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integrating nature conservation

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Update Preliminary Roost Assessment, High Level Inspection and Mitigation Report

18 Parkside Road,
Reading
Berkshire
RG30 2DB

October 2020

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QUALITY CONTROL		
The information which we have prepared and provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct.		
Prepared by	Assistant Ecologist Jessie Forster BSc	25th November 2020
Checked by	Senior Ecologist Ellie Frew MCIEEM	2nd December 2020
This report remains valid for 12 months from date of issue. Survey data are valid for 12-24 months from the date the survey was undertaken.		

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

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

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

1. EXECUTIVE SUMMARY

- 1.1. Darwin Ecology Ltd was instructed by Mr E Mather of Colony Architects Ltd to undertake an Update Preliminary Roost Assessment (PRA) and high level inspection at 18 Parkside Road, Reading, RG30 2DB. The survey and report were required to support the proposed planning application for the site involving the demolition of existing buildings and construction of a block of 12 residential units.
- 1.2. A separate report (Preliminary Ecological Appraisal and Preliminary Roost Assessment, Darwin Ecology Ltd, 2019) details the results of the original ecological appraisal and PRA. No evidence of bats was identified during the PRA, however the main house was considered to have high potential for crevice roosting bats. As such, emergence/re-entry surveys were recommended.
- 1.3. As the recommended emergence/re-entry surveys cannot now be undertaken until April 2021, a high level inspection was carried out in an attempt to characterise the roost so that a robust mitigation strategy could be developed and a planning decision made without further delays. The current owner of the property is elderly and vulnerable, and intends to vacate the dwelling due to the death of their spouse. The planning application must be approved in order for the sale of the house to proceed. Delay to the sale of the property will result in a serious personal cost to the client.
- 1.4. The amount and location of accumulated bat droppings beneath hanging tiles to the front and rear of the building, recorded during the high level inspection, were indicative of 3 low-level day roosts for low numbers of soprano pipistrelle (*Pipistrellus pygmaeus*) bats. Although emergence/re-entry surveys have yet to be undertaken, we are confident that the evidence gathered during the high level inspection and PRA is sufficient to categorise the roosts identified, and we consider it unlikely that species or roost types are present that would require material changes to the mitigation strategy proposed (void-dwellers, maternity roosts, etc.).
- 1.5. **Emergence/re-entry surveys will be undertaken between mid-May 2021 and August 2021.** The results of these surveys will be used to inform the licensing process, and specifically the type of license that will be required (low impact or full).
- 1.6. The proposed works will impact all of the roosts identified. Impacts could include injury, killing, damage or destruction of a roosting site, obstruction of access to roosts and disturbance of bats in their roost. Without mitigation the works would result in an offence under the *European Union (EU) Habitats Directive (1992)*.

- 1.7. The mitigation strategy outlined in this report is designed to sufficiently compensate the loss of a number of low-level soprano pipistrelle roosts. The features proposed are also considered sufficient to compensate for the loss of maternity level roost (in the unlikely event that one is identified during further survey), due to the additional enhancements included in the design. As such, it is considered that this report provides sufficient baseline and mitigation details (informed by the PRA and high level inspection alone) for the LPA to be confident that no material changes will be required following further surveys and thereby allowing the LPA to reach a decision regarding planning consent. Due to the vulnerable situation of the current owner we consider that requesting further surveys prior to a planning decisions (and the subsequent time delay), the result of which would have no effect on the proposed mitigation strategy, would be disproportionate to the additional information gained.
- 1.8. Mitigation measures recommended to ensure the continued Favourable Conservation Status (FCS) of bats is maintained will include:
- Appropriate timing of works;
 - Education of contractors on protection afforded to bats through a toolbox talk;
 - Ecological supervision and soft strip of features suitable for use by bats by hand and using hand tools, prior to the rest of the building works;
 - Any new external lighting to be fitted with downward facing baffles and directed to avoid light spillage;
 - 2 x Schwegler 1FD bat boxes will be installed on site to provide suitable alternative roosting locations for soprano pipistrelles during the works and enhance the site for crevice dwelling bat species in perpetuity;
 - 3 x Green & Blue Bat Block integrated bat boxes will be installed to compensate for the loss of the soprano pipistrelle roosts identified; and
 - A further 2 x interconnected Green & Blue Bat Block integrated bat boxes will provide a maternity-level roosting opportunity for pipistrelle bats and provide additional roosting opportunities for bats in the local area.
- 1.9. Recommendations for further enhancements have also been made, including the installation of a further 3 x integrated bat boxes, to provide additional roosting opportunities for crevice-dwelling bat species. In addition, 2 x swift blocks, 2 x bee bricks and a wildlife friendly landscaping scheme are recommended to enhance the value of the site for wildlife and to encourage greater biodiversity in the local area.

2. INTRODUCTION AND BACKGROUND

- 2.1. Darwin Ecology Ltd was instructed by Mr E Mather of Colony Architects Ltd to undertake an Update PRA and high level inspection at 18 Parkside Road, Reading, RG30 2DB. The survey and report were required to support the proposed planning application for the site involving the demolition of existing buildings and construction of a block of 12 residential units.
- 2.2. A separate report (Preliminary Ecological Appraisal and Preliminary Roost Assessment, Darwin Ecology Ltd, 2019) details the results of the original ecological appraisal and PRA. No evidence of bats was identified during the PRA, however the main house was considered to have high potential for crevice roosting bats. As such, emergence/re-entry surveys were recommended.
- 2.3. As the recommended emergence/re-entry surveys cannot now be undertaken until April 2021, a high level inspection was carried out in an attempt to characterise the roost so that a robust mitigation strategy could be developed and a planning decision made without further delays. The current owner of the property is elderly and vulnerable, and intends to vacate the dwelling due to the death of their spouse. The planning application must be approved in order for the sale of the house to proceed. Delay to the sale of the property will result in a serious personal cost to the client.
- 2.4. Although emergence surveys are yet to be carried out, it is considered that this report provides sufficient baseline and mitigation details for the LPA to reach a decision regarding planning consent based on the initial PRA and update high level inspection (and the subsequent mitigation strategy proposed) alone.
- 2.5. The PRA, high level inspection and reporting follow the standard Bat Conservation Trust (BCT) Good Practice Guidelines (2016).

Site Overview

- 2.6. The proposed development site at 18 Parkside Road is within a very urbanised area and is immediately surrounded by similar residential properties with associated gardens. Parkside Road runs along the western boundary and Westcote Road runs along the northern boundary (Figure 1).
- 2.7. The wider landscape is dominated by the urban residential areas of Reading (Figure 2). Surrounding Reading, the landscape comprises pastoral and agricultural fields, deciduous woodlands, wood pasture and parkland, coastal and floodplain grazing marsh.

- 2.8. The habitats surrounding the site support potential roosting, foraging and commuting habitat for a number of species of bat, with potential flight lines leading from the property to nearby deciduous woodland, although these may be significantly compromised and fragmented by light pollution from urban street lighting.



Figure 1: Site location (Copyright Google Maps 2020)

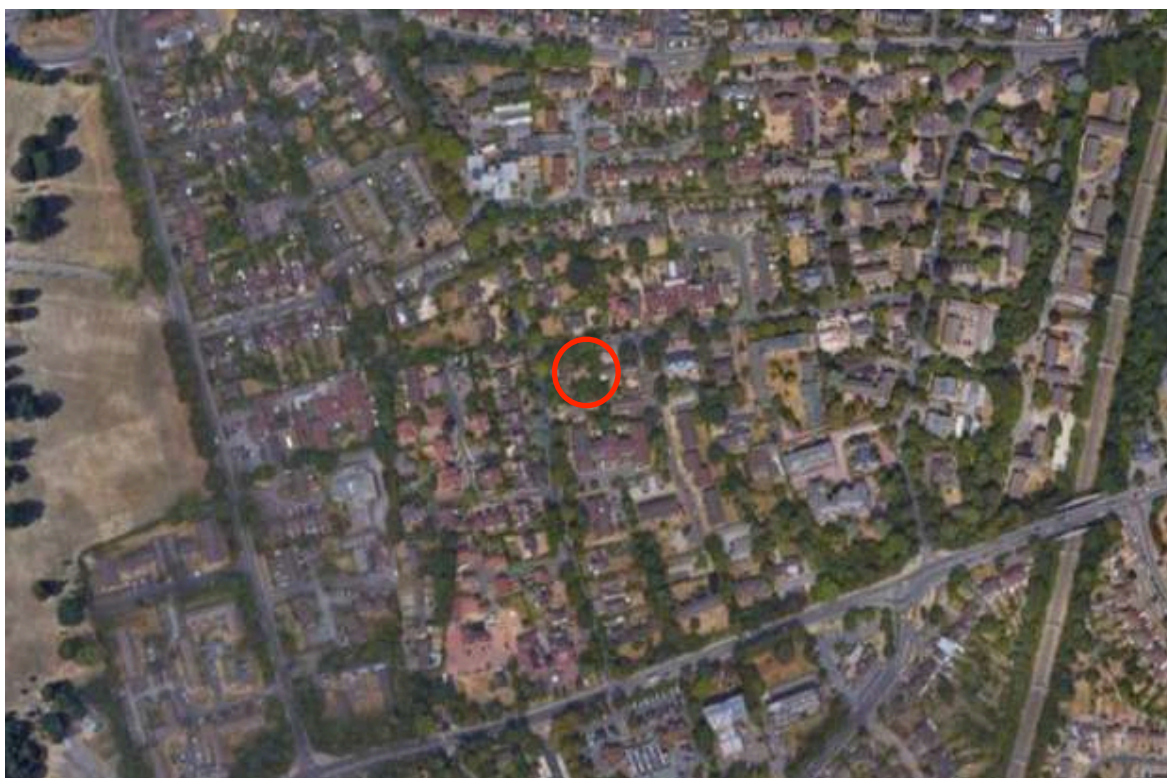


Figure 2: Site location within the wider landscape (Copyright Google Maps 2020)

3. LEGISLATION & POLICY

Bat Legislation

- 3.1. In England and Wales, all bat species and their roosts are legally protected under the EU Habitats Directive (1992); the *Conservation of Habitats and Species Regulations (2017)*; the *Wildlife and Countryside Act (1981) (as amended)*; the *Countryside and Rights of Way Act, 2000*; and the *Natural Environment and Rural Communities Act, (2006)*.
- 3.2. You will be committing a criminal offence if you:
- Deliberately capture, injure or kill a bat;
 - Intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats;
 - Damage or destroy a bat roosting place (even if bats are not occupying the roost at the time);
 - Possess or advertise/sell/exchange a bat (dead or alive) or any part of a bat; or
 - Intentionally or recklessly obstruct access to a bat roost.
- 3.3. Barbastelle (*Barbastella barbastellus*), Bechstein's (*Myotis bechsteinii*), greater horseshoe (*Rhinolophus ferrumequinum*), lesser horseshoe (*Rhinolophus hipposideros*), brown long-eared (*Plecotus auritus*), soprano pipistrelle, and noctule (*Nyctalus noctula*) bats are all species of principal importance in England under *Section 41* of the *Natural Environment and Rural Communities Act (2006)*.
- 3.4. The government's statutory conservation advisory organisation, Natural England, is responsible for administering licences that permit activities that would otherwise lead to an offence.
- 3.5. A licence can be obtained if the following three tests have been met:
- Regulation 53(9)(a) - there is "no satisfactory alternative" to the derogation, and;
 - Regulation 53(9)(b) - the derogation "will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range" and;
 - Regulation 53(2)(e) - the derogation is for the purposes of "preserving public health or public safety or other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment".
- 3.6. Protected species legislation can be found in Appendix 1.

National Planning Policy Framework February 2019

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

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

170a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);

170 d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;

174 b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity;

175 a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused; and

175 d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.

Berkshire Local Nature Partnership

- 3.8. The Berkshire Local Nature Partnership include partners from the health, education, local authority, business, and nature conservation sectors. These partners work together to create a sustainable, healthy and vibrant Berkshire by promoting the conservation and enhancement of nature and the benefits received from a healthy environment.

- 3.9. Priority species in Berkshire that may use or pass through the site include long-eared bats (*Plecotus* sp.) and hedgehogs (*Erinaceus europaeus*).
- 3.10. Priority habitats include urban, lowland meadows, lowland dry acid grassland, lowland calcareous grassland, lowland mixed deciduous woodland, wet woodland, wood-pasture and parkland, rivers, lowland fens, reedbeds, floodplain grazing marsh, eutrophic standing waters, heathland, orchards and hedgerows.

4. METHODOLOGY

Desk Study

- 4.1. A desk study was undertaken for designated sites and protected species and habitat records within 2 km of the site, extended to 5 km for information relating to bats. The following resources were consulted:
- The MAGIC website, to obtain information on any designated sites of nature conservation interest within 2 km of the site and details of any European Protected Species (EPS) licences issued for bats within 5 km; and
 - Google Maps, to view aerial photographs and maps, to assess the ecological context of the site.

Preliminary Roost Assessment

- 4.2. Mike Cummings MSc MCIEEM¹ and Jessie Forster BSc (Hons) carried out an update PRA of the house at 18 Parkside Road on 21st October 2020 in accordance with the following methodology.

Internal Survey:

- 4.3. An update internal survey was not considered necessary as the results of the original PRA in 2019 are considered to be valid. Given the vulnerable nature of the occupant and the current global pandemic, the risk associated with an update internal inspection was considered disproportionate to information that would have been gained.

External Survey:

- 4.4. An investigation was carried out of features that may indicate bat presence. For example; gaps under roof and ridge tiles, or behind soffit boards and wooden fascias. A search for bat droppings was made beneath each potential entry/exit point identified. The surveyor used a powerful, low heat LED torch and binoculars.

High Level Inspection

- 4.5. Mike Cummings MSc MCIEEM and Jessie Forster BSc (Hons) carried out a high level inspection at 18 Parkside Road on 21st October 2020 in accordance with the following methodology.
- 4.6. All features that were assessed as having bat potential from ground level during the PRA were examined with an endoscope and torch, using a ladder to access the features. The

¹ 2015-13903-CLS

features were thoroughly checked for bats, or evidence of bats in the form of droppings or staining. The gaps were also assessed for their suitability (depth and thermal conditions) as roosting locations for bats using the endoscope.

5. OVERVIEW OF SURVEY RESULTS

Desk Study

- 5.1. One statutory designated site has been identified within 2 km of the site at Lousehill Copse Local Nature Reserve (LNR), approximately 1.1 km northwest of the site. The site itself lies within a Site of Special Scientific Interest (SSSI) Impact Risk Zone, although no risks are listed for residential developments and no further action regarding designated sites is required.
- 5.2. A number of priority habitats are present in the local area, including coastal and floodplain grazing marsh, deciduous woodland, traditional orchards, and woodland pasture and parkland. The habitats surrounding the site support potential roosting, foraging and commuting habitat for a number of bat species, with potential flight lines leading from the property to nearby woodland. These may be compromised and fragmented due to the presence of urban street lights.
- 5.3. Fourteen EPS licenses have been granted for bats within 5 km of the site in the last five years. These were for destruction of common pipistrelle (*Pipistrellus pipistrellus*), soprano pipistrelle and brown long eared resting places and for the destruction of a single common pipistrelle breeding site and a single soprano pipistrelle breeding site.

Preliminary Roost Assessment

- 5.4. During the original PRA in 2019, no evidence of bats was identified internally or externally. A number of features providing potential roosting opportunities were identified, therefore the building was classified as having high potential to support roosting bats. The update PRA identified a number of potential roost features to be investigated further during the high level inspection.

External Assessment

- 5.5. The house is a two storey building, constructed of brick with a pitched tiled roof and a number of sections of hanging tiles. The roof tiles are generally well sealed and have a coverage of moss in a number of places. The sections of hanging tiles on the western and eastern elevations have the highest potential for roosting bats, with gaps beneath the tiles at the rear of the building and on the dormer windows. A number of lifted and missing tiles along the verges of the southern section of the building were also identified.

High Level Inspection

- 5.6. During the high level inspection all the crevices beneath the hanging tiles on the eastern and western elevations were examined. Droppings characteristic of pipistrelle bats were identified beneath a number of gaps at the bottom edge of hanging tiles in three locations. Any gaps large enough were investigated using an endoscope.
- 5.7. The majority of the hanging tiles on the dormer windows in the western elevation were well sealed, however, potential roost locations were identified at the apex of each of the dormer windows, at the corner tiles and at a gap created by a missing tile. No crevices inspected with an endoscope were found to contain evidence of bats and there was no access to further crevices or onto the wall plate.
- 5.8. Small accumulations of droppings were identified in two locations beneath hanging tiles on the eastern aspect of the building and beneath hanging tiles on the central dormer window on the western elevation (see Images and Figure 3). Numbers of droppings identified were indicative of low-level use by small numbers of bats. Samples of droppings from both the eastern and western elevations were sent for eDNA analysis conducted by Swift Ecology Ltd which confirmed soprano pipistrelle as the only species present on site.

Limitations

- 5.9. It is recognised that the emergence/re-entry surveys recommended for this building have yet to be carried out, however, the presence of droppings and confirmation of species through eDNA analysis has allowed confirmation of the presence of soprano pipistrelle roosts. The high level inspection has allowed thorough inspection so that any features with potential for larger numbers of bats has been explored (and no further evidence recorded).
- 5.10. Whilst emergence/re-entry surveys are recommended to inform the licensing process, it is considered unlikely that these surveys will identify further species or higher level roosts. The results outlined in this report are therefore considered sufficient to inform comprehensive mitigation information based on the initial PRA and update high level inspection alone. The design of the mitigation is such that the LPA can be confident that there will be no material changes required due to the results of further surveys.



Image 1: Locations of gaps beneath hanging tiles on the western elevation



Image 2: Eastern aspect, showing coverage of moss on roof tiles



Image 3: Endoscope inspection of hanging tiles at the western elevation



Image 4: Location of missing tile gap inspected by endoscope



Image 5: Lifted verge tiles and mortar gap on the eastern elevation



Image 6: Lifted and missing verge tiles on eastern elevation



Image 7 : Light coverage of cobwebs over gap beneath hanging tiles



Image 8: Majority of hanging tiles above dormer windows well sealed, with a gap at the apex



Image 9: Gaps beneath hanging corner tiles on dormer windows on the western elevation



Image 10: Close inspection of gap at the apex of hanging tiles on dormer window



Image 11: Coverage of moss on roof tiles



Image 12: Vegetation growing on roof tiles



Image 13: Hanging tiles on upper storey of the eastern aspect of the building



Image 14: Coverage of moss on well sealed roof tiles and lead flashing



Image 15: Gap beneath corner hanging tiles



Image 16: Gap beneath hanging tiles adjacent to window on the eastern aspect of the building



Image 17: Droppings found stuck to hanging tiles



Image 18: Droppings found beneath corner hanging tiles



Droppings found under hanging tiles on the western elevation:



Droppings found stuck to hanging tile on the eastern elevation:



Droppings found under hanging corner tile on the eastern elevation:



*NOTE Areas are indicative and are not shown to exact scale.

- Site Boundary
- Building - majority of the roof tiles with a coverage of moss
- Soprano pipistrelle droppings identified
- Hanging tiles investigated during high level inspection
- Lifted/missing verge tiles

6. DISCUSSION AND RECOMMENDATIONS

Status of Bats on Site

- 6.1. During the PRA in 2019, no evidence of bats was identified internally within the building. During the update external PRA and high level inspection evidence of low numbers of common bat species was identified in three locations beneath hanging tiles on the eastern and western aspects of the building. The droppings were confirmed by eDNA analysis as belonging to soprano pipistrelle bats and the accumulations found were considered to be indicative of low numbers of this species roosting beneath hanging tiles on the building.
- 6.2. Based on the quantity and locations of bat droppings found during the high level inspection, and the results of a single species returned from eDNA analysis, the sections of hanging tiles to the front and rear of the building were assessed to support 3 low-level day roosts for low numbers of soprano pipistrelle bats.
- 6.3. Although emergence/re-entry surveys have yet to be undertaken, we are confident that the evidence gathered during the high level inspection and PRA is sufficient to categorise the roosts identified and consider it unlikely that additional species or higher level roosts (requiring significantly different mitigation strategies) will be identified at this site.

Impact of works

- 6.4. The proposed works to demolish the current building and construct a block of 12 residential units on a similar footprint will impact all the roosts identified. Impacts could include injury, killing, damage or destruction of a roosting site, obstruction of access to roosts and disturbance of bats in their roost. Without mitigation the works would result in an offence under the European Habitats Directive.
- 6.5. With the assumption that no higher level roosts are found during emergence/re-entry surveys proposed for 2021, the site will be registered under the Bat Mitigation Class License (BMCL) system. Under the BMCL system, registered consultants can register a site which, once approved, permits the disturbance and/or capture of bats and/or damage/destruction of bat roost/s of low conservation significance. Only registered consultants are able to use this licence and each site must then be registered individually by them, should it fit the terms and conditions of the licence as specified below:
 - No more than three common species of bat;
 - Only individual or small numbers of bats of each species; and
 - No more than three roosts in total across all structures at the site.

- 6.6. The BMCL allows faster processing of licence applications due to the reduced amount of paperwork to complete before a site is licensed, and Natural England take on average ten working days to make decisions on these licences.
- 6.7. Please note that such licences will only be granted where it can be shown that there will be no detriment to the species of bat concerned, and thus suitable mitigation measures will still be required.
- 6.8. Input from a registered consultant will be required during licensable activities at the site (such as roof removal). This includes measures to ensure that bats are not harmed during conversion works and to ensure that there is long term provision of alternative roosting opportunities on site. Principal Ecologist, Michael Cummings MSc MCIEEM is a registered consultant on the BMCL (RC137), who can apply for the BMCL for the site.
- 6.9. In the unlikely event that the emergence/re-entry surveys identify the presence of a maternity roost of pipistrelle bats, a full EPS license will be required. Full licenses require a higher level of detail to be submitted to Natural England for approval and have a standard processing time of 30 working days.
- 6.10. In order to ensure that the 'Favourable Conservation Test' can be met, a mitigation strategy will be submitted as part of the license application. This includes measures to minimise the risk of killing or injury of bats during the demolition works and to ensure that there is long term provision of alternative roosting opportunities on site. Input from a suitably qualified bat ecologist will be required during licensable activities at the site (such as the removal of features with potential for roosting bats). In addition, compensatory roosts will be required to replace the confirmed roosting opportunities currently present within the building. The proposals are considered unlikely to have an impact on foraging or commuting habitat in the local area, providing the recommendations and mitigation set out below are followed
- 6.11. The mitigation strategy outlined in this report is designed to sufficiently compensate the loss of a number of low-level soprano pipistrelle roosts. The features proposed are also considered sufficient to compensate for the loss of maternity level roost (in the unlikely event that one is identified during further survey), due to the additional enhancements included in the design. As such, it is considered that this report provides sufficient baseline and mitigation details (informed by the PRA and high level inspection alone) for the LPA to be confident that no material changes will be required following further surveys and thereby allowing the LPA to reach a decision regarding planning consent. Due to the vulnerable situation of the current owner we consider that requesting further surveys prior to a planning decision (and the subsequent time delay), would be disproportionate to the additional

information gained. It is not anticipated that any additional information gained from emergence/re-entry survey would require the proposed mitigation strategy to be amended in any material way.

6.12. Below is a summary of the main mitigation measures proposed in relation to bats.

General Method statement to be applied to all works

6.13. An outline of likely mitigation, compensation and enhancements is included below but the full details will be finalised as part of the licence application.

Mitigation

6.14. *Timing of Works:* Due to the presence of several common species day roosts, works can take place during March - October inclusive.

6.15. In the unlikely event of a maternity level roost being identified during further surveys, the timing of works submitted within the EPS license application will comprise a period outside of the bat maternity season (i.e. March - April or October).

6.16. *Toolbox Talk:* Before commencing any work on site, all contractors will be inducted by a licensed bat ecologist or accredited agent in a tool box talk, to ensure they are aware of the risks to wildlife on site, particularly the presence of bat roosts, their legal protection and of working practices to avoid harming bats and other species in order to ensure working practices on site follow legal requirements.

6.17. *Ecological Supervision:* Immediately prior to any works on site, the building must be subject to an internal and external survey by a suitably qualified and licensed bat ecologist to ensure as far as possible that no bats are present. In addition, hand removal / soft strip of internal features suitable for use by bats must be done very cautiously and under supervision by a bat licensed ecologist.

6.18. *Bat Boxes:* As a precautionary measure and to provide alternative roosting sites for bats during construction works, two bat boxes will be installed prior to works commencing on site. 2 x Schwegler 1FD bat boxes will be installed to provide suitable alternative roosting locations for soprano pipistrelles during the works and to remain on site in perpetuity. The locations will be determined by a licensed bat ecologist to ensure likelihood of repeated use is increased. The bat boxes will be installed at a height of at least 4 m, preferably on a southern un-cluttered aspect with good connectivity to linear features such as other mature trees and hedgerows.

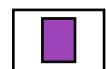
- 6.19. *Lighting*: Any new external lighting must be directed to avoid light spillage onto vegetation, particularly linear habitat features such as woodland edges or potential roosting sites within trees and buildings. Bats are sensitive to light and could potentially avoid the area if access points or the surrounding areas become lit. Appropriate lighting options will prevent a negative impact on bats potentially using the habitats on site and should be approved by a suitably qualified and licensed bat ecologist.
- 6.20. Minimising the periods of lighting and using motion sensors are strongly recommended, using a short timer to reduce the duration of lighting and reduce disturbance to bats. It is important to direct the light only where it is needed and avoid light spillage onto vegetated margins. Upward lighting can be minimised by fitting lights with downward facing baffles to avoid light pollution. Preventing light spillage above an angle of 70 degrees can be achieved by using fixtures that shield the bulb and direct the light downward. Warm white LEDs are much better than bright white LEDs.
- 6.21. The lighting plan should be approved and signed off by a licensed Bat Ecologist prior to finalising the plan, to ensure the scheme is suitable for bats. If appropriate measures are taken to reduce light spillage from the development, it is likely that there will be no negative impacts on local bat populations.
- 6.22. See Appendix 3 for further information on designing lighting to minimise impacts on bats.

Compensation

- 6.23. Compensation on site will be required for the loss of three low-level soprano pipistrelle day roosts.
- 6.24. To provide compensatory roosting opportunities for soprano pipistrelle bats, 3 x Green & Blue Bat Block integrated bat boxes will be installed in suitable locations, at a height of at least 4 m, on the eastern and western elevations of the new building. The integrated bat boxes should preferably be installed on un-cluttered aspects with good connectivity to linear features such as mature trees and hedgerows. These will provide suitable alternative roosting opportunities to compensate for the loss of the known roosts beneath the sections of hanging tiles to be impacted by the works.
- 6.25. In addition, to provide a maternity-level roosting feature for soprano pipistrelle bats, 2 x Green & Blue Bat Block interconnecting bat boxes will be installed at a height of at least 4 m on the southern elevation of the new building (Figure 4). This will provide a satisfactory compensation feature in the unlikely event that a maternity level roost is identified during the emergence/re-entry surveys, and otherwise will comprise a permanent enhancement on site.

7. ENHANCEMENT RECOMMENDATIONS

- 7.1. National planning policy states that all developments should seek to enhance onsite biodiversity whether impacts on protected species are recorded or not. Incorporating enhancement features into new or renovated buildings should be carefully considered. These features can be simple and inexpensive, please see below for specific recommendations.
- 7.2. *Bat roosting features:* It is recommended that a further 3 x Green & Blue Bat Block integrated bat boxes are installed in order to provide additional roosting opportunities for bats within the local landscape.
- 7.3. *Bird boxes:* It is recommended that 2 x Green & Blue Swift Block integrated swift boxes are installed in the new building. These should be fitted on a side of the building that gets some shade during the day, to give protection from heat, but not over windows or near to vents. It should be sited at least 5 metres above ground, with clear adjacent airspace so the birds can access it in high-speed direct flight.
- 7.4. *Bee bricks:* To enhance the site for invertebrates, it is recommended that 2 x bee bricks are integrated within the new building. These should be located in a sunny south-facing location, at least 1m above ground level.
- 7.5. *Hedgehog gaps:* Any new walls or fence lines should include wildlife access holes so that species such as hedgehogs can freely access/exit the site. 13cm by 13cm is sufficient for any hedgehog.
- 7.6. *Wildlife beneficial landscaping scheme:* Any future landscaping planting should seek to enhance biodiversity, improve connectivity to the surrounding habitats and provide food and shelter for a wide range of wildlife. All amenity planting and formal landscaped areas should be designed using a variety plant species beneficial for wildlife. These do not necessarily have to be native but should be chosen for their ability to provide nectar or fruit. Non-invasive species should be planted. There are a number of specialist seed mixes available specific to certain soil types, growing conditions and designed to benefit different groups of species such as bees or butterflies and moths.
- 7.7. All habitats should be managed in a suitable way to encourage a wide variety of insects and other wildlife to use the site.



6 x Green & Blue Bat Block integrated bat boxes



2 x Schwegler 1FD bat boxes



2 x Green & Blue Swift Block swift boxes



2 x interconnected Green & Blue Bat Block integrated bat boxes to create a maternity roost feature suitable for pipistrelle bats.



2 x bee bricks



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Figure 4: Mitigation, compensation and enhancement plan

Date: October 2020

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APPENDIX 1 - PROTECTED SPECIES LEGISLATION

Bats

In England and Wales, all bat species and their roosts are legally protected under the Wildlife and Countryside Act (1981) (as amended); the Countryside and Rights of Way Act, 2000; the Natural Environment and Rural Communities Act (NERC, 2006); and by the Conservation of Habitats and Species Regulations (2010). You will be committing a criminal offence if you:

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

Barbastelle, Bechstein's, greater horseshoe, lesser horseshoe, brown long-eared, soprano pipistrelle, and noctule bats are all priority species under the UK Biodiversity Action Plan (UK BAP) and have also been adopted as species of principal importance in England under Section 41 of the NERC Act 2006.

Badgers

Badgers and their setts are afforded strict protection under the Protection of Badgers Act 1992. This Act consolidates past badger legislation and, in addition to protecting the badger itself, makes it an offence to damage, destroy or obstruct badger setts. Badgers are also protected under Schedule 6 of the Wildlife and Countryside Act 1981 (as amended), and listed under Appendix III of the Bern Convention, as a species that is in need of protection but may be hunted in exceptional instances. Only badger setts that are currently in use are covered by wildlife legislation.

Birds

All wild birds in the UK are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill, injure or take any wild bird or to take, damage or destroy the nest or its eggs.

Some bird species, such as the barn owl *Tyto alba*, are listed in Schedule 1 of the 1981 Act and receive further protection, making it an offence to intentionally or recklessly disturb these birds whilst building a nest or in, on or near a nest containing eggs or young; or to disturb dependent young of such a bird.

The NERC Act (2006) inserts a new schedule into the Wildlife and Countryside Act (1981) to protect the nests of some bird species that regularly re-use their nests, even when the nests are not in use. This protection currently applies to golden eagle, white-tailed eagle and osprey.

Reptiles

All British reptiles are listed under schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and are therefore protected from intentional killing or injury. This is largely as a consequence of a national decline in numbers associated with habitat loss.

Two scarcer native British reptiles (smooth snake *Coronella austriaca* and sand lizard *Lacerta agilis*), are afforded 'full' protection. This legislation makes it an offence to intentionally or recklessly kill, injure, disturb, take, possess or sell these species (in all life stages). It is also illegal to damage, destroy or obstruct access to places they use for breeding, resting, shelter and protection.

All species of reptile are priority species in the UKBAP and have been adopted as Species of Principal Importance under Section 41 of the NERC Act (2006) in England (Section 42 in Wales).

Amphibians

Great crested newts (GCN's) *Triturus cristatus* and their habitats are fully protected by the Conservation of Habitats and Species Regulations (2010) and partially protected under the Wildlife and Countryside Act 1981 (as amended). This legislation makes it an offence to kill, injure or capture GCN's, their young or eggs, or destroy / damage their ponds or places of shelter used for breeding or protection. The great crested newt is also a Priority species in the UK Biodiversity Action Plan (UKBAP), and had been adopted as a Species of Principle Importance in England under Section 41 of the NERC Act 2006.

The natterjack toad *Epidalea calamita* is fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of The Conservation of Habitats and Species Regulations 2010 making it a European Protected Species. The natterjack toad is also a priority species under the UK Biodiversity Action Plan.

The pool frog *Rana lessonae* is protected under the Conservation (Natural Habitats &C.) Regulations 1994 (as amended). As a European protected species the deliberate capturing, disturbing, injuring or killing of this species is prohibited, as is damage or destruction of its breeding sites or resting places. The pool frog is also a priority species under the UK Biodiversity Action Plan due to a 100% decline over 25 years (1980-2005).

Common toads *Bufo bufo* are also designated UKBAP species due to a serious decline of populations across large areas of southern, eastern and central England, thought to be mainly due to changes in habitat management, mortalities on the roads, and climate change.

Dormice

Common dormice *Muscardinus avellanarius* and their habitats are fully protected by both the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations (2010). This legislation makes it an offence to kill, injure, disturb or capture dormice, or destroy or obstruct their resting or breeding places.

The dormouse is also a priority species under the UK Biodiversity Action Plan and has been adopted as a species of Principal Importance in England under Section 41 of the NERC Act 2006 (section 42 in Wales) and so is protected from any adverse effects as a result of development.

Otters

Otters *Lutra lutra* are protected by both the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2010. This legislation makes it is illegal to; deliberately or recklessly kill, injure or capture an otter, deliberately or recklessly disturb or harass an otter, damage, destroy or obstruct access to a breeding site or resting place of an otter.

The otter is also a UK BAP Priority Species and has been adopted as a Species of Principal Importance in England under Section 41 of the NERC Act 2006 (Section 42 in Wales) and the Conservation (Scotland) Act in Scotland.

Water Voles

Water voles *Arvicola terrestris* are fully protected under the Wildlife and Countryside Act 1981 (as amended). This legislation makes it an offence to kill or injure water voles, and to damage, destroy or obstruct access to places used for protection or shelter, and to disturb water voles whilst they occupy such a place.

The water vole is also a Priority species in the UK Biodiversity Action Plan, and had been adopted as a Species of Principle Importance in England under Section 41 of the NERC Act 2006.

White-Clawed Crayfish

The white-clawed crayfish *Austropotamobius pallipes* is protected under the Wildlife and Countryside Act 1981 (as amended), making it a criminal offence to; intentionally or recklessly kill or injure a white-clawed crayfish, or sell or

attempt to sell any part of this species. The Habitats Regulations (2010) provide further protection through the declaration of Special Areas of Conservation (SAC). This protection aims to prevent commercial harvesting of white-clawed crayfish and prohibits their capture without a licence.

The white-clawed crayfish is also a Priority species in the UK Biodiversity Action Plan (BAP), and has been adopted as a Species of Principal Importance in England under Section 41 of the NERC Act 2006.

Hedgehogs

Hedgehogs are UK Biodiversity Action Plan (BAP) species, and therefore must be taken into consideration as part of development planning. A recent report (Wembridge, 2011) shows that hedgehog numbers have declined by 25% in the last ten years.

APPENDIX 2 - SURVEY AND REPORTING LIMITATIONS AND EXCEPTIONS

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

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

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

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

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

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

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

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

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

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

The copyright in this report, plans and other associated documents prepared by Darwin Ecology Ltd is owned by them and no such report, plans and other associated documents may be reproduced without their written consent.

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



THE IMPACT OF LIGHTING ON BATS

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

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

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

and radiates light in multiple directions.

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

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

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

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

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

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

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

What lighting should I use?

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



What to avoid:

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

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

Key Points

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