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Bat Scoping and Emergence Report

Arborfield House, Reading

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Report Summary

1. The Ecology Co-op was commissioned by Inhabitat Design Studios Architects to undertake a Bat Scoping Assessment and Preliminary Ecological Appraisal of Arborfield House and a number of outbuildings within the grounds. The purpose of this report is to present the findings of the appraisal and identify potential ecological constraints and opportunities in relation to a proposal for a single-storey side and two-storey rear extension and the replacement of a double garage, with an annexe above.

2. An assessment of the site was carried out by Bat Class 2 Licence holder and Principal Ecologist Xenia Snowman BSc (Hons.) on the 29th June 2022. This included a ground-based external inspection of the buildings, an internal inspection of potential roost features, such as enclosed loft spaces (subject to access), and an appraisal of the surrounding habitats, to evaluate the site for its potential to support bats. All bat species are European Protected Species (Annex IV, 'Habitats Directive').

3. The site comprises the main dwelling and a number of structures, including a double garage, a brick-built 'overhang', a single 'garage/outhouse', the central 'store room' and a 'tool shed' set within a large, private plot. This site is situated within a suburban location, surrounded by similar large and medium sized detached and semi-detached dwellings and associated gardens. There are no designated protected areas within the zone of influence of the site, or within 2km.

4. No evidence of roosting bats was identified during the survey. However, the main dwelling was assessed as holding moderate bat roosting potential, while the 'overhang' and the 'store' were assessed as having 'low' potential to support crevice-roosting bat species in line with the Bat Conservation Trust Guidelines¹. This was based on the presence of external crevice features under roof tiles, creating suitable bat access into suitable roosting features between the tiles and the internal sarking boards lining the loft void of the main house. The overhang contained a horizontal gap on the underside in the brickwork leading into a cavity and the store displayed suitable bat access and roosting features between the hand-made clay tiles on the roof. The remaining buildings on site were assessed as holding negligible potential for supporting bat roosts, these include the double garage, the single garage/outhouse and the tool shed.

5. No evidence of roosting bats was identified within the two loft voids of Arborfield House. Under existing proposals, only small areas of roof tile are due to be impacted by proposals, in an area of the roof with negligible bat roosting potential. Therefore, no further bat surveys were deemed necessary. However, to mitigate for any potential disturbance to roosting features identified across the roof, precautionary measures are required. These will include works affecting the roof areas to be undertaken following a repeat internal inspection and be carried out under the direct supervision of a Natural England Class 2 bat licence holder in the period between mid-March and the end of October. This is to



avoid disturbing bats that could be in hibernation.

6. As the potential roost features identified on the store and overhang during the inspection are likely to be subject to demolition in order to facilitate the proposals, a single further bat survey was required to confirm presence, or likely absence of roosting bats in these structures and evaluate the conservation importance of the site for bats. An endoscope inspection of the overhang was undertaken on 29th June 2022, with a second undertaken on 29th August 2022, along with a dusk emergence survey conducted on the store, with the assistance of an infra-red night vision camera. The inspections and survey were led by Natural England Bat Licence holder and Principal Ecologist Xenia Snowman BSc (Hons.) and were completed in line with good practice bat survey guidelines.

7. No bats were identified utilising the overhang or recorded emerging from the store. Therefore, bat roosts within the overhang and store at Arborfield House are considered likely absent. Overall, bat activity levels recorded were moderate in the surrounding area with common pipistrelle, noctule and brown long-eared bats recorded foraging and commuting across the site.

8. The structures, trees, shrubs, and dense vegetation on site all have potential to support nesting birds. Therefore, bird nests should be taken into consideration if it becomes necessary to remove any vegetation from the site, or if the buildings are affected during the active bird nesting season, between March and September.

9. No trees or vegetated areas are due to be impacted by current proposals. Therefore, other than the buildings surveyed, the areas of the site due to be impacted are entirely comprised of hard-standing and provide no potential to support any other protected species or species groups.

10. Recommendations are made for the enhancement of the site for roosting bats and nesting birds.

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1 INTRODUCTION

1.1 Purpose of the Report

The Ecology Co-op was commissioned by Inhabitat Design Studios Architects to undertake a Bat Scoping Assessment and Preliminary Ecological Appraisal of Arborfield House and a number of outbuildings within the grounds. This report presents the findings of a walkover survey and building inspection for occupation by bats, undertaken by Xenia Snowman BSc (Hons.) and Natural England Level 2 bat survey class licence holder on 29th June 2022. Whilst this report has maintained a focus on assessing potential impacts upon roosting bats and bat activity within the proposal's zone of influence, it has also considered the potential for any other protected/notable species and/or habitats to be adversely affected.

The proposal for the site comprises side and rear extensions to the main dwelling and the replacement of the double garage, with an annexe to be built above, with associated parking/hard and soft landscaping. Recommendations for further surveys that are likely to be required to inform a planning application and Ecological Impact Assessment are provided, if necessary. Where appropriate, measures to avoid, mitigate and/or compensate for significant adverse effects are outlined.

This report is intended to inform the client and the appropriate planning authority of the potential impacts that this development proposal may have upon roosting bats as well as identifying potential impacts to commuting routes and foraging habitat of value.

1.2 Background

The full address for the site is Arborfield House, Church Lane, Arborfield, Reading RG2 9JB. The central National Grid Reference for this site is SU 75203 67613.

The site comprises the main house and a number of outbuildings including a double garage, a brick-built 'overhang', a single 'garage/outhouse', the central 'store room' and a 'tool shed' set within a large, private plot (Figure 1). This site is situated within in a sub-urban location, surrounded by similar large and medium sized detached and semi-detached dwellings and associated gardens. The wider landscape consists of a combination of arable and grazed pasture, fringed with substantial tree lines and hedgerows, providing valuable potential bat foraging habitat (Figure 2).



Figure 1. Aerial image of Arborfield House, Reading, with the surveyed buildings labelled for the purposes of this report.

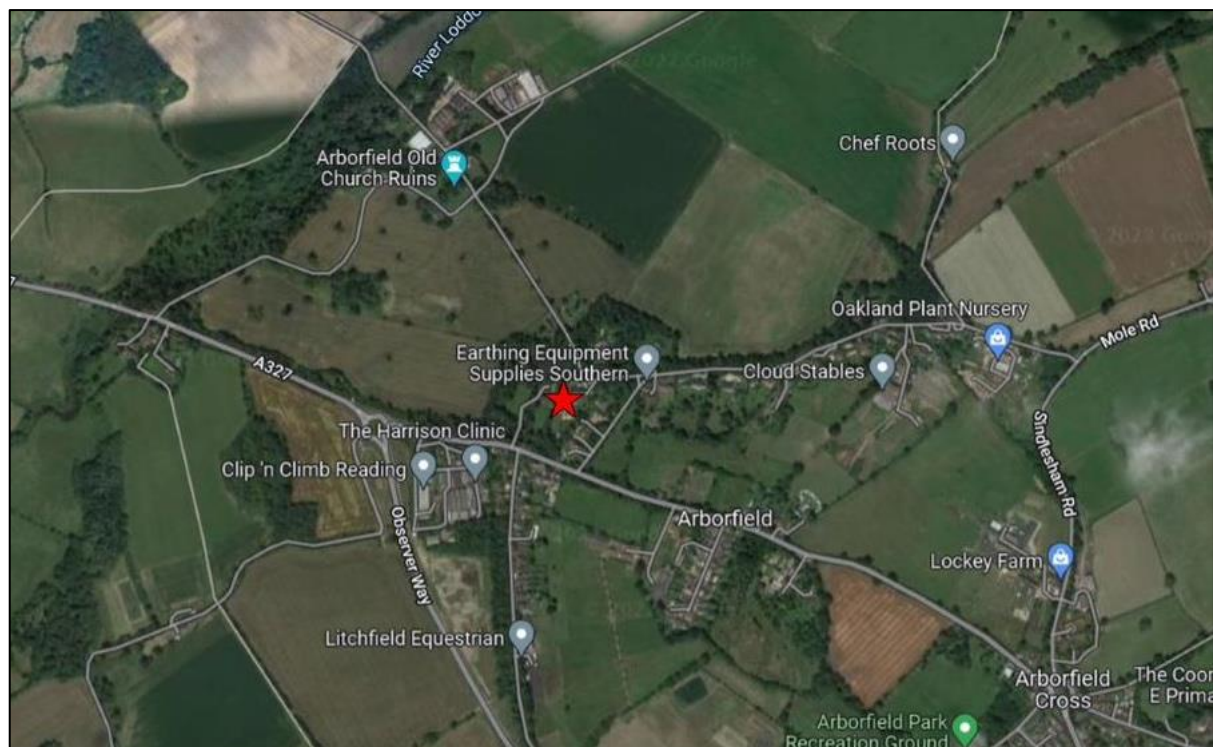


Figure 2. Aerial image of Arborfield House, Reading (indicated by a red star), within a wider landscape context.

1.3 Policy and Legislation

Legal protection applying to all bat species in the UK and any other species relevant to this appraisal, is outlined in Appendix 1 of this report.



The results of this survey will be used to determine the need for further surveys, impact avoidance measures and/or an appropriate mitigation/compensation strategy to ensure compliance with UK wildlife legislation, policy and best practice.

2 METHODOLOGY

The methodologies used for this survey are in accordance with the bat survey guidelines produced by the Bat Conservation Trust¹. Where there has been any deviation from the guidelines due to any site-specific constraints or other circumstances, reasoning and justification has been provided. This survey has also considered the Guidelines for Preliminary Ecological Appraisal produced by CIEEM², where the potential for impacts to species other than bats has been identified.

2.1 Desk Study

A search of on-line mapping resources has been undertaken to characterise the local context of the site with respect to semi-natural habitats and linear features of value to foraging and commuting bats.

The MAGIC website resource (www.magic.gov.uk) has been used to identify the location of designated sites for nature conservation within 2km and European Protected Species (EPS) licences granted within a 1km radius of the survey site. Priority habitats and ancient woodland, upon the site and within the proposal's zone of influence, have also been identified due to their ecological value and potential to act as important foraging resources for bats.

Priority habitats and ancient woodland are classified as habitats of principal importance. Habitats of principal importance are listed in Section 41 of the Natural Environment and Rural Communities (NERC) Act, 2006³, which places a duty on Local Planning Authorities to have due regard to biodiversity.

2.2 Field Survey

2.2.1 Roosting Potential

Bats can use a wide range of features for roosting purposes including loft spaces, cavity walls, loose tiles, mortice joints and cracks/gaps in a variety of built structures. They can also be found in trees with holes, splits, cracks, cavities, ivy and loose bark.

A detailed building inspection was carried out, looking for potential access points and Potential Roosting Features (PRFs) that bats could use and any evidence indicating the presence of bats using the building, such as rub marks, feeding remains, staining or droppings. This included a ground-based external inspection around the buildings and internal inspection of PRFs, such as enclosed loft spaces or roof voids or basements, where safe access was possible. A high-powered torch was used for the internal and external assessment.

The suitability of each feature, or group of features, to support roosting bats has been assessed as either negligible, low, moderate, or high, in accordance with best practice guidance¹ (see Table 1) Any evidence confirming the presence of bats was clearly recorded including photos and samples taken (e.g. droppings), where appropriate. Further surveys have been recommended in accordance with best



practice guidance and the surveyors professional judgement, where evidence of a bat roost or PRFs have been identified that would be adversely impacted by the proposal and where precautionary mitigation alone cannot ensure that bats would not be potentially disturbed or harmed.

Table 1. Guidelines for assessing suitability of structures (buildings and trees etc) to support bat roosts

Suitability	Description of roosting habitats
Negligible	A structure that does not support any features that could be used by roosting bats.
Low	A structure that has one or more potential roosting features that could support individual roosting bats opportunistically. These features however lack the space, shelter or appropriate conditions, to support larger numbers of bats (such as a maternity roost).
Moderate	A structure with one or more potential roost sites that could be used by bats due to their size, shelter and suitable conditions for roosting, but are unlikely to support a roost of high conservation significance.
High	A structure with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potential for longer periods of time due to their size, shelter, protection and conditions.

2.2.2 Hibernation Potential

The structure and its associated features were assessed for their suitability to be used by hibernating bats. The assessment was carried out in accordance with guidelines produced by BatAbility⁴ and the bat survey guidelines produced by the Bat Conservation Trust¹. To determine the potential for features to support hibernating bats the following aspects were considered:

- the suitability of features to support roosting bats or to allow access for roosting bats;
- the temperature and humidity conditions likely to be present within the feature during the winter period and the suitability in this respect for it to be used by bats for hibernating;
- the surrounding habitat, in terms of its potential for use by bats outside of the hibernation period for commuting and/or foraging purposes; and
- the presence of known roosts within the structure, or adjacent structures, or surrounding area during the active season.

The potential for use by hibernating bats for each feature, or group of features was assessed as either negligible, low, moderate, or high, in accordance with best practice. Further surveys are recommended where appropriate, considering the feasibility of a hibernation survey for certain PRFs.

2.2.3 Foraging and Commuting Potential

The habitats surrounding the site and wider landscape were broadly assessed for their potential to support foraging and commuting bats, and were categorised as negligible, low, moderate or high potential suitability in line with published guidance¹.

2.2.4 Further Emergence Surveys

An endoscope inspection of the overhang was undertaken on 29th June 2022, with a second undertaken on 29th August 2022, immediately followed with a dusk emergence survey conducted on the store room, with the assistance of an infra-red night vision camera. The inspections and survey were led by Natural England Bat Licence holder and Principal Ecologist Xenia Snowman BSc (Hons.) and this survey



followed the methodology set out in the best practice guidelines prepared by the Bat Conservation Trust.

The survey focused upon a horizontal gap on the underside in the brickwork leading into a cavity in the overhang and the suitable bat access and roosting features between the hand-made clay tiles on the roof of the store using a surveyor positioned according to Figure 3. From these positions, the surveyor and infra-red camera could view all features potentially suitable for roosting bats that were identified during the initial bat scoping survey. The surveyor recorded any bat activity on or around the potential roosting entry/exit features identified during the scoping survey, using a full-spectrum handheld bat detector to identify species through call frequencies. The bat calls were logged and recorded as sonograms for later confirmation of species where necessary.

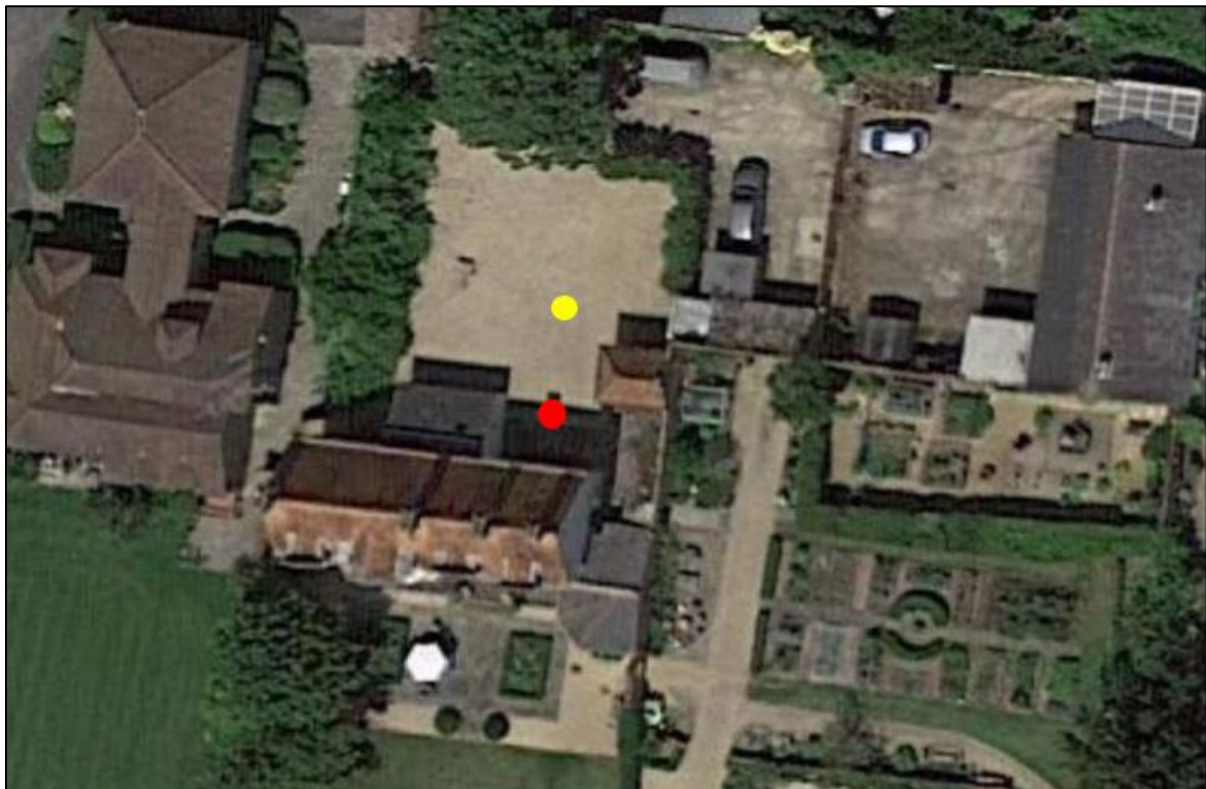


Figure 3. An aerial image of the site, showing the positions of the surveyor (red dot) and night-vision camera (yellow dot). Images produced courtesy of Google maps (Map data ©2022 Google).

2.3 Other Protected and/or Notable Species

Any birds identified, or evidence of nesting birds discovered during the site visit, were recorded. Special attention was paid to notable species such as red-listed Birds of Conservation Concern⁵ and those species afforded special protection on Schedule 1 of the Wildlife and Countryside Act (1981), such as barn owl *Tyto alba* and swallow *Hirundo rustica*.

Whilst this survey has focussed on bats and no specific searches were made with respect to other protected/notable species, any evidence of such species that was encountered during the site visit was also recorded. This included great crested newts.



3 RESULTS/OBSERVATIONS

3.1 Desk Study and Granted EPS Licences

There are no statutory designated sites present within a 2km radius of Arborfield House (see Figure 4) or sites that include bats as a designated feature within the zone of influence from the site. The development does however fall within 5km of the Thames Basin Heath Special Protection Area (SPA).

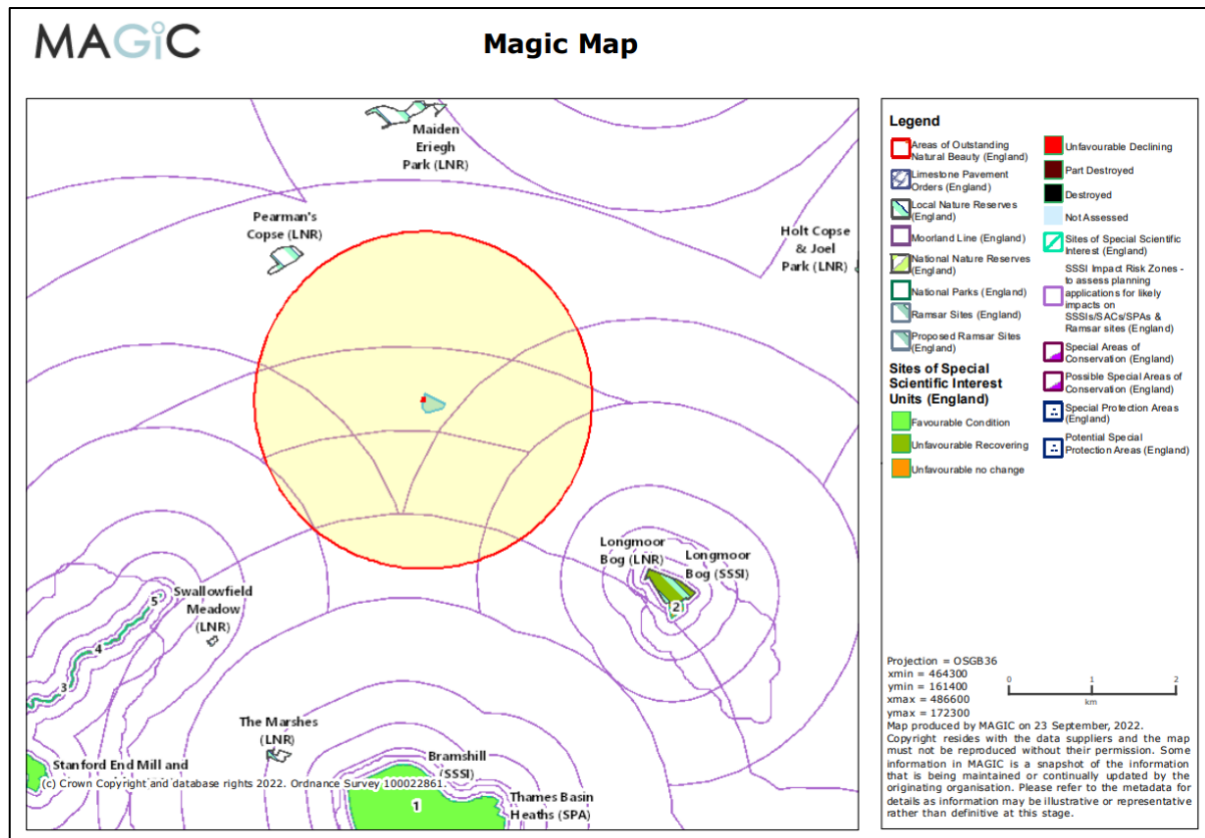


Figure 4. Designated sites within a radius of 2km (yellow circle) of the application site (red line boundary). Image produced courtesy of Magic maps (<http://www.magic.gov.uk/>, contains public sector information licensed under the Open Government Licence v3.0).

A number of priority habitats are present within 2km of the site boundary, including a block of deciduous broadleaved woodland immediately adjacent to the north-western corner of the site, with a number of other woodland parcels and lowland fens, shown in Figures 5 and 6.

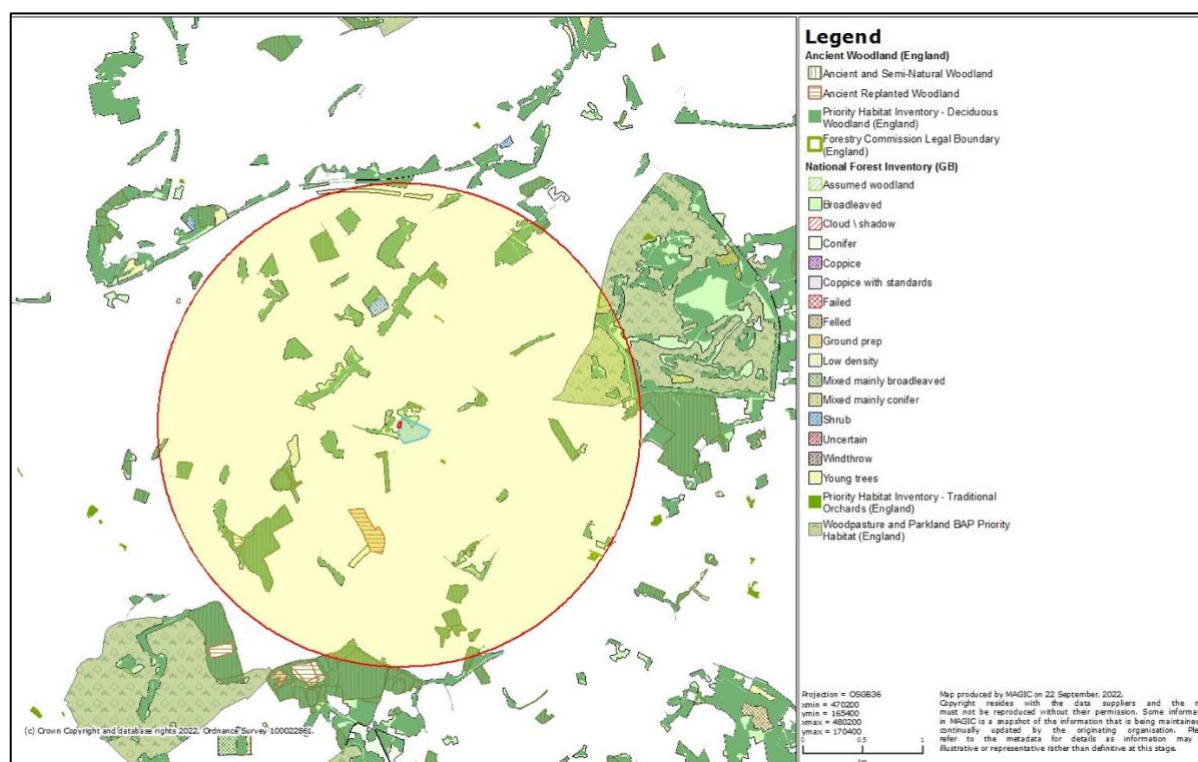


Figure 5. Priority woodland habitats within a radius of 2km of the application site. Images produced courtesy of Magic maps (<http://www.magic.gov.uk/>, contains public sector information licensed under the Open Government Licence v3.0).

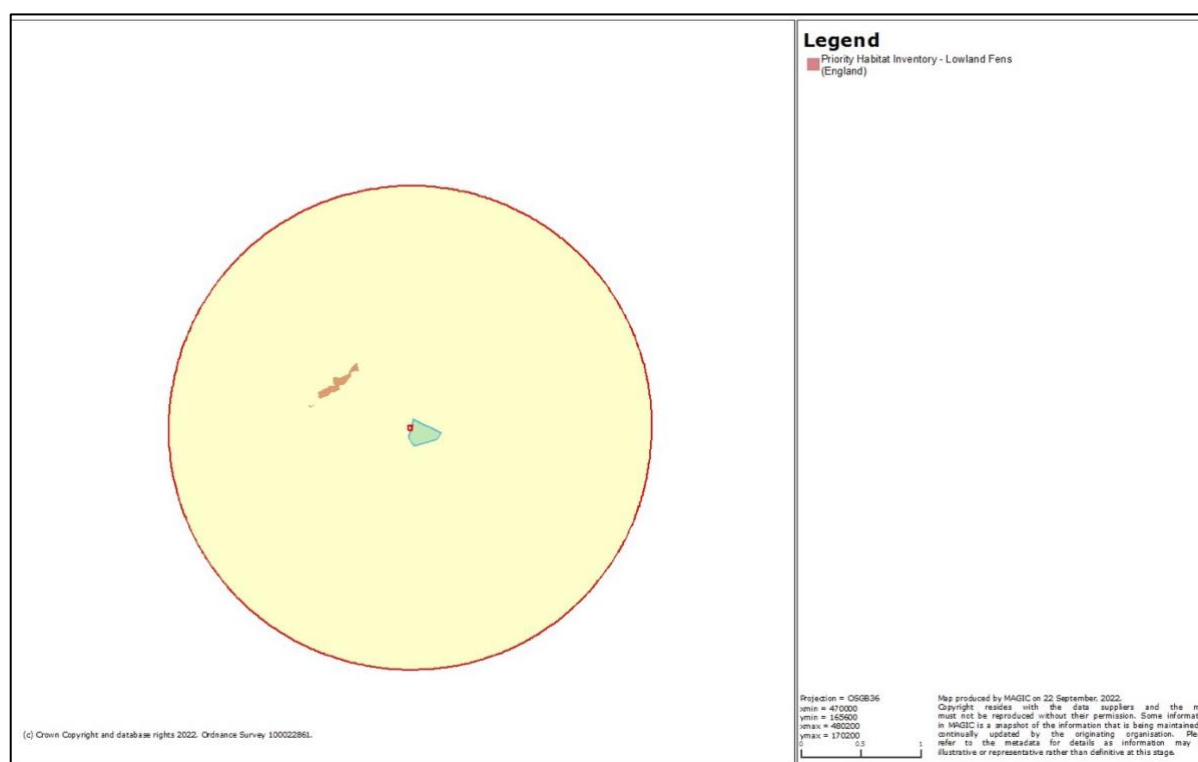


Figure 6. Priority lowland fens wetland habitat within a radius of 2km of the application site. Images produced courtesy of Magic maps (<http://www.magic.gov.uk/>, contains public sector information licensed under the Open Government Licence v3.0).



There is one European Protected Species (EPS) licence granted for mitigation projects concerning bats within 1km of the site shown on the Magic Maps website (Figure 7). This relates to the destruction of a resting place in use by common pipistrelle bats *pipistrellus pipistrellus*, soprano pipistrelle bats *pipistrellus pygmaeus* and brown long-eared bats *plecotus auritus* approximately 288m to the east of the site boundary (EPSM2009-1250).

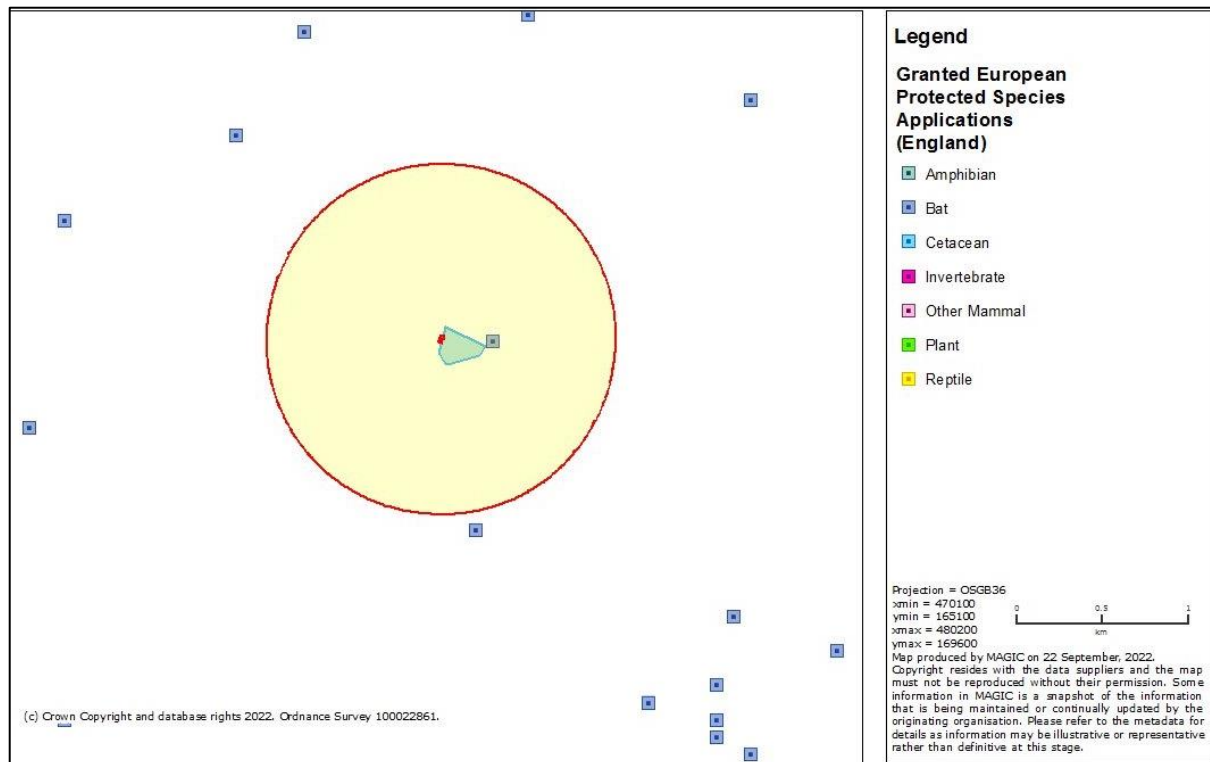


Figure 7. Natural England EPS granted bat licences within a radius of 1km of the application site (yellow circle) and within the wider context. Image produced courtesy of Magic maps (<http://www.magic.gov.uk/>, contains public sector information licensed under the Open Government Licence v3.0).

3.2 Site Context and Surrounding Habitats

This site is situated within in a sub-urban location in Arborfield, Berkshire a village situated between Reading and Wokingham. The surrounding landscape is dominated by mixed farmland, pockets of residential areas, industrial estates and woodland parcels. The close surrounding habitats are considered to be of moderate value for common, more light-tolerant species of bats. In the wider landscape, beyond 1km of the site, there are high value habitats present, including deciduous and ancient woodland. These habitats are likely to support a range of foraging bats, including rare and scarce species and offer valuable roosting habitat in the form of ancient trees.

The site comprises the main dwelling of Arborfield House and a number of outbuilding structures, including a double garage, a brick-built 'overhang', a single 'garage/outhouse', the central 'store room' and a 'tool shed' located to the north and east of the dwelling.

To the south and east of the dwelling is a large hard-standing patio area and walkways, while to the north are large gravelled areas, with hard-standing surrounding all of the outbuildings. Further south of the building is an area of tightly mown lawn, occasional scattered trees and shrubs and formal garden



areas which include a large vegetable plot and short sections of hedging. Beyond the site's boundaries lie similar large and medium-sized detached and semi-detached dwellings and associated large gardens including a swimming pool, a large ornamental garden pond, scattered trees, ornamental hedgerows, flower beds and extensive areas of mown lawn.

3.3 Building Inspections for Bats

3.3.1 Roost Potential

The main house proposed to be extended to the side and rear is brick-built and rendered, with a pitched, gable-ended roof of clay-tiles. The building had moderate numbers of roosting features suitable for use by bats at the time of the survey.

The overhang and store are potentially scheduled for demolition, or may be indirectly impacted by the demolition of the surrounding outbuildings. The overhang is brick-built with a single-pitch corrugated chrysotile roof on the northern aspect. The building holds low potential to support both summer and hibernation bat roosts. The store is a brick-built, rendered building with a pitched, hipped roof covered in clay tiles. The building holds low potential to support bat roosts at the time of the survey.

The double garage due for demolition, single garage/outhouse and tool shed, both potentially scheduled for demolition, or possibly indirectly impacted by the demolition of the surrounding outbuildings, all hold negligible potential to support roosting bats at the time of the survey.

The buildings are described in Table 2 below and illustrated in the following photographs section. It is understood that under the existing proposals, no vegetated areas or trees are scheduled for works or removal.

Table 2. Assessment of PRFs

Building section/ Tree	Description of features	Assessment of roost suitability (Collins 2016)
Main House - exterior	The property is well-maintained and in use as a dwelling. It has a rectangular footprint, with a small single-storey single-pitched rear (northern) extension covered by a slate roof. The property is two-storey and supports a pitched gable-ended roof covered in clay-tiles. The walls, which are brick-built and rendered/painted, are in a good state of repair, with no cracks or gaps identified. The slate tiles across the roof of the extension are tightly-fitted with no lifted tiles or naturally occurring gaps identified. However, moderate numbers of external crevice features were identified under the clay roof tiles and the lead-flashing, creating potential bat access into suitable roosting features between the tiles and the internal sarking boards which line the loft void of the main house. The wooden soffits and fascia boards were tightly fitted across the building. No evidence of bats was identified during the external assessment.	Moderate bat roost suitability
Main House -	This building supports two loft voids. Loft void one contains the boiler/water tank and measures approximately 5m (w), 4m (l) and 2.5m (h) to the apex.	Moderate bat roost suitability



interior	The void is used for light-storage and there were no recent signs of disturbance. The space is timber-framed, lacking any cracks or crevices, has some exposed brickwork and timbers and is boarded with wood internally at ground and roof-level, with gaps showing the sarking boards lining the roof internally. Loft void two is a crawl space spanning the length of the northern aspect of the property at eaves-level and measures approximately 1.2m (w), 14m (l) and 1m (h). It is boarded at ground-level, with a timber-frame, exposed brickwork and insulation present between the rafters. The space is small and has a modern timber-frame which lacks any cracks or crevices. No evidence of bats was identified within either of the two loft spaces. However, evidence of previous use by nesting birds was noted.	
The Overhang	The overhang is brick-built with a single-pitch corrugated chrysotile roof and is integrated into a walled-structure lining an access driveway leading to the double garage at the north-western corner of the site. A horizontal gap was identified in the brickwork on the underside of the overhang section of the structure at the eastern end leading into a cavity with low suitability for use by roosting bats. No evidence of bats was identified. However, a bird box has been installed providing nesting bird potential.	Low bat roost suitability
The Store - external	The store is a single-storey building which supports a pitched roof covered in clay-tiles with a gable-ended construction on the eastern aspect and hipped construction on the western aspect. The walls, which are brick-built and painted, are in a good state of repair, with no cracks or gaps identified. Low numbers of the clay tiles across the roof are lifted or have naturally occurring gaps creating external crevice features providing potential bat access into suitable roosting features between the tiles and the internal lining. The wooden soffit/fascia/barge boards were tightly fitted across the building. No evidence of bats was identified externally.	Low bat roost suitability
The Store - internal	The store is used for storage internally, with an inaccessible loft void present, contained by a false-ceiling with no access hatch available. The walls are lined with shiplap boarding internally, with a window present on the northern aspect. No evidence of bats was identified during the internal inspection and no suitable bat roosting features were identified. No evidence of bats was identified internally.	Negligible bat roost suitability
Double garage - exterior	The double garage is brick-built with a single-pitched corrugated chrysotile roof, a window on the southern aspect, an up-and-over door on the eastern aspect and an access door on the western aspect. The garage is displaying signs of severe structural deterioration in the form of large cracks noted in the brickwork, but no features were deemed suitable for supporting roosting bats. No evidence of bats was identified.	Negligible bat roost suitability
Double garage - interior	The double garage is used as a storage area, with exposed brick walls and a steel-framed roof. The window on the southern aspect allows light into the internal space.	Negligible bat roost suitability



	No suitable bat roosting features were identified and no evidence of bats was identified. However, a bird box has been installed providing nesting bird potential.	
Single garage/outhouse - exterior	The single garage/outhouse is a small, flat-roofed, brick-built, single-storey building, part of which sits beneath the overhang. The building is timber-framed and the roof is part-coated in corrugated steel panels and part-coated in lead. There is a single up-and-over garage door located in the southern end of the building and an access door at the northern end on the western aspect. A number of windows are present on the northern and eastern aspects. The building does not appear to be structurally sound and is supported by a number of upright beams which appear to be preventing collapse. No suitable bat roosting features were identified and no evidence of bats was identified.	Negligible bat roost suitability
Single garage/outhouse - interior	Internally, the outhouse is used for light storage, has exposed brick walls and a timber-framed roof structure. The multiple windows allow light into the internal areas. No suitable bat roosting features were identified and no evidence of bats was identified.	Negligible bat roost suitability
Tool shed - exterior	The tool shed is brick-built with an external lean-to log store on the northern aspect. The roof is a single-pitched chrysotile roof. No suitable bat roosting features were identified and no evidence of bats was identified.	Negligible bat roost suitability
Tool shed - interior	Internally, the tool shed is used for storage with a number of free-standing shelving units, has exposed brick walls and a timber-framed roof structure. A window on the western aspect allows some light into the internal areas. No suitable bat roosting features were identified and no evidence of bats was identified.	Negligible bat roost suitability



3.3.2 Hibernation Potential

Each building was assessed for its hibernation potential. The potential for each structure is described in Table 3 below and illustrated in the following photographs section.

Table 3. Assessment of hibernation roost potential.

Building section	Description of features	Assessment of hibernation potential ^{1 & 3}
Main House	Some potential for bats to be found hibernating in gaps between the internal roof sarking and roof tiles/within the ridge tunnel - though these have some potential to have fluctuating temperatures that are less suitable for hibernation. Although these features are not what would be regarded as 'classic' hibernation sites, there is the potential that bats could be occupying the property over the winter period (e.g. pipistrelle species in small numbers). Numerous gaps provide potential access into the two loft voids which may provide a cool, stable environment with protection from temperature fluctuations for bats throughout the winter. However, depending on insulation and boarding, the heating used within the property over the winter period means this void space may be unsuitable for hibernation.	Moderate hibernation suitability
The Overhang	The cavity feature in the brickwork of the overhang provides moderate potential to be utilised by bats during the hibernation period due to the depth and nature of this feature. This is likely to provide the cool, stable conditions suitable for hibernating bats.	Moderate hibernation suitability
The Store	Some potential for bats to be found hibernating in gaps between the internal roof tiles/within the ridge tunnel - though these have some potential to have fluctuating temperatures that are less suitable for hibernation. Although these features are not what would be regarded as 'classic' hibernation sites, there is the potential that bats could be occupying the property over the winter period (e.g. pipistrelle species in small numbers). Potential that bats can access the loft void above the false ceiling which may provide a cool, stable environment with protection from temperature fluctuations for bats throughout the winter.	Low hibernation suitability
Double garage	The building lacks any features with the potential to be used by roosting or hibernating bats.	Negligible hibernation suitability
Single garage/outhouse	The building lacks any features with the potential to be used by roosting or hibernating bats.	Negligible hibernation suitability
Tool shed	The building lacks any features with the potential to be used by roosting or hibernating bats.	Negligible hibernation suitability



3.4 Bat Emergence Surveys

3.4.1 Survey Conditions

The dates, times, weather conditions, temperatures and personnel for each survey visit are presented in Table 4 below.

Table 4. Details of surveys undertaken, timings weather conditions and personnel.

Date	Survey start time/end time	Temp. degrees centigrade, weather conditions throughout survey	Surveyors
29 th June 2022	N/A - Endoscope inspection of potential roosting features within overhang	N/A	Xenia Snowman BSc (Hons.) Natural England Bat Licence holder
29 th August 2022	Start time: 19:27 Sunset: 19:57 End time: 21:57	Max/min temp: 20–17°C. 100% cloud cover and gentle – light breeze (BF1-2), no precipitation.	Xenia Snowman BSc (Hons.) Natural England Bat Licence holder

3.4.2 Bat Emergence Results

The following descriptions summarise bat activity and emergence from the building for each survey visit.

- 29th August 2022

No bats were recorded roosting within the overhang feature or emerging from the potential roosting features within the roof of the store. General bat activity was of a moderate level with mainly noctule bats *Nyctalus noctula* recorded commuting and foraging over the site throughout the survey. Low numbers of common pipistrelle bat *Pipistrellus pipistrellus* were also recorded with quite high levels of brown long-eared bat *Plecotus auritus* activity recorded from 21:11 until the end of the survey. However, no consistent foraging activity was recorded at any time during the survey.

3.5 Other Protected and/or Notable Species

All the buildings, trees, shrubs and hedging on site have the potential to support the occasional nest of common bird species such as blackbird *Turdus merula*, chaffinch *Fringilla coelebs* and house sparrow *Passer domesticus*.

A large pond, which could potentially support great crested newts, is located within the adjacent garden space, approximately 25m northwest of the site boundary. However, the proposed zone of impact is comprised of buildings and hard-standing, habitats which do not provide suitable terrestrial habitats for this species. The site is also contained by a tall brick wall running along the northern boundary, providing a barrier to movement of this species. The habitats within the zone of impact are not considered to have value for reptiles, badgers or any other protected species.



3.6 Survey Limitations

3.6.1 Bat Scoping

An initial site assessment such as this is only able to act like a ‘snapshot’ to record any flora or fauna that is present at the time of the survey. It is therefore possible that some species may not have been present during the survey but may be evident at other times of the year. For this reason, habitats are assessed for their potential to support bats, even where no direct evidence (such as droppings) has been found. It should also be noted that commonly used bat roosting locations such as between roof tiles and lining and between hanging tiles are inaccessible features for inspection purposes during bat surveys. Therefore, these can only be assessed on their potential likelihood to support bat roosts, with further surveys to record whether bats emerge from, or return to roost within these features providing clarification of presence or likely absence of bat roosts.

It was not possible to access the void above the false ceiling in the store as an access hatch was not present. However, a thorough assessment of the external features on the property was undertaken and further surveys recommended and completed to record whether bats emerged from these features.

3.6.2 Bat Emergence Surveys

In accordance with best practice guidelines, the survey visit was undertaken during the peak period in bat activity and during good weather conditions. The results presented here are therefore considered to be an accurate representation of the general use of the property by roosting bats.

Nevertheless, bats can use roosting features intermittently throughout the year and may be present in larger or smaller numbers depending on their breeding cycle, weather conditions, and in response to disturbance. These surveys record the emergence of bats at the time of the survey visits and therefore only provide a snapshot of bat roosting activity at the site at that time. Bats may be present at other times and the results should therefore be viewed with caution.



3.7 Photographs



Photograph 1. The southern elevation of Arborfield House which is brick built and supports a hipped, gabled roof. Note the surrounding gravelled and hard-standing areas surrounding the property.



Photograph 2. The eastern elevation of Arborfield House. Also shown is the brick wall leading to the overhang (right side of image) and the southern and eastern aspect of the store, with a pitched roof.



Photograph 3. The northern elevation of Arborfield House showing the single storey extension. Note the surrounding gravelled and hard-standing areas. Also shown are the north and western aspects of the store, with a pitched roof, hipped roof and the single garage/outhouse (to the left of the image).



Photograph 4. An example of the gaps identified across the roof of the main house providing suitable bat access and roosting opportunities.



Photograph 5. An example of the gaps identified across the roof of the main house providing suitable bat access and roosting opportunities.



Photograph 6. Loft void one within Arborfield House.



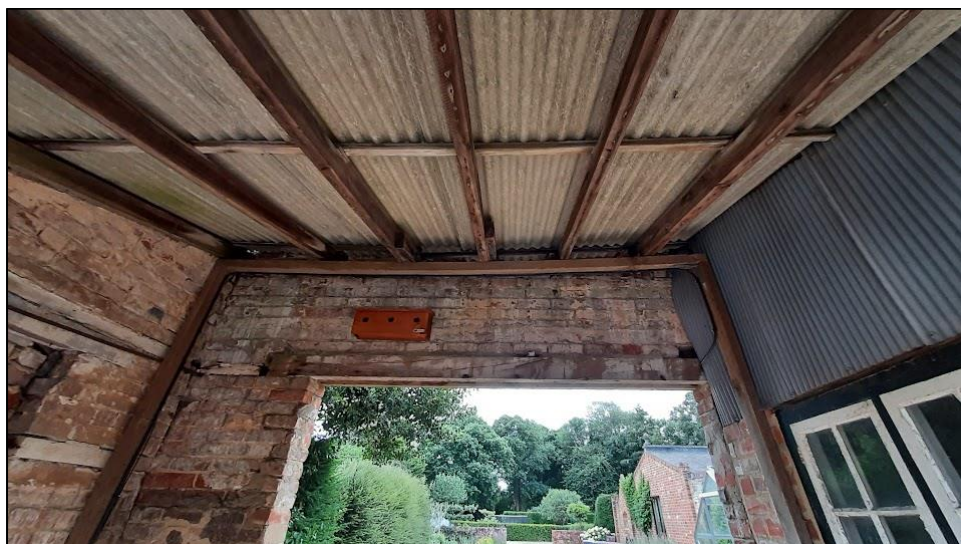
Photograph 7. Loft void two within Arborfield House.



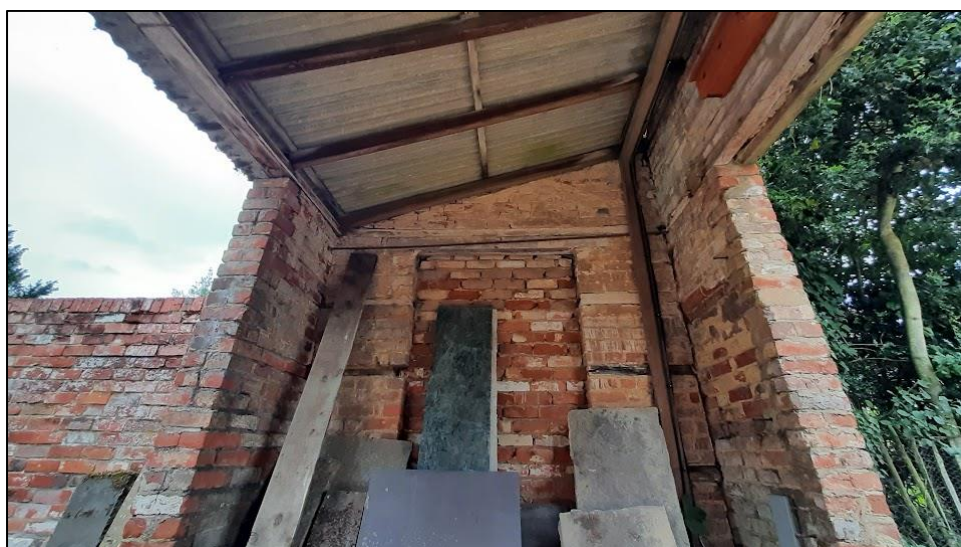
Photograph 8. The brick-built wall and southern aspect of the overhang.



Photograph 9. The brick-built wall and northern aspect of the overhang. The northern and eastern aspects of the flat-roofed single garage/outhouse are also shown to the right side of the image.



Photograph 10. The underside of the overhang facing south.



Photograph 11. The underside of the overhang facing east, with the horizontal gap to the cavity located at the top of where the bricks are slightly inset.



Photograph 12. The horizontal gap to the cavity taken. Picture taken from beneath.



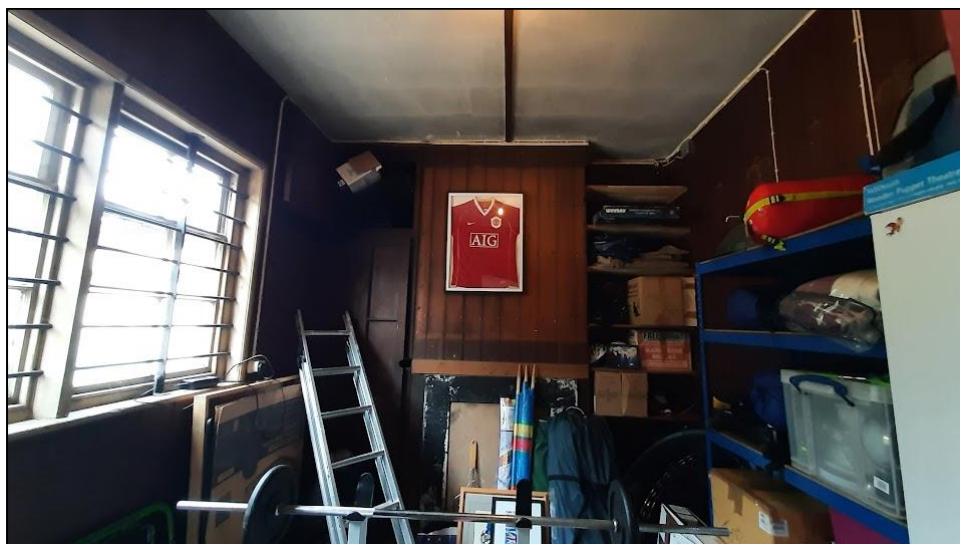
Photograph 13. The western and southern aspects of the store (left side of image) and the western aspect of the tool shed, with adjoining log store (centre and right side of image).



Photograph 14. The northern and western aspects of the store and its proximity to the main house.



Photograph 15. An example of the gaps identified across the roof of the store providing suitable bat access and roosting opportunities.



Photograph 16. The internal areas of the store. Note the false ceiling with no access hatch present.



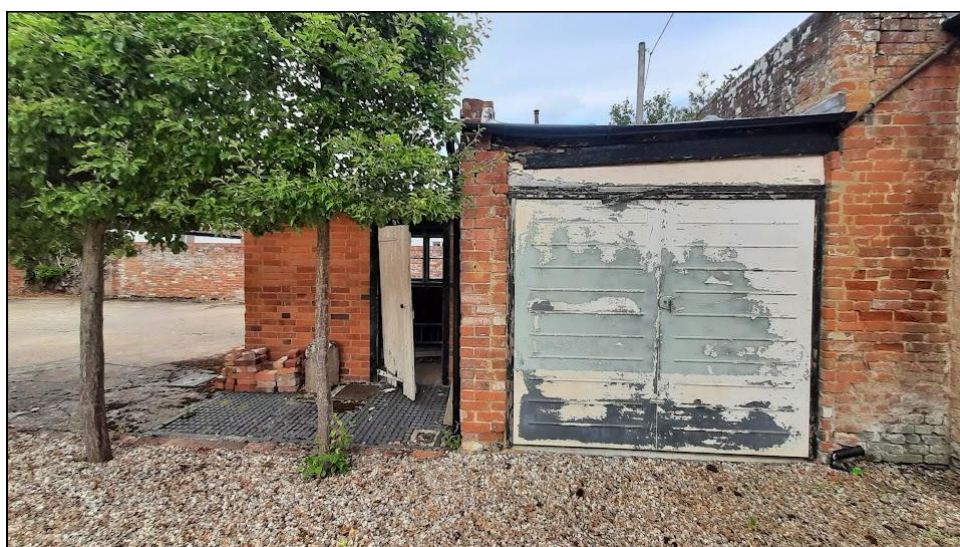
Photograph 17. The southern and eastern aspects of the double garage. Note the large cracks in the brickwork.



Photograph 18. The southern and eastern aspects of the double garage.



Photograph 19. The internal areas of the double garage facing north-west.



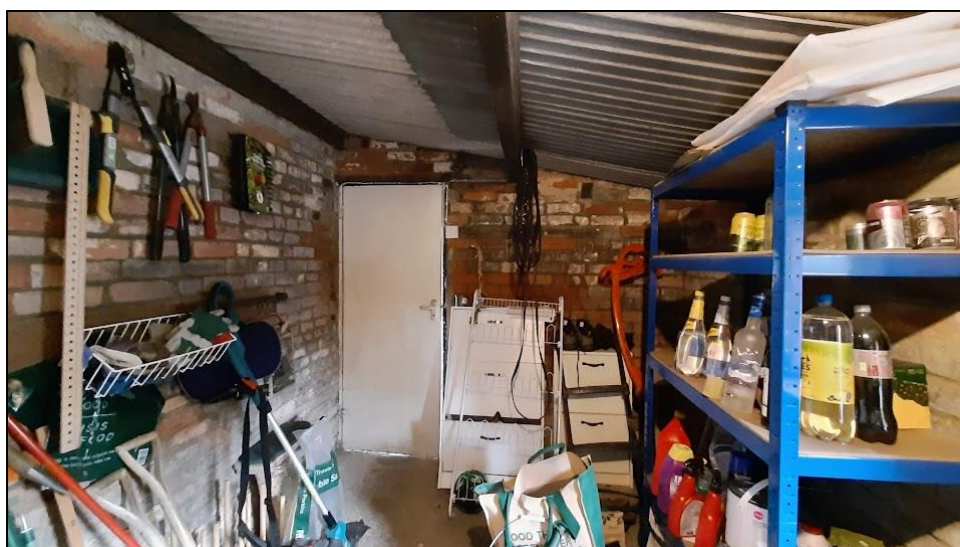
Photograph 20. The western aspect of the single garage/outhouse.



Photograph 21. The internal areas of the single garage/outhouse taken facing south.



Photograph 22. The western aspect of the tool shed, with adjoining log store.



Photograph 23. The internal areas of the tool shed, with adjoining log store. Photo taken facing south.



4 IMPACT ASSESSMENT AND MITIGATION RECOMMENDATIONS

4.1 Interpretation of Findings

No evidence of bat roosts was identified within any of the buildings surveyed, and no bats were seen to emerge from, or to be utilising the potential roosting features within the store, or overhang, during the emergence survey or endoscope inspections. Moderate numbers of bats were recorded foraging and commuting on or across the site during the survey. Species recorded included common pipistrelle, noctule and brown long-eared bats. Based on these results, bat roosts within the store and overhang are considered likely absent. As surveys have not been completed on the main house, the potential of bat roosts within this building remains unknown. However, existing plans are not due to impact the potential roosting features and any indirect impacts can be mitigated against, as detailed below. If works are proposed which will impact any further areas of roof features or loft voids on the main house, further bat surveys will be required in order to determine presence, or likely absence, of bat roosts prior to any work commencing.

4.2 Potential Impacts and Outline Mitigation Measures

The hedgerows and mature trees on and surrounding the site are likely to provide valuable foraging and commuting habitat, as part of a wider resource across the landscape. As the site is used by foraging and commuting bats, it is important that the potential for disturbance from artificial lights is considered. The proposed development should include an 'ecologically sensitive lighting scheme' in accordance with guidance produced by the Bat Conservation Trust (summarised in Appendix 3).

Consideration should be given to the installation of bat boxes within the site, to provide suitable replacement roosting features should these be lost by the removal of these buildings. Bat boxes such as the Woodstone Bat Box are designed to be mounted on walls of buildings and provide a self-contained roost. Alternatively, bat boxes such as the 2F Schwegler Bat Box are designed for mounting on trees. Provision of four bat roost features made of woodcrete or similar within the site is considered a suitable level of compensation/enhancement, given the number of features potentially due to be lost. If it is concluded that these buildings will require removal, the measures below should be adhered to for any work impacting the store and overhang and on Arborfield House:

- **Timing**

The hand-stripping of ridge, hip and verge tiles from the store or main house will be undertaken under the direct supervision of a Natural England Class 2 bat licence holder in the period between mid-March and the end of October, to avoid disturbing bats that could be in hibernation. As no maternity roosts have been identified during the surveys of this property, avoiding the breeding period May–August inclusive) is not considered necessary in this case.

- **Preparatory works – 'soft strip'**

A repeat endoscope inspection should be undertaken of the overhang prior to any works completed on this structure. If the store is due for demolition, the ceiling will be broken through carefully under bat licensed supervision to allow an internal inspection of this void prior to any work impacting the roof areas. All ridge, hip and verge tiles on the roof of the store and main house will be undertaken under the direct supervision of a Natural England Class 2 bat licence holder.



- **Replacement roosting opportunities**

At least two bat boxes will be required to be installed prior to any work impacting the store, the overhang or the main house. One should be suitable for use by brown long-eared bats (a cavity-style box) and one suitable for use by pipistrelle bats (a crevice-style box) will be required, to be installed on a suitable tree on site prior to any work. These can be supplied and installed by the Ecologist on the morning of works commencing.

- **Building Materials**

If clay roof tiles are to be used in any proposed buildings or extensions it is advised that bitumen 1F roofing felt or a certified bat friendly breathable membrane (with a certificate) be utilised. Non-bituminous roofing membranes have been found to fray over time, causing bats to become entangled and die within the fibres. Non-bituminous linings will not be permitted as part of bat licensed projects by Natural England or where bat roosts have been confirmed, for this reason. More information on this research can be found by following this link:

<https://www.bats.org.uk/our-work/buildings-planning-and-development/non-bitumen-coated-roofing-membranes>

- **Artificial lighting**

The use of artificial lighting inappropriately can result in significant disturbance to bats. The detailed design should include a lighting scheme that minimises these impacts by following the Bat Conservation Trust's guidance on lighting, reproduced in Appendix 3 of this report.

4.3 Conclusions

Surveys have confirmed the likely absence of bat roosts from the store and overhang. Proposed works will not directly impact the potential roosting features present within the main house and all other buildings on site hold negligible potential for supporting roosting bats. The proposed mitigation measures outlined above will ensure that individual bats will not be harmed during the demolition or construction phases, and that alternative roosting opportunities are provided during and after project completion. As such, the planning authority can be satisfied that its duty to comply with the Conservation of Habitats and Species Regulations (2017) as amended, will have been met in full.

Should you need any further advice on the information provided above, please do not hesitate to contact The Ecology Co-op.



APPENDIX 1 – Legislation And Policy

All species of British bat are fully protected under the Wildlife and Countryside Act 1981 as amended through inclusion in Schedule V. All bat species in the UK are also included in Schedule II of the Habitats Regulations 2010 which transpose Annex II of the Council Directive 92/43/EEC 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora ("EC Habitats Directive") which defines European protected species of animals. Bat species are afforded further protection by the Natural Environment and Rural Communities Act 2006.

Under the above legislation it is an offence to:

- kill, injure or take an individual;
- possess any part of an individual either alive or dead;
- intentionally or recklessly damage, destroy or obstruct access to any place or structure used by these species for shelter, rest, protection or breeding;
- intentionally or recklessly disturb these species whilst using any place of shelter or protection; or
- deliberate disturbance in such a way as to be likely to impair their ability to:
 - survive, to breed or reproduce, or to rear or nurture their young; or
 - in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
 - to affect significantly the local distribution or abundance of the species to which they belong;
- keep (possess), transport, sell or exchange, or offer for sale or exchange, any live or dead bat, or any part of, or anything derived from a bat.

It is also an offence to set and use articles capable of catching, injuring or killing bats (for example a trap or poison), or knowingly cause or permit such an action. In the case all species of British bat there is also protection under Schedule 6 of The Wildlife and Countryside Act 1981 (as amended) relating specifically to trapping and direct pursuit of these species.

The Habitats Directive and Habitats Regulations provide for the derogation from these prohibitions for specific reasons provided certain conditions are met. An EPS licensing regime allows operations that would otherwise be unlawful acts to be carried out lawfully. In England, Natural England is the licensing Authority and, in order to grant a license, ensures that three statutory conditions (sometimes referred to as the 'three derogation tests') are met:

- a licence can be granted for the purposes of "preserving public health or safety or for other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment" (Regulation 53 (2) (e));
- a licence can only be granted if "there are no satisfactory alternatives" to the proposed action;
- a licence shall not be granted unless the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

A bat roost is defined as "any structure or place, which any wild bat uses for shelter or protection." Bats tend to re-use the same roosts; therefore, legal opinion is guided by recent case law precedents, that a roost is protected whether or not the bats are present at the time. This can include all summer roosts, used for breeding, resting or sheltering and all winter roosts used for hibernating.



APPENDIX 2 – Examples of bespoke bat roosting features for new buildings



Figure 1. Left to right, the 2F, 2FN and the 1FS bat boxes produced by Schwegler. These and other brands are available at many on-line wildlife stores. These are constructed of ‘woodcrete’ (a mixture of cement and woodchip) and are designed to be durable and replicate the stable thermal properties of trees and buildings. They may be attached to trees or buildings.



Figure 2. Examples of integral bespoke bat roosting features that may be incorporated into buildings during construction/renovation. From left to right: an example of bat access tile into loft space; the 2FR bat tube; and an example of 2FR bat tubes installed into a house wall in a series of three. Other brands and designs are available.



APPENDIX 3 – Reducing Impacts Of Artificial Light

Bright external lighting can have a detrimental impact upon foraging and commuting bat flight paths, but more importantly can also cause bats to remain in their roosts for longer. Artificial lighting can also cause significant impacts to other nocturnal species, most notably moths and other nocturnal insects. It can also result in disruption of the circadian rhythms of birds, reducing their fitness.

Guidelines issued by the Bat Conservation Trust¹ should be referred to when designing the lighting scheme. Note that lighting designs in very sensitive areas should be created with consultation from an ecologist and using up-to-date bat activity data where possible. The guidance contains techniques that can be used on all sites, whether a small domestic project or larger mixed-use, commercial or infrastructure development. This includes the following measures:

Avoid lighting key habitats and features altogether

There is no legal duty requiring any place to be lit. British Standards and other policy documents allow for deviation from their own guidance where there are significant ecological/environmental reasons for doing so. It is acknowledged that in certain situations lighting is critical in maintaining safety, such as some industrial sites with 24-hour operation; however, in the public realm, while lighting can increase the perception of safety and security, measurable benefits can be subjective. Consequently, lighting design should be flexible and be able to fully consider the presence of protected species.

Apply mitigation methods to reduce lighting to agreed limits in other sensitive locations – lighting design considerations

Where bat habitats and features are considered to be of lower importance or sensitivity to illumination, the need to provide lighting may outweigh the needs of bats. Consequently, a balance between a reduced lighting level appropriate to the ecological importance of each feature and species, and the lighting objectives for that area will need to be achieved. The following are techniques which have been successfully used on projects and are often used in combination for best results:

- dark buffers, illuminance limits and zonation;
- sensitive site configuration, whereby the location, orientation and height of newly built structures and hard standing can have a considerable impact on light spill;
- consideration of the design of the light and fittings, whereby the spread of light is minimised ensuring that only the task area is lit. Flat cut-off lanterns or accessories should be used to shield or direct light to where it is required. Consideration should be given to the height of lighting columns. It should be noted that a lower mounting height is not always better. A lower mounting height can create more light-spill or require more columns. Column height should be carefully considered to balance task and mitigation measures. Consider no lighting solutions where possible such as white lining, good signage, and LED cat's eyes. For example, light only high-risk stretches of roads, such as crossings and junctions, allowing headlights to provide any necessary illumination at other times;
- screening, whereby light spill can be successfully screened through soft landscaping and the installation of walls, fences and bunding;
- glazing treatments, whereby glazing should be restricted or redesigned wherever the ecologist and lighting professional determine there is a likely significant effect upon key bat habitat and features;
- creation of alternative valuable bat habitat on site, whereby additional or alternative bat flight paths,

¹ Bat Conservation Trust and Institute for Lighting Professionals (2018) Guidance note 8. Bats and Artificial Lighting. <https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/>



commuting habitat or foraging habitat could result in appropriate compensation for any such habitat being lost to the development;

- dimming and part-night lighting. Depending on the pattern of bat activity across the key features identified on site it may be appropriate for an element of on-site lighting to be controlled either diurnally, seasonally or according to human activity. A control management system can be used to dim (typically to 25% or less) or turn off groups of lights when not in use.

Demonstrate compliance with illuminance limits and buffers

- *Design and pre-planning phase*; it may be necessary to demonstrate that the proposed lighting will comply with any agreed light-limitation or screening measures set as a result of your ecologist's recommendations and evaluation. This is especially likely to be requested if planning permission is required.
- *Baseline and post-completion light monitoring surveys*; baseline, pre-development lighting surveys may be useful where existing on or off-site lighting is suspected to be acting on key habitats and features and so may prevent the agreed or modelled illuminance limits being achieved.
- *Post-construction/operational phase compliance-checking*; as a condition of planning, post-completion lighting surveys by a suitably qualified person should be undertaken and a report produced for the local planning authority to confirm compliance. Any form of non-compliance must be clearly reported, and remedial measures outlined. Ongoing monitoring may be necessary, especially for systems with automated lighting/dimming or physical screening solutions.

Lighting Fixture Specifications

The Bat Conservation Trust recommends the following specifications for lighting on developments to prevent disturbance:

- Lighting spectra: peak wavelength >550nm
- Colour temperature: <2700K (warm)
- Reduction in light intensity
- Minimal UV emitted
- Upward light ratio of 0% and good optical control

Further reading:

- Buglife (2011) A review of the impact of artificial light on invertebrates.
- Royal Commission on Environmental Pollution (2009) Artificial light in the environment. HMSO, London. Available at: <https://www.gov.uk/government/publications/artificial-light-in-the-environment>
- Rich, C., Longcore, T., Eds. (2005) Ecological Consequences of Artificial Night Lighting. Island Press. ISBN 9781559631297.
- CPRE (2014) Shedding Light: A survey of local authority approaches to lighting in England. Available at: <http://www.cpre.org.uk/resources/countryside/dark-skies/item/3608-shedding-light>
- Planning Practice Guidance (2014) When is light pollution relevant to planning? Available at: <https://www.gov.uk/guidance/light-pollution>
- Institution of Lighting Professionals (2021) Guidance Notes for the Reduction of Obtrusive Light GN01:2011. Available at: <https://www.theilp.org.uk/resources/free-resources/>
- Voigt, C.C., Azam, C., Dekker, J., Ferguson, J., Fritze, M., Gazaryan, S., Hölker, F., Jones, G., Leader, N., Lewanzik, D. and Limpens, H., 2018. *Guidelines for consideration of bats in lighting projects*. Unep/Eurobats. Available at: https://cdn.bats.org.uk/uploads/pdf/Resources/EUROBATSGuidelines8_lightpollution.pdf?v=1542109376