*):** one 1983 record for droppings from 1.3km away.
- **Soprano pipistrelle (*Pipistrellus pygmaeus*):** 19 records, the closest being a 2002 record for a roost from just under 1.5km away.
- ***Pipistrellus* species:** 16 records, the closest being a 2002 roost record from 1.5km away.
- **Nathusius's pipistrelle (*Pipistrellus nathusii*):** one 2012 record from just under 1.6km away.
- **Noctule (*Nyctalus noctula*):** 12 records, the closest being two 2020 records from 1.6km away.
- ***Myotis species*:** four records, the closest being a 2002 roost record from just over 2km away.
- **Natterer's (*Myotis nattereri*):** two records, the closest being a 1984 record from just under 1.8km away.
- **Bats (*Vespertilionidae*):** two 2002 records from 2.4km away.

2.2.3 An online search reported the following previous applications for the **Barns**: Application 21/0759/LBC for listed building consent (LBC) for removal of 5 unauthorised modern double-glazed windows (one in **Barn 1**, one in Barn 2, one in **Barn 3** and two in **Barn 4**); Reinstate previous timber and wrought iron windows; and remove unauthorised concrete slab installed in **Barn 4** was withdrawn on 22nd October 2021. Application 22/0317/FUL (with associated listed building consent application 22/0318/LBC) for conversion of **Barns 3 and 4** to provide residential space ancillary to Burfa House together with external and internal works and alterations including seeking to rectify unauthorised work undertaken by the site's previous owner was withdrawn on 17th October 2022. In relation to the above, the ecologist's response states that the submitted Design Statement referred to a previous bat survey of the **Barns** undertaken in 2018 to inform works undertaken in **Barns 1 and 2**. The survey had not been provided but was considered out of date to inform the proposal. The survey identified roosting **Lesser horseshoe (*Rhinolophus hipposideros*) in Barns 1 and 2** and recommended retention of suitable roost space with proposed works requiring a European Protected Species licence. However, no planning application for works relating to **Barns 1 and 2** appeared to have been submitted and from the photographs in the Heritage Impact Assessment it was not clear whether the required mitigation had been undertaken. The Design Statement stated that access to the bat loft would be kept but it was not clear from the submitted information if the bat mitigation/compensation works were being proposed as part of the scheme or were already in place. The Statement identified that **Barns 3 and 4** were unsuitable for roosting bats and therefore roosts would not be affected and no EPS licence required. However, insufficient information was provided to confirm if this was the case. If bats, including ***R. hipposideros*** were still present at the site, there was potential for noise from construction (such as removal of concrete floors), installation of any future external lighting (although none appeared to be proposed) or removal of nearby hedgerows and trees, to impact on their use of any adjoining roost.

3. Field survey methods and results

3.1 Methods

3.1.1 A Preliminary Roost Assessment (PRA) was undertaken on 26th May 2023 to identify Potential Roost Features (PRF). Details of the equipment used by I&G Ecological Consulting Ltd can be found in appendix 1. The survey was undertaken by Iestyn Evans.

3.1.2 In relation to survey limitations, many of the UK species of bat are crevice dwelling, and bats or signs of bats can be difficult to find within a building. In addition, there may be areas that are inaccessible to the surveyor. Externally, sufficient access was available to enable a thorough survey from ground level while internal access was available to all areas. In addition, two activity surveys were undertaken in good weather conditions to understand how bats may be using the surrounding area. Using the equipment available, all accessible areas were thoroughly surveyed to maximise effectiveness.

3.1.3 The dusk survey was undertaken on 29th May 2023 and the surveyors were Iestyn Evans, Sharon Doherty, Greg Evans, and Bonnie Illingworth. Sunset was at 21:20, the survey started at 21:00 and ended at 23:20. The weather remained dry throughout the survey and was clear and sunny before sunset, humidity was around 55%, there was a light easterly breeze of 2mph, and the temperature started at 14.4°C and ended at 11.2°C.

3.1.4 The dawn survey was undertaken on 18th June 2023 and the surveyors remained as for the dusk survey. Sunrise was at 04:49 the survey started at 02:50 and ended at 04:55. The weather remained dry throughout the survey with 75% cloud ate the end, humidity was around 85%, there was little to no wind, and the temperature started at 14.2°C and ended at 13.6°C.

3.1.5 Figure 5 shows the position of surveyors during the activity surveys. Each surveyor had a Magenta 5 or an Elekon Batscanner bat detector to assist in identification and detection of bats and their behaviour. **Surveyors moved along the elevation they were watching during the surveys.**

Figure 5: Surveyor positions during the activity surveys. From Apple© maps

3.2 Survey results

3.2.1 The PRA found that the 18th/19th century Grade II listed **Barns** form a T-shape with the southern section and part of the eastern section (**Barns 1 to 4**) being constructed of stone walls (some brickwork) with a pitched slate roof, timber framed windows and timber doors – the large openings on the corner of the southern and eastern section are currently covered with plastic/fabric sheeting. The eastern end of the eastern section (**Barns 5 & 6**) has horizontal timber cladding with a curved corrugated metal sheet roof and part metal/part timber doors while the northern section (**Barn 7**) has corrugated metal sheet walls on its western side, is open on the eastern side and has a curved, corrugated metal sheet roof. It is generally in good condition and well maintained (noting that some unauthorised works had taken place previously under different ownership). The walls are intact but there are potentially exploitable gaps within the stone walls as well as vent holes in the walls which could facilitate internal access for all bats as well as small gaps under the timber cladding. In addition, there are numerous wall top gaps as well as gaps around the door frames could enable access via the wall tops for crevice dwelling bat species. The roofs are also generally in good condition but there are a small number of raised slates and ridge tiles that could offer potential for crevice dwelling species. The roofs are part unlined/part non-bitumen roofing membrane lined with some areas also having fabric. The lining is in good condition with no damage but the fabric has areas which could offer opportunities for roosting bats. The spaces are used for storage and droppings were found throughout **Barns 1 to 4**, with the largest amount being found stuck in cobwebs at the wall tops. Only droppings characteristic of ***Pipistrellus* species** were found and DNA analysis confirmed that they were from ***P. pygmaeus.*** As a result of all the findings, the **Barns** have **confirmed** potential to support roosting bats and a **confirmed** risk of bats using the features present. Site survey images are included in appendix 6 and the DNA certificate is in appendix 7.

3.2.2 Figure 6 on the following page shows the flight lines of bats detected and the times they were detected. The species detected during the surveys, and the nature of their activity follows.

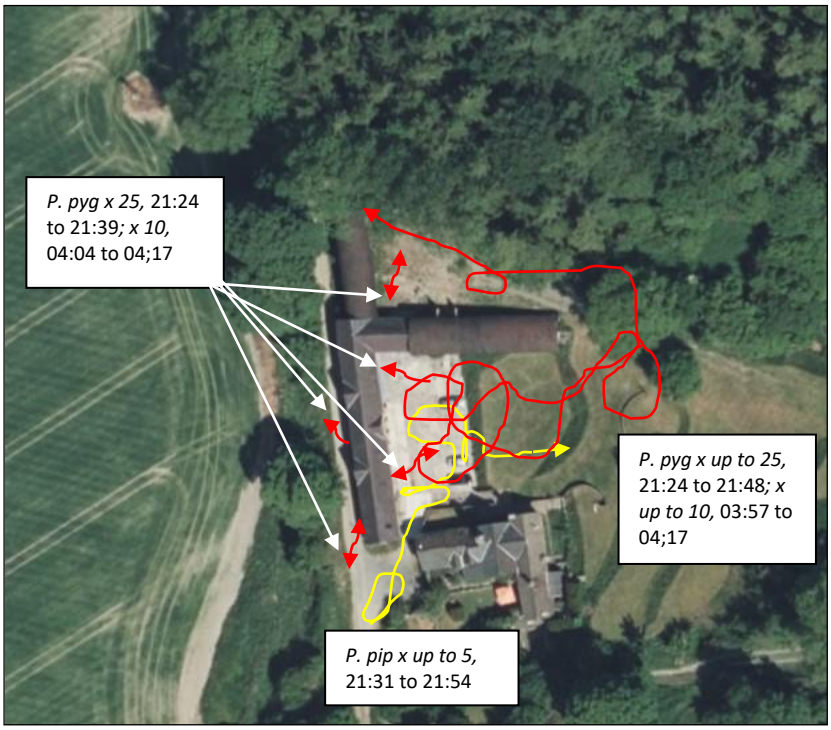


Figure 6: Aerial map showing the flight lines of bats detected (from Apple© Maps)

29/05/2023: Sunset was at 21:20, the survey started at 21:00 and ended at 23:20

18/06/2023: Sunrise was at 04:49 the survey started at 02:50 and ended at 04:55

- ***P. pygmaeus:*** On both surveys' bats were seen to leave and enter wall top gaps on **Barns 1 to 4**. The earliest activity on the dusk survey was an emergence at four minutes after sunset with emergence continuing until 19 minutes after sunset and a total of 25 bats observed emerging. There was no sustained activity on site but bats were detected foraging and commuting on the eastern and northern side until 28 minutes after sunset. Calls were also heard to the north and west between 100 and 115 minutes after sunset. During the dawn survey calls were heard on all sides of the **Barns** around halfway through the survey and it is considered likely that number of bats re-entered at this time. In addition, 10 bats were seen to re-enter **Barns 1 to 4** via wall top gaps between 45 and 32 minutes before sunrise.
- ***P. pipistrellus:*** There was no sustained activity on site during either survey, and during the dawn survey the only activity recorded was occasional calls to the south during the first half of the survey. Activity was greater on the dusk survey with bats detected to the south (possibly related to the main house) and east of the **Barns** from 11 minutes after sunset until 34 minutes after sunset. Occasional calls were also heard to the north and east for the remainder of the survey.
- ***Myotis* species:** No bats were detected on site during either survey. However, the surveyor on the northern site recorded up to five calls between 91 and 99 minutes after sunset on the dusk survey and between 86 and 78 minutes before sunrise on the dawn survey.
- ***N. noctula*:** No bats were detected on site during either survey and no activity was detected during the dusk survey. However, the surveyor on the northern site recorded two calls characteristic of this species at 68 and 63 minutes before sunrise on the dawn survey.

3.2.3 **Flight activity summary:** During the activity surveys up to 25 ***P. pygmaeus*** were seen to either leave or enter the **Barns**, and this species as well as ***P. pipistrellus*, *N. noctula*,** and ***Myotis* species** were also detected foraging and commuting on site.

3.2.4 Evidence of nesting birds was found and mitigation measures will need to be implemented. No signs of owl were discovered.

4. Interpretation, conclusions and recommendations

4.1 Interpretation and conclusions

4.1.1 Using the findings of the desk study and field surveys, it is **concluded that the property is located within favourable bat habitat but is not within 10km of any site designated for its bat interest.**

4.1.2 **Roost Characterisation Assessment:** from the evidence gathered it is considered that the **Barns** are being used as a **small maternity (25 bats confirmed)** roost by ***P. pygmaeus*. Based on the desk survey findings alone, it is also considered that the Barns have been used by a R. hipposideros. No numbers were provided to enable the status of the roost to be confirmed but the mitigation measures will be suitable for a maternity roost.** A summary of the evidence is as follows:

- ***P. pygmaeus:*** There are no sites within 10km designated for this species but there are roost records within 2km. On both surveys bats were seen to leave and enter wall top gaps on **Barns 1 to 4**. The earliest activity on the dusk survey was an emergence at four minutes after sunset with emergence continuing until 19 minutes after sunset and a total of 25 bats observed emerging. There was no sustained activity on site but bats were detected foraging and commuting on the eastern and northern side until 28 minutes after sunset. Calls were also heard to the north and west between 100 and 115 minutes after sunset. During the dawn survey calls were heard on all sides of the **Barns** around halfway through the survey and it is considered likely that number of bats re-entered at this time. In addition, 10 bats were seen to re-enter **Barns 1 to 4** via wall top gaps between 45 and 32 minutes before sunrise. The evidence confirms that a roost is present and while 25 is a relatively low number for a maternity roost, it is always possible that bats may have been missed emerging/re-entering, and it is concluded that the **Barns** are being used as a **small (25 bats confirmed) maternity roost** by this species.
- ***P. pipistrellus:*** There are no sites within 10km designated for this species but there are roost records within 2km, including from another building at the site. There was no sustained activity on site during either survey, and during the dawn survey the only activity recorded was occasional calls to the south during the first half of the survey. Activity was greater on the dusk survey with bats detected to the south (possibly related to the main house) and east of the **Barns** from 11 minutes after sunset until 34 minutes after sunset. Occasional calls were also heard to the north and east for the remainder of the survey. The evidence as a whole therefore suggests that this species is using the area as part of its foraging and commuting habitat with the timing of the activity suggesting that they may be roosting close by.
- ***Myotis species:*** There are no sites within 10km designated for this species but there are roost records within 2km. No bats were detected on site during either survey. However, the surveyor on the northern site recorded up to five calls between 91 and 99 minutes after sunset on the dusk survey and between 86 and 78 minutes before sunrise on the dawn survey. The evidence as a whole therefore suggests that this species is using the area as part of its foraging and commuting habitat.
- ***N. noctula:*** There are no sites within 10km designated for this species but there are records within 2km. No bats were detected on site during either survey and no activity was detected during the dusk survey. However, the surveyor on the northern site recorded two calls characteristic of this species at 68 and 63 minutes before sunrise on the dawn survey. The evidence as a whole therefore suggests that this species is using the area as part of its foraging and commuting habitat, with the proximity of the woodland to the site providing ideal habitat for this species.

- ***R. hipposideros:*** There are no sites within 10km designated for this species but there are 2018 roost records from the **Barns**, although the report was not available at the time of writing this report. No bats or their signs were found during the scoping survey, no bats were seen to either leave or enter the Barns, and no activity was detected on site during either survey. However, based on the desk survey evidence alone there has previously been a roost within Barns 1 & 2. The status of this roost could not be confirmed at the time of writing this roost but it can be confirmed that it is not currently in use and the lack of residual evidence suggests that it was unlikely to have been a maternity roost and was probably a day/night roost for a small number of bats of this species.

4.1.3 **Roost significance:** In relation to roost status and significance, the data included in the Bat Mitigation guidelines (Mitchell, 2004; Reason & Wray, 2023) was used, and focus was placed upon the need for appropriate – but proportionate – mitigation.

- ***R. hipposideros*** is considered to be a rare bat species but is a species of least concern on the IUCN Red List of Threatened species; although it is noted that the population is decreasing. Nationally, ***R. hipposideros*** has been the subject of a Species Action Plan under the UK Biodiversity Action Plan, and their UK populations are declining and now restricted to South-west England and Wales, with their population centre being within Pembrokeshire, and their conservation status is vulnerable. Using the mitigation guidelines, the roost at the site is considered to be of medium low conservation significance and the proposed mitigation measures will provide a suitable dedicated roost space at the property.
- ***P. pygmaeus*** are considered to be a common bat species and species of least concern on the IUCN Red List of Threatened species. Nationally, they are a priority bat species and have previously been the subject of Species Action Plans under the UK Biodiversity Action Plan, their populations are considered to be stable, and their conservation status is favourable. As a result, the roost at the property is considered to be of medium conservation significance, and the proposed mitigation measures will provide a suitable roost space at the property.

4.1.4 In relation to use of the property at other times of the year, ***Pipistrellus*** **species** will use small cracks and crevices within cavity walls in a church roof or bell tower, a quiet place in a large house, a hollow tree, or rock crevice where small groups will form clusters. The species has a relatively flexible winter hibernation strategy and will fly when the weather is mild. They will also use bat boxes to hibernate. Therefore, it is considered that the property has **moderate** potential for hibernation for these species. In relation to ***R. hipposideros***, this species favours caves, disused mines, tunnels and cellars for hibernation but have been found in old buildings. Therefore, it is considered that the property has **low** potential for hibernation for this species.

In addition, the measures to be put in place (e.g., inspection prior to works commencing and timing to avoid sub-optimal weather conditions such as when bats may be in deep torpor) will ensure that any risk is minimised.

4.1.5 *Crevice-dwelling bats* such as ***P. pygmaeus*** can crawl into roosts via small gaps in the range of 15–20mm high by 20–50mm wide. The roost area should maintain a crevice of this approximate size gap that the bats can roost between. The area this roost provision covers can be small but about $1m^2$ would be useful for summer nursery roosts. The height of entry can be from 2–7m. ***Horseshoe bats*** need a larger access so that they can fly (instead of crawl) directly into the roost. ***R. hipposideros*** need an access of 300mm (w) x 200mm (h), while ***R. ferrumequinum*** need 400mm (w) x 300mm (h). The roosting area should not be trussed, to allow flight, and should (where possible) be of similar dimensions to the roost being replaced. All bats and their roosts, irrespective of the number of bats, species, and whether bats are present or not, receive protection from the Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981

(as amended). As a result, in the absence of mitigation, the proposed works could result in the destruction of bat roosts for up to two species of bat as well as the potential disturbance, killing and/or injury of bats. Destruction of a roost is an absolute offence under the above legislation and **therefore, an EPS derogation licence must be obtained from Natural Resources Wales for the works to be legally undertaken on the property.**

4.1.6 Enforceable conditions of the EPS licence will require the maintenance of mitigation measures to minimise the risk of disturbance, killing or injury of bats (i.e., timing and methods of demolition works), and compensation measures to ensure continued bat roosting provision at the site and that the site is enhanced for protected species. These are outlined in section 4.2 and detailed in 5.1.

4.1.7 There are not considered to be any survey limitations which would impact upon the findings and recommendations of this report.

4.2 Recommendations

4.2.1 As noted in section 4.1 above, all bats and their roosts are protected under the Conservation of Habitats and Species Regulations 2017, and the Wildlife and Countryside Act 1981 (as amended). An EPS licence must be obtained for the works to legally proceed.

4.2.2 ***P. pygmaeus*** and ***R. hipposideros*** are species of principal importance in Wales. With regards to such species (Biodiversity Action Plan (BAP) species) in Wales, under section 42 of the Natural Environment and Rural Communities Act 2006, and sections 6 and 7 of The Environment (Wales) Act 2016 – the LPA must 'have regard' to the conservation of their biodiversity in considering the planning application. In the Environment (Wales) Act 2016 Section 6 *places a duty upon Local Authorities to enhance biodiversity and the resilience of ecosystems* and 7 to *Creating local biodiversity lists and a duty to take steps to maintain and enhance biodiversity*.

4.2.3 Measures will be required to help meet obligations within The Environment (Wales) Act 2016, Future Wales 2040, and Planning Policy Wales 11th Edition (February 2021); as well as compensate for the loss of roosting opportunity. Excellent long-term enhancement can be delivered, see appendix 9 for proposals and examples. Mitigation measures (against the risk of disturbing, killing, or injuring bats during the works), and compensation measures (to provide continued bat roosting provision at the site) will need to be implemented as conditions of the licence. Recommendations are as follows and **plans for the location of all bat/bird provision are to be submitted:**

- ***Recommendation 1 (Site Bat Enhancement):*** Prior to works commencing, x 2 Harlech Woodstone (or similar) and x 1 Improved Maternity (or similar) bat boxes to be affixed to mature trees to be retained within the curtilage of the property. See Putting up your box - Bat Boxes - Bat Conservation Trust (bats.org.uk)
- ***Recommendation 2 (Bat Mitigation):*** The loft space within **Barns 1 & 2** is to be retained as a dedicated roost space. No dimensions have been provided so length, width, and height (full height to apex)) are required to be added to the final plans, along with any proposed external lighting. Access (subject to listed building consent) for ***R. hipposideros*** will be via a cowled 'letterbox' (300mm wide x 200mm high) to be cut into the timber door on the southern gable end. Access for ***P. pygmaeus*** and all crevice/cavity dwelling bat species will be via 2 x wall top gaps on each of the east and west elevations. Any lining must be Type 1F bitumastic felt.
- ***Recommendation 3 (Bat Enhancement):*** subject to listed building consent, retain at least 10 holes in the stonework to offer hibernation opportunities for crevice dwelling bats.

4.2.4 An outline Method Statement has been included (see 5.1) to enable the LPA to have '*regard to the requirements of the Habitats Directive… in the exercise of their functions in considering the planning application'*. A full Method Statement will be prepared as part of an EPS licence application to be submitted to Natural Resources Wales.

4.2.5 All wild birds and their nests (when in use), eggs and dependent young are afforded protection under the Wildlife and Countryside Act 1981 (as amended), nesting season is generally from 1st March until 31st July and works cannot be conducted whilst birds are nesting. Evidence of nesting birds was found but there were no signs of Owl were found. Any nests found must be confirmed vacant before work commences. Recommendations for enhancement are as follows:

- ***Recommendation 4 (Passerine Bird Mitigation)***: Prior to works commencing 2 x Small-holed nest boxes and 2 x Open-fronted nest boxes to be affixed to mature trees within the curtilage of the property (or other buildings on site). See Where To Put A Bird Box | Nestboxes - The RSPB
- ***Recommendation 5 (Swallow Mitigation)***: x 2 Swallow nest cups to be affixed internally within a building on site with access or an area where there is a 200mm+ overhang. All nests must be confirmed vacant prior to works commencing. See Attracting Swallows to Nest Sites in Outbuildings - The RSPB

4.2.6 This ecological **report will remain valid** for a period of 24 months from the date of the last survey i.e., **until 18/06/2025** (CIEEM, 2019). A further scoping survey may be required to update the site information if planning is not obtained or works do not commence within that period, especially if the property to be developed has fallen into further disrepair.

5. Outline method statement for planning and mitigation/compensation measures

5.1 Outline method statement

5.1.1 As there are bats present in the **Barns** an outline method statement for both the LPA and the licence application is required; this will inform the ecologist undertaking the licensing work. If bats are discovered during any stage, then work must stop and NRW called for advice/ guidance.

5.1.2 This Outline Mitigation Strategy will form the basis of the EPS Method Statement to be submitted to Natural Resources Wales following the receipt of planning permission. It aims to address the timing and methods of activities; provision of new bat roosts and site enhancement; impact on, and maintenance of, existing roosts; lighting and habitat provisions; and monitoring.

Timing and methods of activity

5.1.3 All contractors will receive a toolbox talk prior to the commencement of works to outline the status of the building, conditions of the licence and Method Statement. High risk works will be directly supervised by a licensed bat ecologist.

5.1.4 All roof/roofware works will be undertaken carefully by hand and in the presence of a licensed bat ecologist. Whilst bats were only seen to leave wall top gaps on the **Barns**, it is always possible that they may be using other areas of the buildings.

5.1.5 It is not anticipated that any bats will need to be excluded or captured during the works. However, measures will be included in the Method Statement to be produced for the EPS licence and mitigation and enhancement will be in place prior to any works commencing. See table 1 on the following page for a provisional timetable of works.

Table 1: Provisional timetable of works

Stage	Dates	Works
0	From receipt of planning permission to receipt of EPS licence.	• NO works to the **Barns**. This includes any other works to the site subject to development which may impact on these areas. • ***Recommendation 1 (Site Bat Enhancement):*** Prior to works commencing, x 2 Harlech Woodstone (or similar) and x 1 Improved Maternity (or similar) bat boxes to be affixed to mature trees to be retained within the curtilage of the property. See Putting up your box - Bat Boxes - Bat Conservation Trust (bats.org.uk) • ***Recommendation 4 (Passerine Bird Mitigation)***: Prior to works commencing 2 x Small-holed nest boxes and 2 x Open-fronted nest boxes to be affixed to mature trees within the curtilage of the property (or other buildings on site). See Where To Put A Bird Box | Nestboxes - The RSPB ***The above are all to be inspected by the named ecologist on the EPS (Bats) Licence prior to any licensable works commencing.***
1	From receipt of EPS licence	• Toolbox talks. ***Licensable works to be completed outside of the active bat season:*** • Ecologist to be on site to check when all works that will impact upon the roost is taking place i.e., works to the roof and roofware of the **Rear lean-to** prior to its demolition**.** ***Bat mitigation and enhancement measures to be completed under licence:*** • ***Recommendation 2 (Bat Mitigation):*** The loft space within **Barns 1 & 2** is to be retained as a dedicated roost space. No dimensions have been provided so length, width, and height (full height to apex)) are required to be added to the final plans, along with any proposed external lighting. Access (subject to listed building consent) for ***R. hipposideros*** will be via a cowled 'letterbox' (300mm wide x 200mm high) to be cut into the timber door on the southern gable end. Access for ***P. pygmaeus*** and all crevice/cavity dwelling bat species will be via 2 x wall top gaps on each of the east and west elevations. Any lining must be Type 1F bitumastic felt. • ***Recommendation 3 (Bat Enhancement):*** subject to listed building consent, retain at least 10 holes in the stonework to offer hibernation opportunities for crevice dwelling bats. ***Other enhancement measures to be completed:*** • ***Recommendation 5 (Swallow Mitigation)***: x 2 Swallow nest cups to be affixed internally within a building on site with access or an area where there is a 200mm+ overhang. All nests must be confirmed vacant prior to works commencing. See Attracting Swallows to Nest Sites in Outbuildings - The RSPB • ***Recommendation 6 (Broadscale Site Enhancement)*****:** Wider ecological benefit could be gained by retaining any mature hedgerow/tree boundaries that are the responsibility of the property owner and ensuring any future planting is with native species of wildlife value to increase connectivity to the surrounding habitat. See 17_bats_&_hedges_leaflet.pdf (hedgelink.org.uk). In addition, any garden areas are to include measures to enhance the site for Hedgehogs. See developers-1.pdf (britishhedgehogs.org.uk)
2	Completion of all works	• Monitoring check within 4 weeks of completion of all works to confirm bat mitigation and enhancement implemented correctly (roost and bat

		box inspection). • Reporting to NRW/Welsh Government within 4 weeks of completion of works by the named ecologist.
3	Summer period 1 Year post completion	• Inspect bat mitigation and enhancement. • Reporting to NRW/Welsh Government by 30th September.
4	Summer period 3 Years post completion	• Inspect bat mitigation and enhancement and undertake one dusk or dawn survey during the active summer period (ideally between 1st June and 31st August). • Reporting to NRW/Welsh Government by 30th September.
5	Annually	• Monitoring the integrity of the bat roost with defects made good in advance of the bat season (April) annually, and a written report of works undertaken each year back to NRW by the end of April. To be undertaken by the licensee (internal access would require a licensed ecologist). • **Note: The owner WILL NOT enter the roost itself** as a licence is required for any actions which may potentially disturb a roost.

Maintaining bat roost provision

5.1.6 As per ***recommendation 1 (Site Bat Enhancement),*** prior to works commencing, x 2 Harlech Woodstone (or similar) and x 1 Improved Maternity (or similar) bat boxes to be affixed to mature trees to be retained within the curtilage of the property. See Putting up your box - Bat Boxes - Bat Conservation Trust (bats.org.uk). In addition, as per ***recommendation 2 (Bat Mitigation):*** The loft space within **Barns 1 & 2** is to be retained as a dedicated roost space. No dimensions have been provided so length, width, and height (full height to apex)) are required to be added to the final plans, along with any proposed external lighting. Access (subject to listed building consent) for ***R. hipposideros*** will be via a cowled 'letterbox' (300mm wide x 200mm high) to be cut into the timber door on the southern gable end. Access for ***P. pygmaeus*** and all crevice/cavity dwelling bat species will be via 2 x wall top gaps on each of the east and west elevations. Any lining must be Type 1F bitumastic felt. Further, as per ***recommendation 3 (Bat Enhancement),*** subject to listed building consent, retain at least 10 holes in the stonework to offer hibernation opportunities for crevice dwelling bats.

5.1.7 Any new timbers/timber products must be checked to ensure that chemicals toxic to bats are not used (TIN 092) and the only lining membrane for areas that bats may encounter is 1F traditional bitumen membrane. Research has demonstrated that **none** of the modern breathable membranes currently on the market are safe to use where bat roost mitigation is provided.

Lighting and Habitat provisions

5.1.8 Current **lighting** plans for the site are not known but should any be proposed, they must ensure that exterior lighting is kept to a minimum to prevent any adverse impacts on bats. In particular, external lighting around the recommended enhancement must be carefully designed to avoid any impact upon bats (Institution of Lighting Professionals, Guidance Note GN08/23). Any external lighting scheme proposed for this application must comply with the lighting principles outlined within the guidance referenced above. See appendix 2 for additional information.

5.1.9 Where **external lighting** is necessary, this should utilise a number of key design points to limit any impact, as follows: Low level lighting pointed towards the ground; LED bulbs to be used of 2700 Kelvin (*p.29 of the lighting guidelines referenced above*) and below (warm white light and not daylight); use of light shields and hoods to direct the light downwards and prevent vertical and horizontal light spill; and use of passive infrared (PIR) motion sensors on timers to ensure lights

only come on when necessary, especially important for the more light sensitive bat species such as horseshoe bats.

5.1.10 Habitat. There are no known plans to significantly alter the habitat at the property. Measures to support House sparrow and House martin could also be provided as they are a UK BAP species. Suitable designs and measurements may be found within the publication '*Biodiversity for low and zero carbon buildings – a technical guide for new build*' (Williams, 2010). In relation to ***Recommendation 6 (Broadscale Site Enhancement),*** wider ecological benefit could be gained by retaining any mature hedgerow/tree boundaries that are the responsibility of the property owner and ensuring any future planting is with native species of wildlife value to increase connectivity to the surrounding habitat. See 17 bats & hedges leaflet.pdf (hedgelink.org.uk). In addition, any garden areas are to include measures to enhance the site for Hedgehogs. See developers-1.pdf (britishhedgehogs.org.uk).

5.1.11 Monitoring. In line with mitigation guidelines for medium conservation significance roosts such as a maternity roost for ***P. pygmaeus***, there are timing constraints and monitoring requirements (for at least two years). As such, in addition to inspection of the bat boxes, dedicated bat roost, and the property prior to works commencing, a monitoring check will be undertaken within four weeks of completion of all works to confirm bat mitigation and enhancement measures have been implemented correctly (roost and bat box inspection) and monitoring will be implemented for two years. Further, as required by NRW for all ***Rhinolophus*** roosts, monitoring the integrity of the bat roost will be undertaken by the licensee (if entry internally is required a licence bat ecologist is to be employed) annually with any defects being rectified by 30th April (i.e., in advance of the bat season) of that year. Reporting to NRW will be completed within four weeks of inspection by the named ecologist with annual reporting being completed by the licensee.

5.1.12 Maintenance. The installation of bat mitigation and enhancement measures are to be completed prior to/during the development, and the patency and viability of the roosts will be examined and reported on as required. These will all be checked by the licensed ecologist as part of the agreed monitoring scheme within the EPS (Bats) Method Statement to be prepared as part of the licence application. Post development and monitoring, the bat measures will be retained and maintained by the owner, along with the surrounding vegetation. If ownership changes then the requirement to maintain any mitigation/enhancement measures is to be included in the relevant legal documents. The bat boxes are self-maintaining and do not require any management but are to be replaced if damaged, after discussion with a licensed bat ecologist/NRW.

Appendix 1: An introduction to bat surveys

A note on bat surveys

- All bats and their roosts, irrespective of the number of bats, species, and whether bats are present or not, are fully protected by the Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981 (as amended). Bats are the only mammal capable of true flight. They are notoriously difficult to survey for as they cannot be heard unaided and are difficult to see due to their nocturnal behaviour. They are also small and can live in the smallest of crevices, so may often be overlooked because of their size.

- Wales has relatively high numbers of most of the species that occur in Britain; the rural landscape with its abundance of wooded areas, river valleys and hedgerows means that buildings are commonly used as roosting sites by bats. This is particularly the case for older buildings (typically with stone walls and slate roofs) that are located close to good feeding areas, on the edge of settlements, or that are rarely disturbed.

- Bats may also change their resting and feeding places regularly throughout the year, depending on the time of year and weather conditions. Thus, other signs of use are also looked for such as their droppings or signs of feeding.

- To gain an understanding as to how bats are using a building, a survey may also involve dusk and/or dawn observations which may need to be repeated at different times throughout the year. These surveys are aided by both Night vision Camcorders (Sony) and Pulsar Helion XP 50 and Flir Infra Cam thermal devices. The NV cameras are often aimed at potential PRFs with suitable Infra-red illuminators and left in situ for the survey or manned – depending on staff levels. The footage is then watched for bat activity upon our return to office to ascertain bat use if any. The thermal cameras are mainly used by staff to make bat detection more likely (if they 're present) as they're highly sensitive and can even detect animals in the fog and high above in the sky. Images will be included in the report where they add any detail.

- The search buffers implemented as part of the survey are considered to more than adequately cover the predicted zone of influence of the proposed development. The reasons for the site designations have also been considered when discussing potential impacts on the biodiversity of these sites. If the sites are designated for their bat or bird interest, this will be mentioned.

- Survey methodologies are implemented as appropriate, based on the surveyors' assessment of the site features and with particular reference to the advice in Bat Surveys for Professional Ecologists: Good practice guidelines, 3rd edition (Collins, J. (Ed.), 2016) & The Bat Workers' Manual, 3rd edition. (Mitchell-Jones, A.J., & McLeish, A.P. (Ed.), 2004). Reports are written with reference to the CIEEM (2015) Guidelines as well as BS42020.

- A PRA visit (scoping survey) is used to identify all potential access and egress points for bats in the building, and to identify crevices and possible dwelling places. Internal and external inspections are aided using powerful binoculars and close-focussing monoculars, as well as ladders, high powered Cree flashlights and head-torches. We also have thermal imaging cameras and night vision devices at our disposal as well as full spectrum photographic cameras which can photograph a bat in complete darkness with an infrared flash. Exploitable crevices are also endoscoped with either a hand-held digital scope or a smart phone compatible scope. Digital thermometers and hygrometers are also at our disposal.

- The survey consists of a visual inspection of the interior and exterior of the building for evidence of bat use, including droppings, smells, feeding remains, staining, and scratching around roost exit and entry points. Potential features conducive (but not necessarily predictive) to bat presence include voids in the stonework, wooden beams, any associated rot holes, gaps behind soffits or within walls and facia boards, raised tiles, any raised render, and any sufficiently large crevices. The general condition of the building is examined, including the structure of the roof, condition of walls, the potential for disturbance, and the position of the building in relation to connectivity to good bat habitat.

- If positive bat signs are discovered, or the construction style suggests cryptic bats *may* be present, a passive recorder is deployed within the space of the building surveyed. These commonly record all bats from within and to the exterior of a building as they have extremely sensitive microphones so clusters of calls or high frequency of calls over short periods that are repeated (not just a vocal (Chatty) bat passing the microphone once on a foraging /socialising expedition) may indicate a presence within the building. Supporting evidence is then needed to make a decision, such as bats seen during surveys, droppings and feeding signs as well as building suitability for a given species. For example, we have had clear sonograms for Serotine bats (*Eptesicus serotinus*) from a loft space deployed recorder where no gaps existed anywhere and no droppings from serotines were present. These large bats must have been present elsewhere on site or use the site for foraging.

- The outcomes have been used to specify whether further surveys are required, or to establish the need for, and extent of, any mitigation or compensation measures required as part of the proposed works.

- If positive signs of bat activity are found then it will be necessary to assess whether a licence is needed at all (damage and disturbance to the roost and harm to bats can be avoided through thoughtful and planned working practices), or whether a licence is recommended as damage, disturbance or harm are unlikely to be avoided.

Appendix 2: Overview of the legislation

- All bats and their roosts, irrespective of the number of bats, species, and whether bats are present or not, are fully protected by the Conservation of Habitats and Species Regulations 2017 and the Wildlife and Countryside Act 1981 (as amended).
- There is a risk that works could result in the damage or destruction of a bat roost or roosts, the disturbance of bats, and the potential killing or injury of bats, sufficient survey effort (where indicated) helps to minimise this risk.
- All wild birds, their nests, eggs, and dependent young are afforded protection under the Wildlife and Countryside Act 1981 (as amended), with the bird nesting season generally from 1st March until 31st August.
- Technical Advice Note (TAN) 5 (Welsh Government, 2009) specifically provides advice about how the land use planning system should contribute to protecting and enhancing biodiversity and geological conservation. The TAN provides advice for local planning authorities on the key principles of positive planning for nature conservation; nature conservation and Local Development Plans; nature conservation in development management procedures; development affecting protected internationally and nationally designated sites and habitats; and development affecting protected and priority habitats and species. Under Section 2.4 within the TAN 5, 'when deciding planning applications that may affect nature conservation local planning authorities should':
    - Pay particular attention to the principles of sustainable development, including respect for environmental limits, applying the precautionary principle, using scientific knowledge to aid decision making and taking account of the full range of costs and benefits in a long-term perspective;
    - Contribute to the protection and improvement of the environment, so as to improve the quality of life and protect local and global ecosystems, seeking to avoid irreversible harmful effects on the natural environment;
    - Promote the conservation and enhancement of statutorily designated areas and undeveloped coast;
    - Ensure that appropriate weight is attached to designated sites of international, national and local importance;
    - Protect wildlife and natural features in the wider environment, with appropriate weight attached to priority habitats and species in Biodiversity Action Plans;
    - Ensure that all material considerations are taken into account, and decisions are informed by adequate information about the potential effects of development on nature conservation;
    - Ensure that the range and population of protected species is sustained; and
    - Adopt a step-wise approach to avoid harm to nature conservation, minimise unavoidable harm by mitigation measures, offset residual harm by compensation measures and look for new opportunities to enhance nature conservation; where there may be significant harmful effects local planning authorities will need to be satisfied that any reasonable alternative sites that would result in less or no harm have been fully considered.
- Bats are listed under Schedule 5 and 6 of the Wildlife and Countryside Act 1981 and protected under sections 9 and 11 (as amended by the Countryside and Rights of Way (CRoW) Act 2000).
- The Environmental Damage (Prevention & Remediation) Regulations 2009 – A protected species and its habitat are protected under this legislation as well as others.

- The Conservation of Habitats and Species Regulations 2017 – (regulation 43) fully protects all bats and their roosts, making it **an offence** *to deliberately kill*, *injure or capture* (take) bats; *to* deliberately *disturb bats; damage or destroy bat roosts* or resting places (this is considered an 'Absolute Offence' as damage and destruction may detrimentally effect the Continuous Ecological Functionality of that roost/resting place); possess or transport a bat or any part of a bat; sell (or offer for sale) or exchange bats or parts of bats.
- Bats are also protected by: Appendix III of the Bern Convention; Appendix II of the Bonn Convention (including the Convention's Agreement on the conservation of Bats in Europe); Natural Environment and Rural Communities Act 2006 (in England); and The Environment (Wales) Act 2016: specifically, Sections 6 (*places a duty upon Local Authorities to enhance biodiversity and the* ***resilience of ecosystems***) and 7 (*Creating local biodiversity lists and a duty to take steps to* ***maintain and enhance biodiversity***).
- For any offence to occur a derogation or **European Protected Species (EPS) licence** must be gained from Natural Resources Wales. To gain an EPS Licence, they must be satisfied that;

  i. granting the licence would not be detrimental to the Favourable Conservation Status (FCS) of the populations of species concerned within its natural range;

  ii. the derogation (licence) is in the public interest of Health and Safety or for other reasons of over-riding public interest, including those of a socio-economic nature or will have a benefit of primary importance to the environment; and

  iii. there is no satisfactory alternative to the derogation which would allow the described development to proceed but which would avoid or reduce, the need for any adverse impact to the species.

- All bats are listed in Annex IV of The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 and are therefore designated as *European Protected Species*. These *protected* species are afforded enhanced protection and more stringent licensing provisions than those protected by the Wildlife and Countryside Act (WACA) alone. There are also biodiversity obligations to be met within the Well-being of Future Generations (Wales) Act 2015 [WFG] and the seven well-being goals which include an emphasis on socio-economic resilience as well as protecting culture, heritage and the Welsh language. One Act does not take precedence over the other.
- Planning Policy Wales (11th Ed.) also emphasises the importance of ensuring – wherever possible – a net gain to biodiversity from any development. Future Wales (The National Plan 2040) highlights in the 10th of 11 outcomes that the aim is for a "Wales where people live…in places with biodiverse, resilient and connected ecosystems". Highlighting the importance for creating and enhancing resilient and diverse eco-systems.
- Future Wales – the National Plan 2040 states the following:

  - Outcome 10 focuses on places with biodiverse, resilient and connected ecosystems. As such, the variety of flora and fauna found across Wales make Wales a special place. Biodiversity underpins the functioning of healthy, resilient ecosystems and the multiple benefits they provide. While biodiversity has declined in recent decades, we will reverse these losses and enhance the resilience of ecosystems. The planning system will ensure wildlife is able to thrive in healthy, diverse habitats, both in urban and rural areas, recognising and valuing the multiple benefits to people and nature.
  - Policy 9 concerns Resilient Ecological Networks and Green Infrastructure. To ensure the enhancement of biodiversity, the resilience of ecosystems and the provision of green infrastructure, the Welsh Government will work with key partners to: • identify areas which should be safeguarded and created as ecological networks for their importance for

adaptation to climate change, for habitat protection, restoration or creation, to protect species, or which provide key ecosystems services, to ensure they are not unduly compromised by future development; and • identify opportunities where existing and potential green infrastructure could be maximised as part of placemaking, requiring the use of nature-based solutions as a key mechanism for securing sustainable growth, ecological connectivity, social equality and well-being. Planning authorities should include these areas and/or opportunities in their development plan strategies and policies in order to promote and safeguard the functions and opportunities they provide. In all cases, action towards securing the maintenance and enhancement of biodiversity (to provide a net benefit), the resilience of ecosystems and green infrastructure assets must be demonstrated as part of development proposals through innovative, nature-based approaches to site planning and the design of the built environment.

- Institution of Lighting Professionals, Guidance Note GN08/23 (pages 29 and 30), **Appropriate luminaire specifications:** 4.29 Light sources, lamps, LEDs and their fittings come in a myriad of different specifications which a lighting professional can help to select. However, the following should be considered when choosing luminaires and their potential impact on Key Habitats and features: All luminaires should lack UV elements when manufactured. Metal halide, compact fluorescent sources should not be used; LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability; A warm white light source (2700Kelvin or lower) should be adopted to reduce blue light component Guidance Note 08/23: Bats and Artificial Lighting At Night 30 Institution of Lighting Professionals; Light sources should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats (Stone, 2012); Internal luminaires can be recessed (as opposed to using a pendant fitting) where installed in proximity to windows to reduce glare and light spill; Waymarking inground markers (low output with cowls or similar to minimise upward light spill) to delineate path edges (see Case Study 1); Column heights should be carefully considered to minimise light spill and glare visibility. This should be balanced with the potential for increased numbers of columns and upward light reflectance as with bollards; Only luminaires with a negligible or zero Upward Light Ratio, and with good optical control, should be considered - See ILP GN01; Luminaires should always be mounted horizontally, with no light output above 90° and/or no upward tilt; Where appropriate, external security lighting should be set on motion sensors and set to as short a possible a timer as the risk assessment will allow. For most general residential purposes, a 1- or 2-minute timer is likely to be appropriate; Use of a Central Management System (CMS) with additional web-enabled devices to light on demand; Use of motion sensors for local authority street lighting may not be feasible unless the authority has the potential for smart metering through a CMS; The use of bollard or low-level downward-directional luminaires is strongly discouraged. This is due to a considerable range of issues, such as unacceptable glare, poor illumination efficiency, unacceptable upward light output, increased upward light scatter from surfaces and poor facial recognition which makes them unsuitable for most sites. Therefore, they should only be considered in specific cases where the lighting professional and project manager are able to resolve these issues. See Case Study 6; and **only** if all other options have been explored, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed. However, due to the lensing and fine cut-off control of the beam inherent in modern LED luminaires, the effect of cowls and baffles is often far less than anticipated and so should not be relied upon solely.

Appendix 3: Types of bat roost and survey timings

As the mitigation guidelines state: The presence of a significant (important) bat roost… can normally be determined on a single visit at any time of year; providing that the entire structure is accessible and that any signs of bat activity have not been removed by others. The table below shows the applicability of survey methods. The table has been reproduced from Bat Mitigation Guidelines (table 5.2) (2023).

Season	Roost type	Inspection	Bat detectors and emergence counts
Spring (Mar – May)	Building	Suitable (signs, perhaps bats)	Limited, weather dependent
	Trees	Difficult (best for signs before leaves appear)	Very limited, weather dependent
	Underground	Suitable (signs only)	Static detectors may be useful
Summer (June – August)	Building	Suitable (signs and bats)	Suitable
	Trees	Difficult	Limited: use sunrise survey
	Underground	Suitable (signs only)	Rarely useful
Autumn (September – November)	Building	Suitable (signs and bats)	Limited, weather dependent
	Trees	Difficult	Rather limited, weather dependent; use sunrise survey?
	Underground	Suitable (signs, perhaps bats)	Static detectors may be useful
Winter (December – February)	Building	Suitable (signs, perhaps bats)	Rarely useful
	Trees	Difficult (best for signs after leaves have gone)	Rarely useful
	Underground	Suitable (signs and bats)	Static detectors may be useful

The table below shows the recommended survey timings and is reproduced from the Good Practice Guidelines (table 7.1) (4th Edition, 2023). This is for presence/absence surveys to give confidence in a negative result for structures (also recommended for trees but unlikely to give confidence in a negative result).

Low roost suitability	Moderate roost suitability	High roost suitability
May to August (structures) No further surveys required (trees)	May to September[a] with at least one of the surveys between May and August[b]	May to September[a] with at least two of the surveys between May and August[b]

[a] September surveys are both weather and location dependent. Conditions may become more unsuitable in these months, particularly in more northerly latitudes, which may reduce the length of the survey season.

[b] Multiple survey visits should be spread out to sample as much of the recommended survey period as possible; it is recommended that surveys are spaced at least two weeks apart, preferably more, unless there are specific ecological reasons for the surveys to be closer together (for example, a more accurate count of a maternity colony is required but it is likely that the colony will soon disperse). If there is potential for a maternity colony then consideration should be given to detectability. A survey on 31 August followed by a mid-September survey is unlikely to pick up a maternity colony. An ecologist should use their professional judgement to design the most appropriate survey regime.

The table below shows the recommended minimum number of surveys to be carried out according to roost potential. It is reproduced from the Good Practice Guidelines (table 7.3) (4th Edition, 2023).

Low roost suitability	Moderate roost suitability	High roost suitability
One survey visit. One dusk emergence or dawn re-entry[a] (structures). No further surveys required (trees)	Two separate survey visits. One dusk emergence and a separate dawn re-entry survey[b]	Three separate survey visits. At least one dusk emergence and a separate dawn re-entry survey. The third visit could be either dusk or dawn[b]

[a]Structures that have been categorised as low potential can be problematic and the number of surveys required should be judged on a case-by-case basis (as noted in section 5.2.9 of the guidelines). If there is a possibility that quiet calling, late-emerging species are present then a dawn survey may be more appropriate, providing weather conditions are suitable. In some cases, more than one survey may be needed, particularly where there are several buildings in this category.

[b] Multiple survey visits should be spread out to sample as much of the recommended survey period (see table 7.1 above) as possible; it is recommended that surveys are spaced at least two weeks apart, preferably more. A dawn survey immediately after a dusk one is considered to be only one visit.

Roosts required by bats

Hibernation sites (hibernacula). Sheltered areas with relatively stable winter temperatures.
Underground cavities, caves, mines, cellars, hollow trees and cavities and crevices in buildings or similar structures are examples.

Nursery roosts (maternity roosts). Places usually warm, where adult females of a colony gather to give birth and rear their young. These are often traditional sites with a history of such use and include roof voids, walls, soffit boxes, hollows and cracks/splits in trees and cavities in bridges and similar structures.

Night roosts/feeding perches. Places where bats may gather at night away from the day roost after initial feeding. These places are often quite exposed and may not be suitable for day roosting. They are often recognisable by deposits of droppings and insect remains.

Intermediate/dispersal roosts. Sites where small numbers of bats may gather after hibernation before taking up residence in the nursery roost. Bats may return to these sites after dispersal from the nursery roost and before entering hibernation.

Mating/male roosts. Places that an individual male may defend from other males and to which he will attempt to lure females. These will include small holes/cavities in trees, stonework, caves, mines and buildings.

Access, size of roost space and structure

• *Crevice-dwelling bats* (such as Soprano pipistrelles) can crawl into roosts via small gaps in the range of 15–20mm high by 20–50mm wide. The roost area should maintain a crevice of this approximate size gap that the bats can roost between. The area this roost provision covers can be small but about $1m^2$ would be useful for summer nursery roosts. The height of entry can be from 2–7m.

• *Roof-void dwelling bats* require similar dimensions to access the roost but typically need timber joists or beams on which to roost. The height of entry can be from 2–7m.

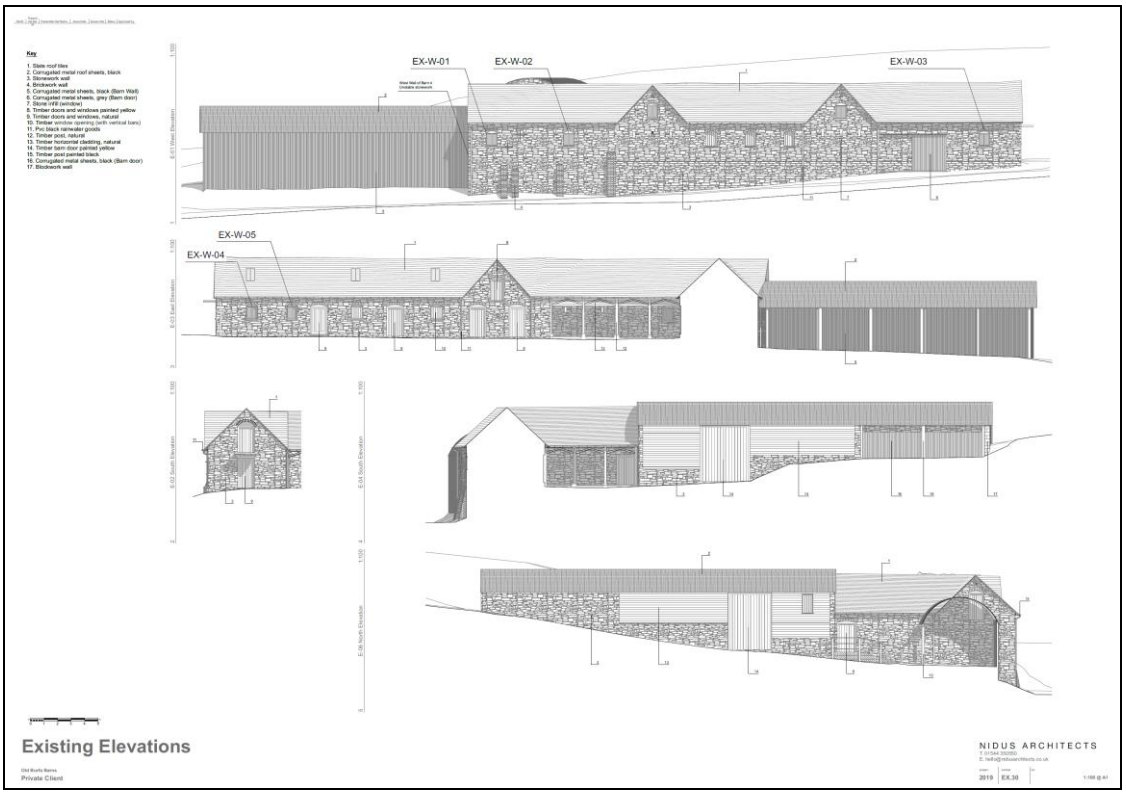
• *Bats needing a flying area* require the same access dimension as mentioned above, 15– 20mm (h) x 20–50mm (w) situated over 2m in height. The roosting area should not be trussed, to allow flight, and should ideally (wherever possible) be of similar dimensions to the roost being replaced.

• *Horseshoe bats* need a larger access so that they can fly (instead of crawl) directly into the roost. Lesser horseshoe bats need an access of 300mm (w) x 200mm (h), while greater horseshoe bats need 400mm (w) x 300mm (h). As above, the roosting area should not be trussed, to allow flight, and should again (where possible) be of similar dimensions to the roost being replaced.

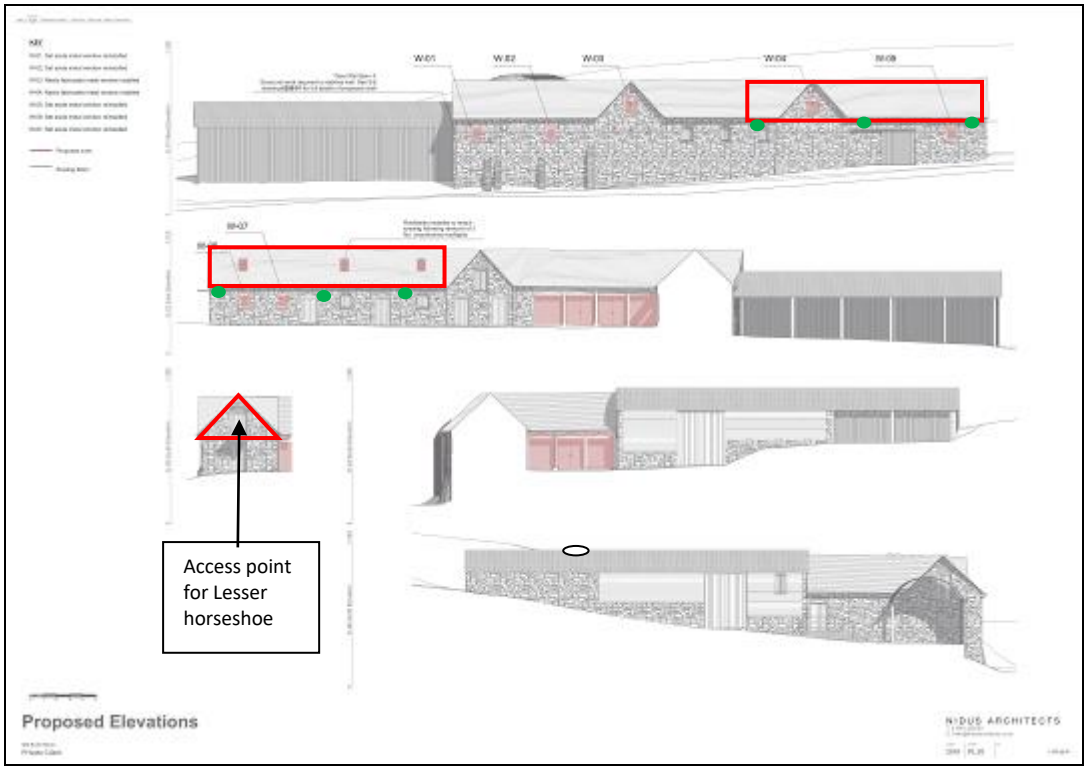
Appendix 4: List of surveyors

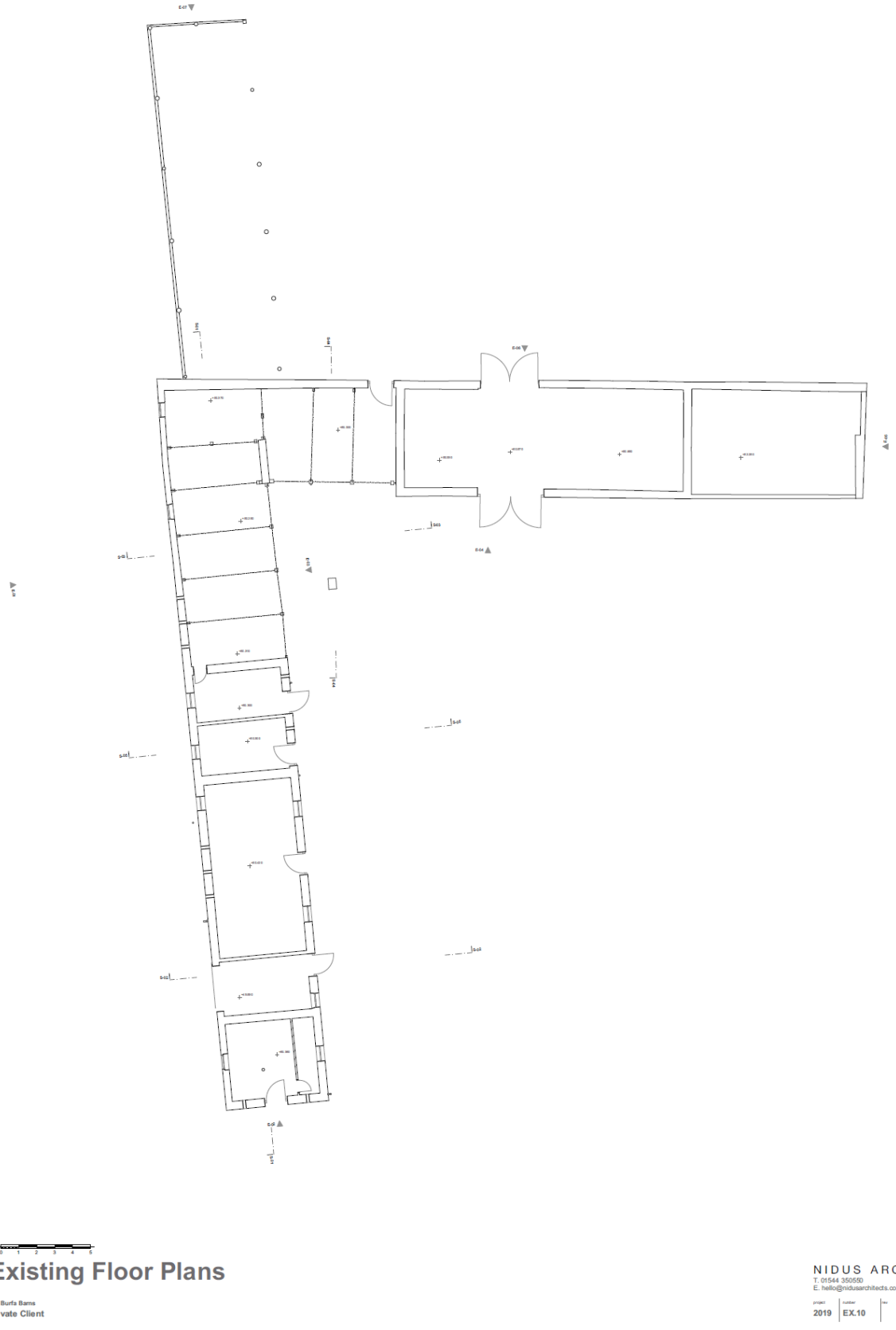
Surveyor	Licence	Experience/background
Mr Glyn Lloyd-Jones	Bats	*I&G have held bat licences and been operating for more than a decade* and in that time, Glyn has gained significant experience in many survey skills and has assisted/worked with many other licensed bat surveyors as well as local bat groups. He possesses both a Bachelor's (with honours) and Master's degree in the biological sciences and is a Chartered Biologist & member of the Royal Society of Biology. He has worked for EAW, NRW and CCW for over a decade and has gained significant experience of working for regulators and conservation bodies. He also holds a Class 2 bat licence in England and has undertaken many badger, tree and herpetofaunal surveys. Natural Resources Wales Licence number S091520/1. I&G were proud to be shortlisted for a BCT roost award in 2021 and proud to have contributed to the new Mitigation guidelines as well as the good practice guidelines and to also sponsor the latter.
Mr Iestyn Evans	Bats	Iestyn has extensive experience in conservation, habitat improvement and management and has also worked with and assisted other licensed bat workers for many years. He has also helped with local bat group surveys and assisted in data gathering for the Beacon for Bats project undertaken by the Vincent Wildlife Trust. Iestyn has also assisted the Glamorgan Bat Group and will also help supervise and mentor (if needed) members of the newly incarnated Carmarthenshire Bat Group. Natural Resources Wales Licence number S090746/1.
Miss Ceri Daugherty	Bats	Ceri worked at Team Leader level within the SNCO for Wales for many years, dealing with customers and negotiating with landowners. She also has practical conservation management experience as both a Countryside Ranger and a conservation volunteer. She possesses a Master's degree in Environmental Impact Assessment and a Bachelor's degree (with honours) in the natural sciences. She is a member of the Carmarthenshire Bat Group. Natural Resources Wales Licence number S092522/1.
Ms Megan Hill	Trainee	Megan provides survey and report writing support and has a keen eye for detail. She is currently utilising any opportunity to broaden her experience in conservation and ecology and further develop her strong interests in animal behaviours and movements. She is an active member of the Warwickshire Bat Group and a valued team member at I&G.
Mr Greg Evans	Trainee	Greg attends dusk and dawn surveys to provide extra monitoring for possible entry and exit points for bats. He is currently building his experience in this area and is a keen amateur natural historian with an enthusiasm and affinity for bats.
Mr Mike Jones	Assistant	Whenever we need extra assistance in observing and recording bat activity on buildings, Mike provides an excellent and reliable service
Ms Sharon Doherty	Assistant	Whenever we need extra assistance in observing and recording bat activity on buildings, Sharon provides an excellent and reliable service.
Mr Lewis Jones	Assistant	A Graduate with a background in the biological sciences with an aptitude and passion for ecology. Lewis has undertaken courses in herpetology and phase 1 surveys and has a hunger to learn. With a fondness for bats and owls he's also keen to develop his survey skills in this area.
Ms Bonnie Illingworth	Assistant	Bonnie has been a member of the Kent Bat Group for a number of years and has undergone formal training in leading Bat Walks by Shirley Thompson, who set up The Young Batworkers group/magazine etc. She has led several educational sessions for the Scouts and local community groups. She has undertaken many bat activity surveys and has enjoyed conservation work with BCT.
Ms Wendy Larcombe	Assistant	Wendy has an Honours degree in Environmental Biology and over 17 years' experience working in conservation, including as a Planning Ecologist and a freelance Ecologist. She has a wide range of experience, which includes extended Phase 1 habitat surveys, building assessment for bats, bat/barn owl surveys, summer roost counts (Gower), and winter roost counts (Black Mountains.) She has undertaken a range of training including bat ecology and surveying and is a valued member of the team.

Appendix 5: Site plans

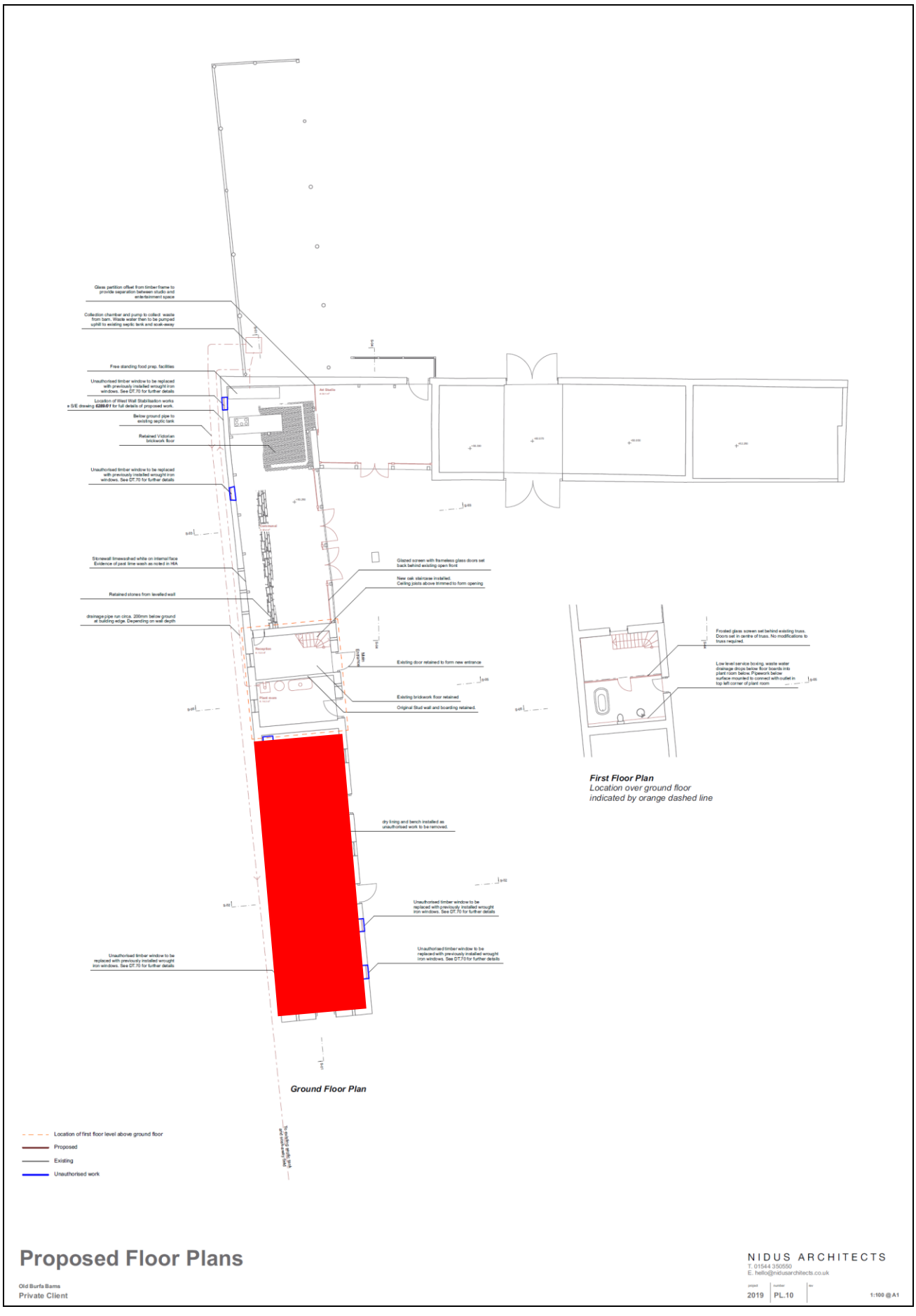


Above: Existing and proposed elevations. **Below:** The loft space within **Barns 1 & 2** is to be retained as a dedicated roost space (outlined in red). No dimensions have been provided so length, width, and height (full height to apex)) are required to be added to the final plans, along with any proposed external lighting. Access (subject to listed building consent) for **Lesser horseshoe** will be via a cowled 'letterbox' (300mm wide x 200mm high) to be cut into the timber door on the southern gable end. Access for **Soprano pipistrelle** (and all crevice/cavity dwelling species) will be v2 x wall top gaps on each of the east and west elevations (green dots). Any lining must be Type 1F bitumastic felt. In addition, subject to listed building consent, retain at least 10 holes in the stonework to offer hibernation opportunities for crevice dwelling bats.





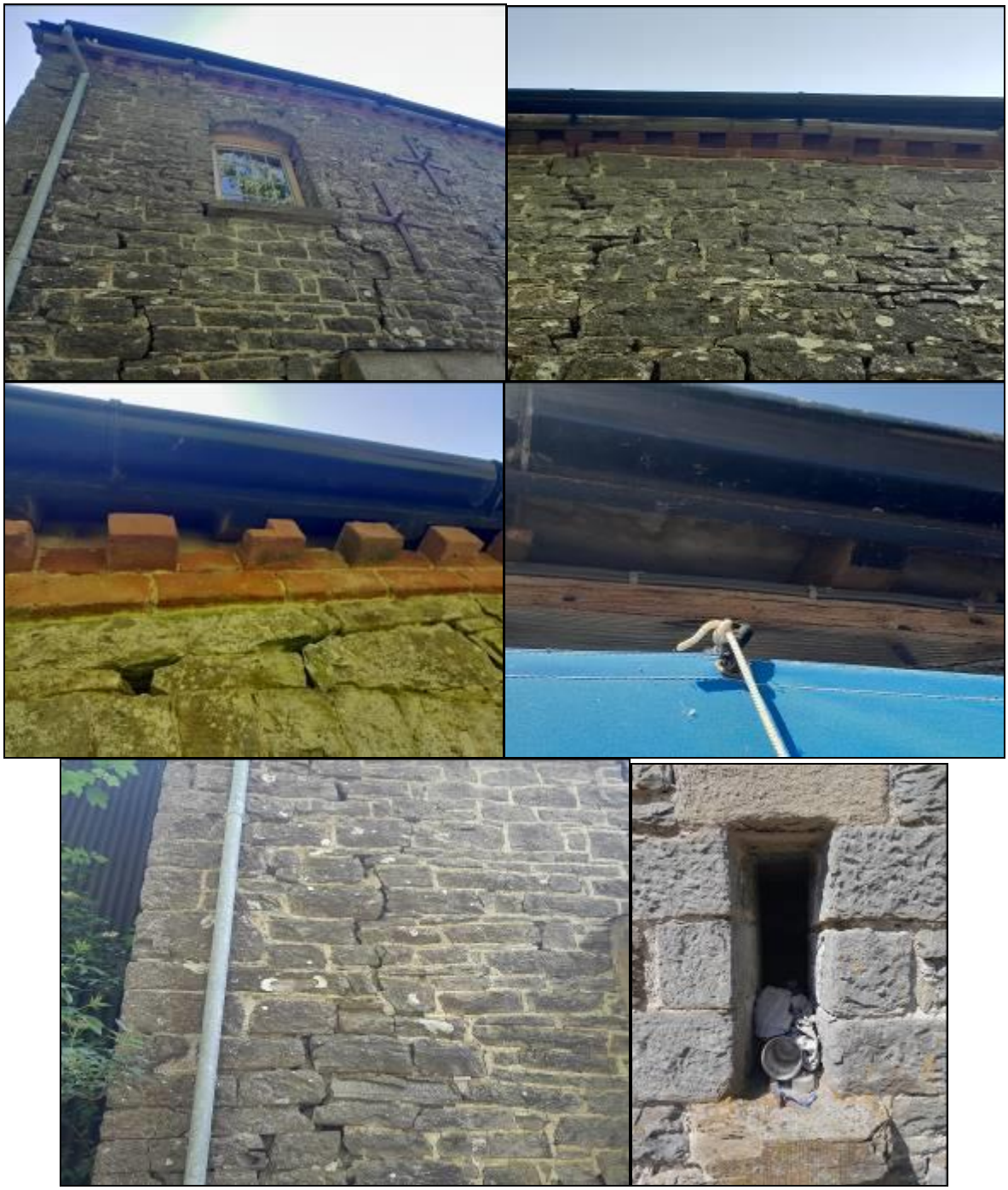
Existing floor plans



Proposed floor plans. The loft area to be dedicated to use for R. hipposideros is outlined in red. The final plans need to include the length, width and height (to apex) of this area.

Appendix 6: Site survey images

The 18th/19th century Grade II listed **Barns** are subject to proposed plans for conversion. The **Barns** form a T-shape with the southern section and part of the eastern section (**Barns 1 to 4**) being constructed of stone walls (some brickwork) with a pitched slate roof, timber framed windows and timber doors – the large openings on the corner of the southern and eastern section are currently covered with plastic/fabric sheeting. The eastern end of the eastern section (**Barns 5 & 6**) has horizontal timber cladding with a curved corrugated metal sheet roof and part metal/part timber doors while the northern section (**Barn 7**) has corrugated metal sheet walls on its western side, is open on the eastern side and has a curved, corrugated metal sheet roof. It is generally in good condition and well maintained (noting that some unauthorised works had taken place previously under different ownership).



North elevation where **Barn 4** adjoins **Barn 7**

The walls are intact but there are potentially exploitable gaps within the stone walls as well as vent holes in the walls which could facilitate internal access for all bats as well as small gaps under the timber cladding. In addition, there are numerous wall top gaps as well as gaps around the door frames could enable access via the wall tops for crevice dwelling bat species.

The roofs are also generally in good condition but there are a small number of raised slates and ridge tiles that could offer potential for crevice dwelling species.

The roofs are part unlined/part non-bitumen roofing membrane lined with some areas also having fabric. The lining is in good condition with no damage but the fabric has areas which could offer opportunities for roosting bats. The spaces are used for storage and droppings were found throughout **Barns 1 to 4**, with the largest amount being found stuck in cobwebs at the wall tops. Only droppings characteristic of ***Pipistrellus*** **species** were found and DNA analysis confirmed that they were from ***P. pygmaeus.*** There was also evidence of nesting birds.

Additional interior images showing the droppings within the **Barns.**

Additional interior images.

Appendix 7: DNA results

B1917	Old Burfa	-	GCTTTGGAACTGACTGGTTC CACTTATGATCGGAGCCCCC GACATGGCCTTTCCTCGTAT AAATAATATGAGTTTCTGACT TCTGCCCCCTTCTTTTCTACT ACTACTAGCCTCATCTATAG TGGAAGCGGGAGCGGGTAC GGGCTGAACAGTCTATCCCC CTCTAGCAGGAAATCTAGCT CATGCATGGAGAG	Soprano pipistrelle	*Pipistrellus pygmaeus*	98.35%

Appendix 8: Roost status and mitigation

The figure below is taken from Table 5.1 Bat Mitigation guidelines (Reason & Wray, 2023) and focuses upon the need for appropriate, but proportionate, mitigation.

Table 5.1: Proposed scale of compensation required

Value of receptor	Roost category: note this table relates to a feature's original VALUATION and does not mean that all such sites are 'places of shelter' as referenced in the W&CA or Habitats Regulations. Inclusion in this table does not indicate that a licence would be required; this would be driven by any impacts and the likelihood of an offence.						
	Feeding perches; night-roosts Individual or very small occasional/transitional /opportunistic roosts	**Non-breeding day roosts**	**Mating sites (excluding individual trees and larger swarming sites) Small numbers of hibernating bats**	**Larger transitional roosts**	**Hibernation sites**	**Autumn swarming sites** (largely, vesper species which hibernate underground (Myotis, long-eared bats and barbastelle)	**Maternity sites**
Site	Flexible (in terms of timing and type)	Flexible (in terms of timing and type)	Flexible (type); do not leave bats without a roost	Flexible (in terms of timing and type)			Flexible (type); do not leave bats without a roost
Local							
District		Like-for like replacement; no timing constraints	Like-for like replacement; do not leave bats without a roost	Like-for like replacement; do not leave bats without a roost	Like-for like replacement (as close as possible or better); do not leave bats without a roost	Like-for like replacement (as close as possible or better); do not leave bats without a roost	Like-for like replacement (as close as possible or better); do not leave bats without a roost
County							
Regional					Like-for like replacement (as close as possible, or better); do not leave bats without a roost; erected (if possible) to be available in relevant season before original removed	Like-for like replacement (as close as possible, or better); do not leave bats without a roost; erected (if possible) to be available in relevant season before original removed	Like-for like replacement (as close as possible, or better); do not leave bats without a roost; erected (if possible) to be available in relevant season before original removed
National					As agreed with SNCB	As agreed with SNCB	As agreed with SNCB

In all cases, provision should be suitable for the species, and 'do not leave the bats without a roost' means 'in the season when that roost would be expected to be in use'. Ideally, such compensation would be in place **well in advance,** but it is recognised that this isn't always possible.

Table 6.1: Optimum season for works in different types of roosts

The period of works may be extended if the way in which the bats use the site is well understood.

Roost type	Months to avoid	Optimum period for carrying out works (some variation between species and weather-dependent)[a]
Maternity	May-August (potentially September)	September to end April
Hibernation (not used for swarming)	November to March	April to end October [see also **6.2.14** et seq]
Hibernation and swarming site	August to March (key); potentially July until April	April to July (potentially later, depending on site and nature of works)
Mating/swarming: not used for hibernation	August to October (key); potentially July until mid-November Also April-early May in at least some species[b]	Mid-November – end March (potentially later, maybe species-specific) Broader restrictions if site also used for hibernation: see above
Non-breeding summer roost	None	No restrictions – assuming bats can be excluded if present in small numbers or otherwise safely managed

Appendix 9: Roost compensation & enhancement measures

Mitigation and enhancement recommendations:

- ***Recommendation 1 (Site Bat Enhancement):*** Prior to works commencing, x 2 Harlech Woodstone (or similar) and x 1 Improved Maternity (or similar) bat boxes to be affixed to mature trees to be retained within the curtilage of the property. See Putting up your box - Bat Boxes - Bat Conservation Trust (bats.org.uk)
- ***Recommendation 2 (Bat Mitigation):*** The loft space within **Barns 1 & 2** is to be retained as a dedicated roost space. No dimensions have been provided so length, width, and height (full height to apex)) are required to be added to the final plans, along with any proposed external lighting. Access (subject to listed building consent) for **Lesser horseshoe** will be via a cowled 'letterbox' (300mm wide x 200mm high) to be cut into the timber door on the southern gable end. Access for Soprano pipistrelle (and all crevice/cavity dwelling species) will be v2 x wall top gaps on each of the east and west elevations. Any lining must be Type 1F bitumastic felt.
- ***Recommendation 3 (Bat Enhancement):*** subject to listed building consent, retain at least 10 holes in the stonework to offer hibernation opportunities for crevice dwelling bats.
- ***Recommendation 4 (Passerine Bird Mitigation)***: Prior to works commencing 2 x Small-holed nest boxes and 2 x Open-fronted nest boxes to be affixed to mature trees within the curtilage of the property (or other buildings on site). See Where To Put A Bird Box | Nestboxes - The RSPB
- ***Recommendation 5 (Swallow Mitigation)***: x 2 Swallow nest cups to be affixed internally within a building on site with access or an area where there is a 200mm+ overhang. All nests must be confirmed vacant prior to works commencing. See Attracting Swallows to Nest Sites in Outbuildings - The RSPB
- ***Recommendation 6 (Broadscale Site Enhancement)*:** Wider ecological benefit could be gained by retaining any mature hedgerow/tree boundaries that are the responsibility of the property owner and ensuring any future planting is with native species of wildlife value to increase connectivity to the surrounding habitat. See 17_bats_&_hedges_leaflet.pdf (hedgelink.org.uk). In addition, any garden areas are to include measures to enhance the site for Hedgehogs. See developers-1.pdf (britishhedgehogs.org.uk)

Plans for all the bat and bird box provision as well as details of lighting provision are to be submitted and must include all details of sizes, materials, access points etc.

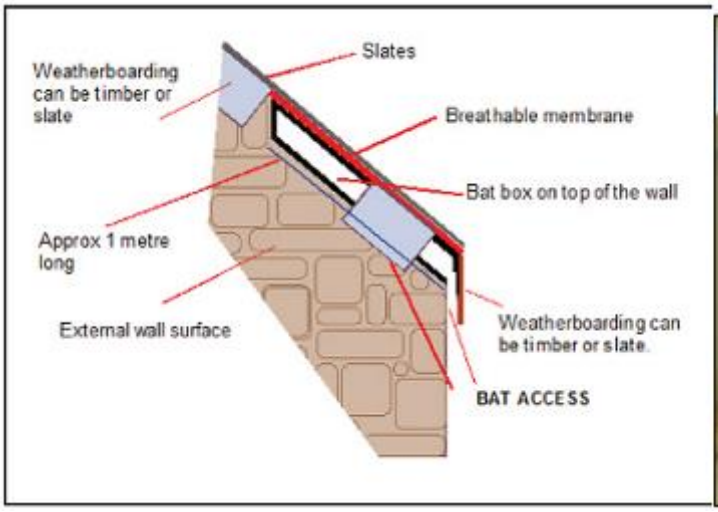
Right: The Beaumaris Bat Box is made from 100% WoodStone which is very durable so this product has a lifetime warranty. The attractive design is suitable for crevice roosting bats and has a rough interior to provide lots of grip. Bats need to increase their body temperature before flight so prefer warm roosting spots, which is why many of our bat boxes have a black exterior to absorb heat from the sun. WoodStone isn't just strong, it also has good thermal insulation, reducing temperature fluctuations inside the box and helping to make this an ideal roost site.

Left: The Harlech WoodStone bat box offers excellent insulation with a minimum of condensation for roosting bats. WoodStone® is a mixture of sawdust from FSC wood sources and concrete, and it is designed to last for years. It is breathable so there will be no problems with condensation and Woodstone maintains a consistent temperature inside, providing excellent insulation for roosting bats. Height 24cm x width 19cm x depth 18cm; Weight 4.4kg; Colour: Black with White front panel; Hook for hanging; Removable front panel for inspection/cleaning; and 10 Year Manufacturers Guarantee.

Left: The Improved Roost-Maternity Bat box is a large 3 crevice box suitable for larger roosts or maternity groups of the small British crevice-dwelling bats such as Pipistrelles. All external panels precision cut from 12mm Exterior Grade FSC plywood, for improved heat insulation. Exterior surface stained with black water based wood stain for improved thermal input, whilst avoiding any possibility of deterring use by bats due to vapour from the stain. Overhanging roof with additional internal insulation for protection from UK weather, and to seal crevices from internal airflow. 3 separate crevices each with different temperature characteristics. Wide entrance with accurately sized opening. Ideal for Pipistrelles and deters unwelcome birds etc. Internal ceramic heat sinks ensure improved temperature stability in crevices. Improved "Bat Ladder" at base of box facilitates bats landing and climbing into box. Ladder continues inside box, while textured internal surfaces ensure bats find it easy to move around inside box and hang in crevices. Ladder acts as "convector heater" for box - when sun shines on ladder, warm air rises into the box, but does not come out when the outside cools. Easy and safe to erect box on walls or trees. Rectangular back plate facilitates fitting boxes side to side to increase colony size. Improved aesthetics - looks good to humans as well as bats. Suits any building or tree. See Improved Roost-Maternity Bat Box | NHBS Practical Conservation Equipment.

Lack of sunlight can cause bat box/house failure, and structures for summer roosting should be positioned where they are unshaded for most of the day. Summer maternity roosts (in the northern hemisphere) should have a southerly or westerly aspect.

Below: Examples of soffit gaps



Night Roosts and Day Roosts for Horseshoe Bats

Day roosting in horseshoe bats tends to refer to roosting activity in buildings and in some cases, large numbers of females that form a maternity colony. Within these roosts they congregate to give birth and raise their young. As a result, day roosts are of prime conservation concern as disturbance and destruction has resulted in severe population declines.

Night roosting activity is less understood. Through behavioural research it is known that night roosts are used as 'pit stops' between foraging sites and used for resting and digestion between commutes. The loss of a night roost must also be mitigated for.

Factors to Consider While Creating or Retaining a Roost for Horseshoe Bats

While planning successful mitigation strategies for horseshoe roosts or hibernation sites, there are a number of factors that need to be considered: Temperature and humidity regimes; Aspect and orientation; Size; Access points; Lighting; Materials; and Vegetation Linkages.

Temperature is deemed one of the most important environmental variables affecting the success of a new roosting facility. Optimum roost temperatures are species-specific.

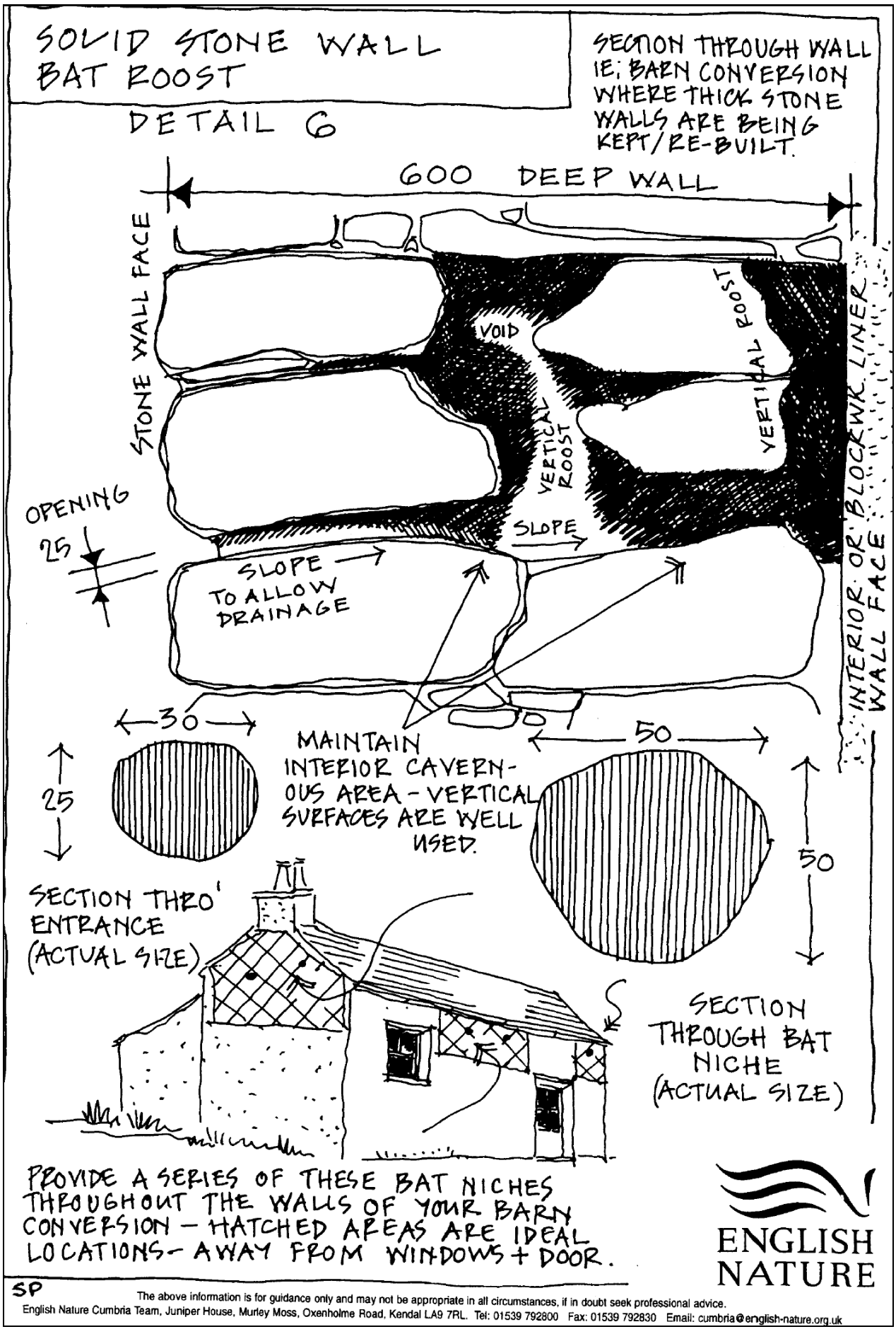
Aspect and orientation can be manipulated in order to utilise solar energy and maintain optimum temperatures within a roost. In the northern hemisphere, a southerly or westerly facing roost site is best; particularly maternity roosts.

The **size** of the roost specifically for horseshoe bats should be at least 2.8m in height and 5m in length and width. The void should not be cluttered or obstructed as horseshoes will often fly in spaces between the rafters and ceiling, and ceilings to the floor. A typical truss design should be avoided to successfully mitigate for horseshoes. The only lining membrane for the areas that bats may encounter is 1F traditional bitumen membrane), especially around the roof apex and 1m or more down the slope.

Access points are key to the success of horseshoe roost sites as horseshoe bats directly fly into a roost. They need access points of 30cm (width) x 20cm (height) for **Lesser horseshoe** and 40cm (width) x 30cm (height) for **Greater horseshoe.**

As nocturnal mammals, bats are **light-sensitive** and adapted to low light conditions. Consideration must be made to reduce light spill close to roosting areas. Horseshoe bats typically emerge approximately 30 minutes after sunset and during emergence they often fly in and out of the roost repeatedly before leaving. This behaviour is termed "light sampling" and has an important social function prior to the bats leaving the roost. This behaviour can be seen in the video below. Mitigation schemes can try to create a covered area where bats can undertake this behaviour as shown in the image on the left.

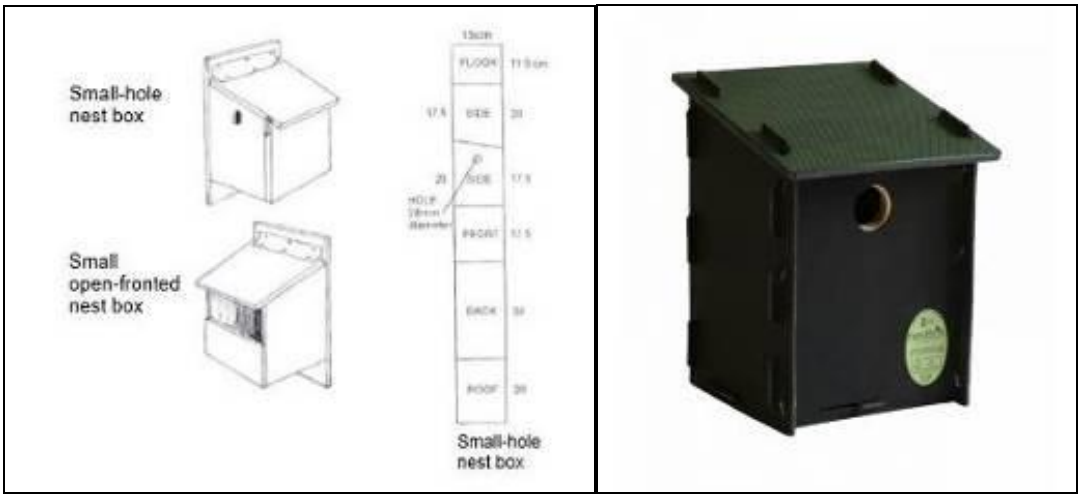
Right: example of a cowled hood for horseshoe bat access



Above: Example of stone wall cavities.

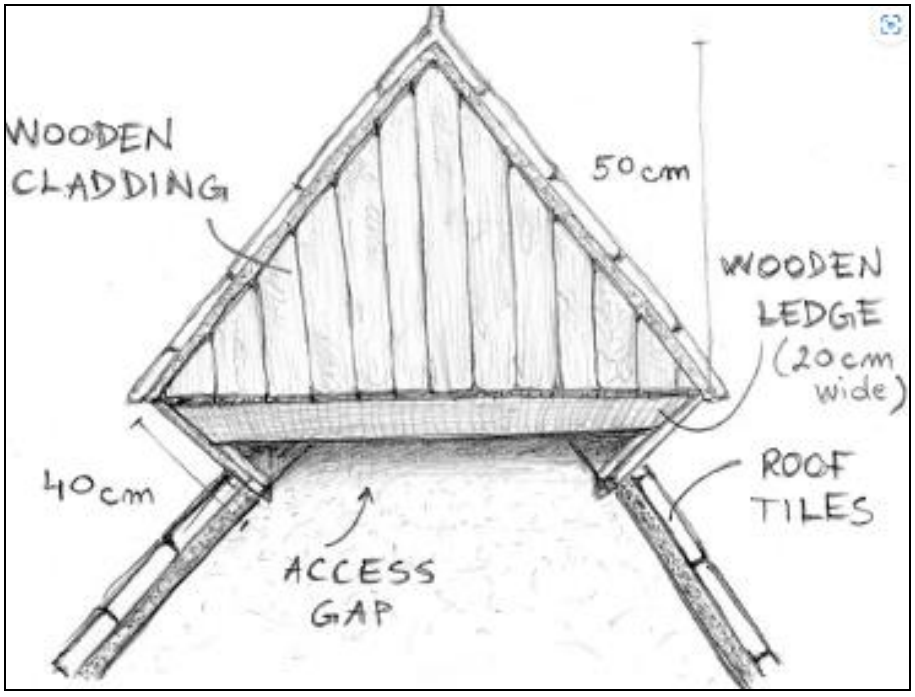
Examples of Sparrow terraces (top) and House martin nest cups (bottom). Siting advice can be found at [Where To Put A Bird Box | Nestboxes - The RSPB]

Examples of Small-holed and Open-fronted nest boxes. Siting advice can be found at [Where To Put A Bird Box | Nestboxes - The RSPB]



Examples of Open-fronted nest boxes. Siting advice can be found at [Where To Put A Bird Box | Nestboxes - The RSPB]

Examples of Swallow nest cups. Siting advice can be found at [Attracting Swallows to Nest Sites in Outbuildings - The RSPB]



Appendix 10: I&G Ecological Consulting Ltd legal disclaimer

This report was prepared by I&G Ecological Consulting Ltd at the instruction of, and for use by, our client(s) named on the front of the report. It does not in any way constitute advice to any third party who is able to access it by any means. I&G Ecological Consulting Ltd excludes to the fullest extent lawfully permitted, all liability whatsoever for any loss or damage howsoever arising from reliance on the contents of this report. We do not however, exclude our liability (if any) for personal injury or death resulting from our negligence, for fraud or any other matter in relation to which we cannot legally exclude liability.

We confirm that in preparing this report, we have exercised reasonable skill and care, taking into account the project objectives, the agreed scope of the work, and prevailing site conditions.

Advice in this report is based on the judgement of I&G Ecological Consulting Ltd and the interpretation of data gathered during the course of their survey on the property named in this document. ***Until payment has been received, this report remains the intellectual property of I&G Ecological Consulting Ltd and can be withdrawn from the planning process at our request. You are also not covered by any of our indemnity or liability insurance until the report has been paid for in full***.

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All work undertaken in this report is the sole responsibility of I&G Ecological Consulting Ltd.

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