

Spring Cottage, Whiteshill, Stroud

Update Preliminary Ecological Appraisal

Date: July 2022

For: Rupert Wakefield

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Produced By:

Cotswold Ecology Ltd

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General Notes

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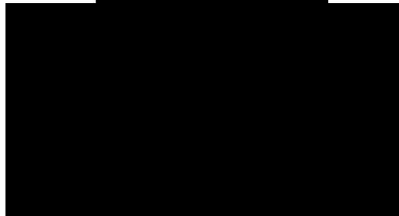
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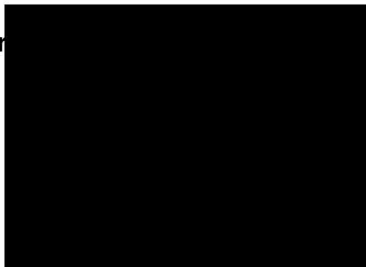
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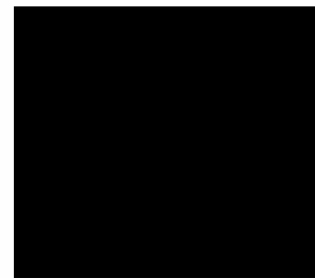
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Executive Summary

1. This report describes the results of an Update Preliminary Ecological Appraisal carried out by Cotswold Ecology at Spring Cottage, Whiteshill, GL6 6AB (Ordnance Survey Grid Reference: SO838074). The update survey included detailed bat surveys and a [REDACTED] A location map is given in Figure 1.
2. A Preliminary Ecological Appraisal (PEA) was previously carried out by CSA Environmental (2020) which included a desk study and Phase 1 Habitat Survey of the site. The update PEA was undertaken on 1st April 2022 with bat dusk and activity surveys in May and June 2022.
3. The site has not significantly changed since the 2020 PEA survey. The house has been empty since the sale of the property and the garden appears to have been maintained without carrying out any significant works to the site. The 2020 assessment of potential impacts of a development on the site are also therefore accurate.
4. The site contains a cave (former mine workings) used by hibernating Greater Horseshoe (*Rhinolophus ferrumequinum*) bats. Individuals using the cave have been identified as those using Woodchester Park Site of Special Scientific Interest (SSSI), a nationally important breeding site for this species. The results of bat dusk and activity surveys suggest that the northern boundary of the site is mostly used by bats commuting to and from the cave. The northern boundary will be unaffected by the proposals. Lighting has been restricted on the northern and eastern elevations of the proposed development to ensure light-sensitive bat species are able to continue to use the site. The cave (and bats using the SSSI) will therefore remain unaffected by the proposals.
5. A section of woodland within the Throat Meadows & Quarry Local Wildlife Site (LWS) is present on the site but will remain unaffected by the proposals. The species-rich grassland in the north of the site, an undesignated site of interest, will also not be affected by the development.
6. Three bat dusk surveys were carried out on the cottage and no roosting bats were recorded. A Precautionary Working Method Statement has been produced to ensure no bats are harmed or killed during the removal of the roof.

7. New landscape planting, a green roof and other ecological enhancements have been suggested which will result in a net increase of native planting on the site and will benefit biodiversity.

1 Introduction

1.1 Purpose of the Report

This report describes the results of an update Preliminary Ecological Appraisal carried out by Cotswold Ecology Ltd at Spring Cottage, Whiteshill, GL6 6AB (Ordnance Survey Grid Reference: SO838074). A site location map is given in Figure 1.

A Preliminary Ecological Appraisal (PEA) was carried out by CSA Environmental 2020. The purpose of the update survey was to provide a current assessment of the ecological value of the site and to assess any significant changes to its potential to support protected animal species and any important plant communities since the 2020 survey. A detailed bat survey of the site and surrounding habitats was also carried out. The results were then used to inform an assessment of the potential impacts of the latest proposals.

Proposals for the site include the demolition of the existing cottage and construction of a replacement dwelling. The proposals also include new landscaping and parking in the immediate vicinity of the new dwelling. A site plan is provided in Figure 2 that shows the site boundary and the development area.

1.2 Background Information

A Preliminary Ecological Appraisal (PEA) was carried out by CSA Environmental (2020) which included a desk study and Phase 1 Habitat Survey of the site. The PRA concluded that the woodland and meadow habitats on the site were of high nature conservation value and should be retained in any future development. A section of woodland within the Throat Meadows & Quarry Local Wildlife Site (LWS), a non-statutory designated site, is present on the site.

The site contains a cave (former mine workings) used by hibernating Greater Horseshoe (*Rhinolophus ferrumequinum*) bats. Individuals using the cave were identified as those also using Woodchester Park Site of Special Scientific Interest (SSSI), a nationally important breeding site for this species.

A [REDACTED] was identified on the site. The woodland habitat was identified as being suitable for Dormouse (*Muscardinus avellanarius*). The site was also considered suitable for common reptiles, nesting birds and possibly Great Crested Newts (*Triturus cristatus*). The site was also considered suitable for Polecat (*Mustela putorius*) and Hedgehog (*Erinaceus europaeus*).

1.3 Ecological Context

The habitats surrounding the site were previously described in the PEA report (CSA Environmental, 2020). The site and surrounding habitats remain as described in the previous report and as such, are not reproduced here. The only difference is the construction of three large detached houses on the other side of Main Road to the north-east of the site, the location of a Slow-worm translocation scheme (records of which were provided in the 2020 data search).

An aerial photograph of the site and surrounding area is shown in Figure 4.

1.4 Structure of the Report

The remainder of this report is structured as follows:

- Section 2 describes the survey and assessment methods;
- Section 3 presents the survey results;
- Section 4 gives an evaluation of the results;
- Section 5 lists the references;
- Appendix 1 provides the background data search results; and
- Appendix 2 gives a Precautionary Working Method Statement.

2 Methods

2.1 General

The update PEA was undertaken by James Pattenden on 1st April 2022 and included an assessment of the site to identify any significant changes to the habitats and potential for protected species since the 2020 PEA. A detailed daytime survey of the buildings for bats and a [REDACTED] survey were also carried out.

[REDACTED] holds Natural England protected species survey licences for bats (Class 2 licence number 2015-106-CLS-CLS and Bat Low Impact Class Licence RC162, Annex B and D), Great Crested Newts, Dormice and Barn Owls. [REDACTED] is a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and has 17 years of experience in ecological surveying for developments.

2.2 Background Data Search

A detailed record search was carried out in 2020 as part of the PEA and as such, a full records search was not repeated in 2022. However, the 2020 PEA only provided summary information on the use of the cave by bats. In an attempt to obtain more detailed information, records of bats were requested within 1 km of the centre point of the site from Gloucestershire Environmental Records Centre (GERC). Gloucestershire Bat Group and Dr Roger Ransome of Bristol University (associated with Woodchester Mansion SSSI) were also contacted for any information which could help in the assessment. However, due to circumstances beyond the control of all consultees, no additional information could be provided prior to the assessment.

A review of freely available information was also carried out to update the previously recorded information on internationally, nationally and locally designated sites up to a 1 km from the site and Special Areas of Conservation (SAC) designated for bat species up to 10km from the site. Aerial photographs and Ordnance Survey maps were also reviewed to assess the site in context of surrounding habitats. The MAGIC (the Multi-Agency Geographic Information for the Countryside) website was searched for records of European Protected Species (EPS) licence applications in the area.

2.3 Update Phase 1 Habitat Survey

An assessment of the site was carried out to identify any significant changes to the habitats on the site since the 2020 PEA was carried out.

Any plant nomenclature in this report follows Stace (2019) for vascular plants. Plant names in text are given with scientific names first, followed by the English name in brackets. Doubtful identifications are preceded by 'cf.' placed before the specific epithet where the plant is very probably the species indicated, but it is impossible to distinguish it from similar members of the genus with certainty.

2.4 Invasive Plant Species

The list of invasive plant species included on Schedule 9 of The Wildlife and Countryside Act 1981 (as amended) is extensive and these plants are found in a range of different habitats. The update survey checked in particular for the presence of the most commonly found and problematic species: *Impatiens glandulifera* (Indian Balsam), *Heracleum trachyloma* (Giant Hogweed), *Fallopia japonica* (Japanese Knotweed) and *Fallopia sachalinensis* (Giant Knotweed).

2.5 Assessing the Value of Habitats

The scientific value of habitats for nature conservation is assessed according to widely accepted criteria of which the most important are naturalness, extent, rarity, and diversity. These and others are described in an extensive literature (Ratcliffe 1977, Usher 1986). In addition, the following criteria were used.

A list of priority habitat types have been identified in connection with UK implementation of the EC 'Habitats Directive'. Other important habitats and species are identified in National Biodiversity Action Plans (UK BAP website: www.ukbap.org.uk).

Special importance attaches to ancient semi-natural habitats that depend for their survival on traditional types of land management, especially where these have suffered large reductions over the last fifty years due to agricultural intensification and extensification. Habitats in these categories are discussed in Rackham (1986).

2.6 Habitat Assessment for Protected Species

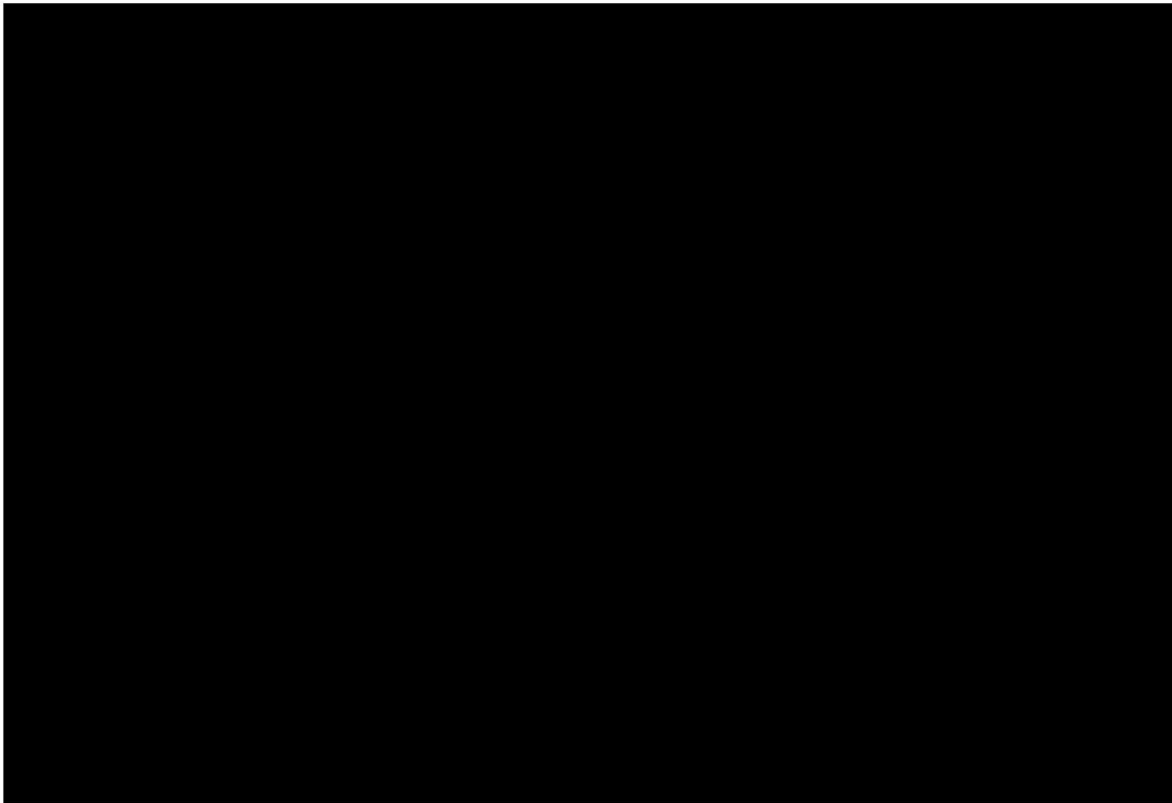
2.6.1 General

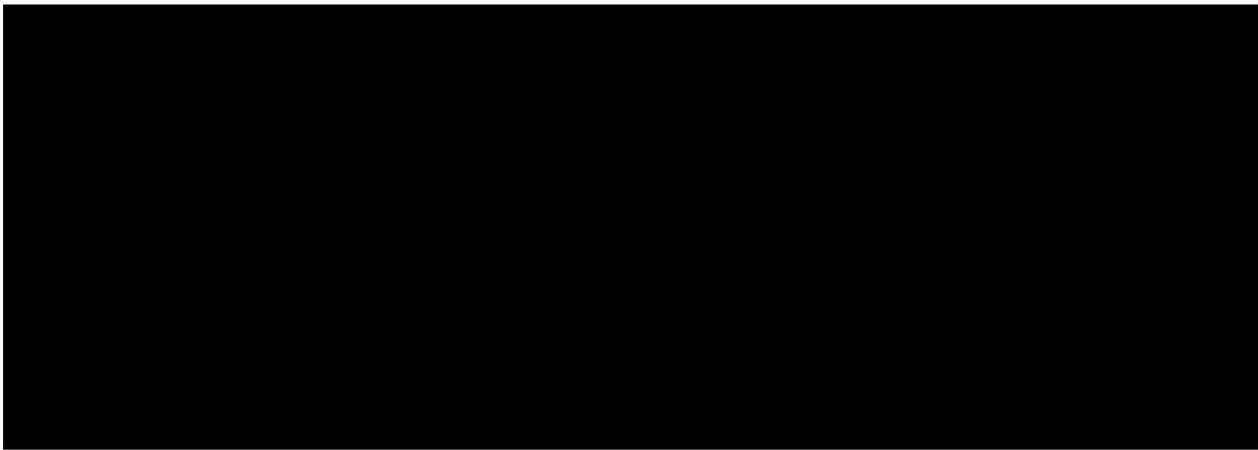
The site was re-assessed for protected species and recognisable areas (habitat, land parcels or locations) that are suitable for protected species were identified. Obvious signs and incidental sightings of protected species would have been noted where present, although this type of survey cannot usually confirm whether species are actually present or absent.

Taking into consideration the geographical region, the habitat types at the site and the previous assessment, protected animals that could be encountered are:

- [REDACTED];
- bats;
- Great Crested Newt (*Triturus cristatus*);
- Dormouse (*Muscardinus avellanarius*);
- nesting birds; and
- common reptiles.

2.6.2 [REDACTED]





2.6.3 Bats

General

The bat survey was carried out according to standard bat surveying guidelines issued by the Bat Conservation Trust (Collins, 2016). This comprised a habitat assessment and appraisal of the buildings and trees for roosting bats. In addition, three dusk emergence surveys and bat activity surveys comprising static detector surveys were carried out.

Habitat Assessment

Habitats were assessed for their suitability for roosting, foraging and commuting bats. Although foraging requirements differ between species, good bat foraging habitat generally includes sheltered areas and habitats with good numbers of insects, such as woodland, scrub, hedges, watercourses, ponds, lakes and more species-rich or rough grassland. For commuting, well-connected hedgerows, woodland edge, watercourses and other linear features are generally considered to be of high value.

Daytime Bat Survey

As bats are crevice-dwelling mammals it is often difficult to thoroughly inspect buildings for bats and evidence of bats without a destructive search, which is not generally practical or acceptable. An example of this would be where bats roost in between the roof tiles and the lining. These areas cannot be inspected, but a surveyor would know that bats might roost here because there are places where bats could gain entry from the outside.

The buildings were therefore assessed for bat roost potential according to the following factors that influence the likelihood of bat roosting:

Surrounding habitat: whether there are potential flight-lines and bat foraging areas nearby.

Construction detail: the type and construction of architectural features such as attics, soffit boxes, lead flashing and hanging tiles that could be used by roosting bats. Some construction details and materials are more favourable to bat occupation than others.

Building condition: whether the building has no roof or has a sound roof without any potential bat-access points.

Internal conditions: bats favour sheltered locations with a stable temperature regime, protection from the elements and little wind/light/rain penetration.

Potential bat-access points: whether there is flight and crawl access.

Potential roosting locations: descriptions of all bat-accessible voids, cracks and crevices.

A description of the buildings were recorded onto specially-designed survey sheets, and digital photographs were taken as a record. The development was categorised into a standard scheme as detailed in Table 1.

Table 1. Classification criteria for Bat Roosting Potential (BRP) of Buildings and Built structures

Category (Potential to support roosting bats)	Description
Negligible Potential	Buildings with no features suitable for supporting roosting bats. Modern, well maintained buildings or built structures that provide few opportunities for bat access/roosting (i.e. with no cracks or crevices); composed of prefabricated steel and sheet materials; no internal loft space; high level of regular disturbance; high interior light levels and subject to large temperature fluctuations. Buildings may be surrounded by poor or sub-optimal bat foraging habitat. No evidence of bats found.
Low Potential	Buildings with limited features to support roosting bats - shallow crevices where mortar is missing between brickwork. Buildings may have large open locations subject to large temperature fluctuations. Buildings may be surrounded by poor or sub-optimal bat foraging habitat. No evidence of bats found.
Moderate Potential	Buildings with some features suitable for roosting bats – building usually of brick or stone construction with a small number of features suitable for roosting bats – loose roof or ridge tiles, gaps in brickwork, gaps under fascia boards, and/or sealed internal loft space. No evidence of bats found.
High Potential	Buildings with a large number of features or extensive areas with potential for roosting bats. Sheltered locations with a stable temperature regime and suitable access points. Features can include: weatherboarding and/or hanging tiles with gaps/large (>20cm) roof timbers with mortise joints, cracks, holes); poorly maintained fabric providing ready access into roofs, walls, but at the same time not being draughty and cool; large and complicated roof void with unobstructed flying spaces. No evidence of bats found.
Confirmed Roost	Bats or evidence of bats recorded within the building during the initial inspection surveys or during dusk/dawn surveys. A confirmed record (supplied by records centre/local bat group) would also apply.

External and internal features of the buildings were then inspected for evidence of bats.

In this case, visual, systematic examinations were made for bats and evidence of bats, both internally and externally, of the following:

- wall, window and door surfaces;
- window and door frames;
- wall bases;
- wall ledges and wall tops (where accessible);
- cracks, crevices and sheltered voids;
- loft voids; and
- floors and stored items.

Evidence of roosting bats includes droppings, urine stains, staining from fur-oils, scratch marks, wear marks, feeding remains, dead bats, odour, squeaking and chattering, and in some cases the absence of cobwebs.

Dusk Emergence Surveys

Three dusk surveys were undertaken on the cottage in June and July 2022. The bat surveys were carried out according to standard bat surveying guidelines issued by the Bat Conservation Trust (Collins, 2016).

Dusk surveys were all led by [REDACTED] with one assistant. All assistants are trained and experienced in using bat detectors and surveying buildings for bats. Surveyor locations are provided in Figure 3.

Surveyors used Elekon Batlogger M and Echo Meter Touch bat detectors to listen and view the echolocations of bats during the survey. Echolocations were recorded and if required, later analysed using BatSound and Bat Explorer software.

Surveyors were paired with Canon XA10 and XA40 camcorders coupled with two Nightfox XB5 torches, an iRedzilla IR torch and two 12 LED 90° wide angle IR illuminators. The footage from the darker periods of the surveys were then viewed in the office at normal speed to determine if any bats had emerged. Typical screenshots of the field of view from the darkest part of the surveys are provided in Plate 1 below, as suggested by the interim NVA Guidance Note (Bat Conservation Trust, 2022). Batteries and SD cards were sufficient to last the entire survey without a requirement to be changed.



Plate 1. Field of view of the IR camera deployed to south of the cottage.

Surveyors used hand held radios to communicate with each other and ensure that bats passing over the ridge line of the buildings were only flying past and not emerging from the building.

2.6.4 Weather

Weather conditions during the surveys were suitable for bat activity and are shown in Table 2 below. All timings followed best practice guidelines (Collins, 2016).

Table 2 – Survey timing and weather conditions

Date	06.06.22	29.06.22	11.07.22
Sunset/Sunrise	21:23	21:31	21:25
Survey start time	21:00	21:15	21:10
Survey end time	23:10	23:15	
Survey start Temp (Air) °C	14	18	22
Wind (Beaufort Scale)	1	1	0/1
Cloud (Oktas Scale)	8	8	8
Weather Notes	Showers earlier in the day. Cool and cloudy.	Light rain showers prior to survey but dry during survey.	Very hot weather for the previous few days.

Dusk Activity Surveys

Two activity surveys using static detectors were carried out in April and May 2022 in order to investigate the use of the site by the Greater and Lesser Horseshoe bats roosting in the cave.

Bat Activity Survey 1

During the first activity survey, three Echo Meter (EM) Mini detectors were deployed for 8 nights between 25.04.22 and 02.05.22. Locations were chosen based on the likely bat commuting routes and potential for impacts by the proposed development (shown in Figure 4). This included:

- adjacent to the cave (SD1);
- along the northern boundary vegetation (SD2); and
- adjacent to vegetation by the existing decking (SD3).

Bat Activity Survey 1

A second activity survey was carried out on 11.05.22 which included a dusk emergence survey of the cave by a single surveyor, with static detectors deployed around the site. The aim of the survey was to record numbers of bats leaving the cave, using the static detectors to determine commuting routes from the cave through the site.

The surveyor located adjacent to the cave used a BatLogger M bat detector and Canon XA40 camcorder coupled with two Nightfox XB5 torches and a 12 LED 90° wide angle IR illuminator. The field of view is shown in Plate 2. Direction of flights from the cave was recorded together with a count of emerging bats.

Two EM Mini static detectors and two EM Touch (EMT with iPad) bat detectors were also deployed in areas with potential for likely commuting by bats. They were deployed at the following locations:

- EMT detector along the northern boundary vegetation (SD2);
- EM Mini detector adjacent to vegetation by the existing decking (SD3);
- EMT detector in a central location along vegetation between the garden and the cottage (SD4); and
- EM Mini detector along the eastern boundary vegetation (SD5).

Locations are shown in Figure 4.



Plate 2. Field of view of the IR camera deployed adjacent to the cave on 11.05.22.

Tree Roost Assessment

An assessment of the trees in the immediate vicinity of the proposed works from ground level using a Clu-lite torch and binoculars where necessary was also made to identify any Potential Roosting Features (PRF) such as cracks, splits and holes that may be used by roosting bats. Any PRF observed were recorded using criteria set out in the Bat Tree Habitat Key (BTHK, 2018).

2.6.5 Great Crested Newt

The suitability of aquatic and terrestrial habitat on the site and in the immediate vicinity (up to 500m from the site, a distance that this species can travel between ponds and terrestrial habitat) was considered, along with the habitat-connectivity between suitable habitat areas. Aerial photography and Ordnance Survey maps were searched for signs of ponds or other suitable breeding habitat within 500 m of the site.

2.6.6 Dormouse

Terrestrial habitats were assessed for their general suitability for Dormouse. Dormice generally use areas of dense woody vegetation cover, and are usually found where there is a wide diversity of

woody species contributing to three-dimensional habitat complexity and good connectivity of areas of suitable habitat. This usually includes a dense shrub-layer and a variety of food sources.

2.6.7 Nesting Birds

Habitat that might be used by breeding and wintering birds was identified.

2.6.8 Common Reptiles

The site was assessed for reptiles, with particular attention paid to those features that provide suitable basking areas (e.g. south-facing slopes), hibernation sites (e.g. banks, walls, piles of rotting vegetation) and opportunities for foraging (rough grassland and scrub).

The site was assessed for its suitability for each of the four common reptile species. The specific habitat requirements differ between species. Common Lizards (*Zootoca vivipara*) use a variety of habitats from woodland glades to walls and pastures, although one of their favoured habitats is rough grassland. Slow-worms (*Anguis fragilis*) use similar habitats to Common Lizards, and are often found in rank grassland, gardens and derelict land. Grass Snakes (*Natrix natrix*) have broadly similar requirements to Common Lizards with a greater reliance on ponds and wetlands, where they prey on Common Frogs. Adders (*Vipera berus*) use a range of fairly open habitats with some cover, but are most often found in dry heath (Beebee & Griffiths 2000).

2.7 Criteria for Assessment

The nature conservation value of habitats is assessed according to widely accepted criteria that relates to important factors such as naturalness, extent, rarity, and diversity. These and others are described in an extensive literature (Ratcliffe 1977, Usher 1986). In addition, the following criteria were used:

- relevance to International, European and wildlife law;
- relevance to the UK Government's duty to the Convention on Biological Diversity (CBD) through national and local Biodiversity Action Plans;
- semi-natural habitats, such as ancient woodland (Rackham 1986),

Significant species were defined as follows:

species protected by International, European and wildlife law;
IUCN Red List species;
County Red Data Book species (Cheffings and Farrell 2005);
Priority habitats and species listed within national and local BAPs; and
other notable species listed as rare or scarce in literature issued by conservation organisations or learned societies (e.g. Stewart et al. 1994).

2.8 Constraints

2.8.1 Static Detectors

Bat detectors are known to be more sensitive to certain bat calls than to others for reasons such as varying bat call loudness and directionality of certain calls. For example, a call from a Lesser Horseshoe Bat is directional and a bat detector will only be able to record the call if the bat echolocates directly at the detector whereas a Common Pipistrelle call is less directional and can be recorded even when the call is aimed away from the microphone. This can result in certain bat species (such as Lesser Horseshoe Bat and Brown Long-eared Bat) being under-recorded due to the limitations of current bat detectors. Some detectors (e.g. EM Mini) may be better at picking up quiet calls than other detectors (e.g. EMT). The difference in recording efficiency may therefore bias any results and this has been taken into account where possible during any assessment of the results.

2.8.2 Kaleidoscope Pro Analysis

The calls recorded by the static detectors have been analysed using the latest Kaleidoscope Pro automated analysis software. This software has been specifically designed to automatically classify the known bat calls of Britain and Ireland.

The programme automatically identifies bat calls using algorithms and provides statistical levels of confidence associated with each classified call. The confidence levels reflect the fact that there will be certain classification errors related to every classified bat call. With experience of using the software it is, on the whole, reliable when identifying certain bat calls (Common Pipistrelle, Soprano Pipistrelle, Noctule, Serotine, Leisler's Bat, Lesser Horseshoe Bat and Greater Horseshoe Bat) but less reliable when identifying other species (Brown Long-eared Bat and Barbastelle species).

The software cannot always distinguish between the various Myotis species and, in this case simply classifies them to genus level (i.e. Myotis sp.). This is in line with classification that would be achieved by manual identification due to the similar nature of Myotis calls making species classification subject to a high degree of error. Where confidence levels are higher a species is attributed to a call, which has been used during the analysis of the data collected to determine the number of species recorded.

From experience of using the software, it appears that various species of bat are either under or over recorded and classifications can be inaccurate. Steps have been taken to compensate for this inaccuracy. All records of Barbastelle, Myotis and Brown Long-eared Bat identified by the automated software have been manually verified and where appropriate the call identified corrected.

Where the software is unsure of a bat call, it will classify the call as 'NoID'. All NoID calls were checked and the correct species identified.

In conclusion, the classification data produced from Kaleidoscope Pro, along with any manual verification of certain problem/important species, is considered to provide an accurate record of the bat species recorded by a static bat detector and as such has been used within this report.

3 Results

3.1 Background Data Search

3.1.1 Designated Sites

Statutory Designated Sites

There are no statutory designated sites within 1 km of the site. However, hibernating bats using the cave on the site are known to use Woodchester Park SSSI, located approximately 5.8 km south of the site. Bats using the SSSI are also known to hibernate within the Wye Valley and Forest of Dean Bat Sites Special Area of Conservation (SAC) (Steering Group, 2016). A Habitat Regulations Assessment (HRA) may therefore be carried out as part of the assessment by Stroud District Council.

Edge Common SSSI and Cotswold Common and Beechwoods NNR are located in the wider area, which are connected to the Cotswolds Beechwoods SAC. Rodborough Common SAC is also present in the wider area. These sites are susceptible to recreational pressure and air quality impacts. However, the site is small and there will be no net gain in housing as a result of the proposals. As such, there will be no increase in potential impacts to these designated sites.

Non-statutory Designated Sites

Part of the woodland on the site lies within The Throat Meadows & Quarry Local Wildlife Site (LWS). The grassland fields located offsite, to the north of the site are also included in the LWS. However, the 2020 PEA identified the grassland in the north of the site as being of similar characteristic to the grassland in the LWS and suggested the grassland in the north of the site be treated as an undesignated site of interest.

3.1.2 Protected Species

GCER Data Search Results

The 2022 data search recorded no new information on the cave and other records in the area. The cave is monitored by [REDACTED] in connection with the long-term study at Woodchester Park SSSI and is known to support a hibernation roost of Greater and Lesser Horseshoe Bats. The

data shows the latest visit as being in 2016 and the notes state that 11% of breeding females (Greater Horseshoe Bats) at Woodchester Park are using the cave during the winter period. Following direct communication with GCER, no other information is held by the records centre and [REDACTED] was unavailable to provide additional information at the time of writing.

European Protected Species Licences

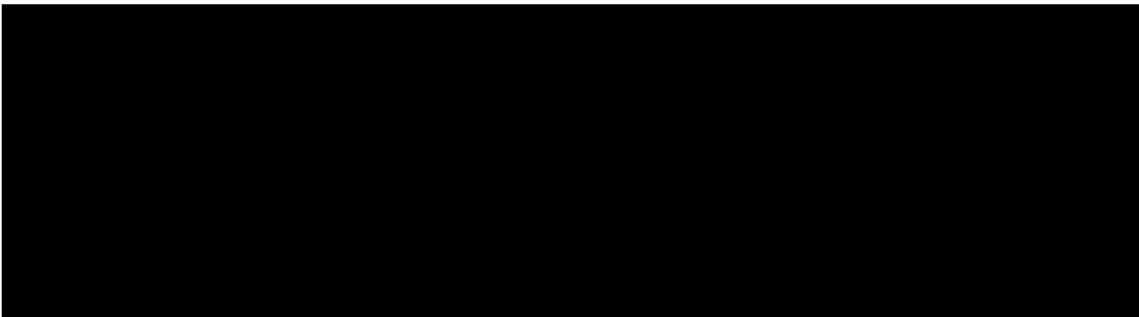
There are no EPS development licence records within 1 km of the site. The nearest EPS development licence (2019-43970-EPS-MIT) is for work affecting non-breeding roosts of Brown Long-eared Bat (*Plecotus auritus*), Whiskered Bat (*Myotis mystacinus*) and Serotine (*Eptesicus serotinus*) located north of Pitchcombe (approximately 1.3 km to the north-east).

3.2 Habitats

The site has not significantly changed since the 2020 survey. The house has been empty since the sale of the property and the garden appears to have been maintained without carrying out any significant works to the site. The Phase 1 Habitat Map produced in the 2020 PEA is still accurate and as such, has not been reproduced in this report. The assessment of potential impacts of a development on the site are also therefore accurate. The remainder of this assessment therefore relates to the specific proposals being put forward for the site that were not available for the 2020 assessment.

3.3 Protected Species

3.3.1 [REDACTED]



3.3.2 Bats

Foraging and commuting

The site is dark other than the presence of windows and external lighting from the existing cottage. There are mature trees on the site boundaries and a section of broad-leaved woodland on the steep slope in the west and north-west of the site. The woodland habitats connect to the wider landscape including Standish Woods and the Ruscombe Valley.

The proposed development area around the cottage has some limited foraging potential with some trees, shrubs and flowering plants but is not a significant foraging resource in the context of the remainder of the site and the surrounding landscape. The habitats adjacent to the development areas provide excellent foraging habitat for bats and suitable commuting habitat into the wider countryside.

Daytime Bat Survey

Spring Cottage

A description of the cottage and results of the daytime bat survey are provided below. Photographs of the building and evidence recorded during the survey are provided in Plates 3-8 below.

The cottage comprises a two storey section (hereafter referred to as the Main Building) and a single storey extension that wraps around the building on three sides. All aspects of the extension have sloped roofs covered in concrete tiles. The Main Building has a pitched roof with the southern aspect covered in red concrete tiles. The northern pitch is covered in concrete tiles, similar to the single storey extension. All sections of the building have stone walls with windows throughout.

There is a porch on the southern aspect with a pitched roof covered in concrete ridge and roof tiles. There is some wooden boarding around the base with metal flashing where the porch joins the Main Building. There are also two chimneys with associated metal flashing.

The building was unoccupied at the time of survey, but appeared only recently vacated and was therefore watertight and in habitable condition.



Plate 3. View of the cottage from the south



Plate 4. View of the cottage from the north showing single storey extension.



Plates 5 & 6. Internal views of the cottage

There is a loft void present in the Main Building which extends the length of the roof. The loft is approximately 1.5 m from floor to apex and has insulation on the floor. The tiles have traditional bitumen felt and sarking boards on the underside with a few gaps and tears in the lining.

A second loft space is present above the single storey extension measuring approximately 1.25 m from floor to apex. The tiles in the extension have modern membrane underneath which was in good condition with no visible gaps or tears present. The loft has insulation on the floor.

Both loft voids were relatively free of dust and debris with only a few cobwebs present at the apex.



Plate 7. Internal view of the loft void in the Main Building

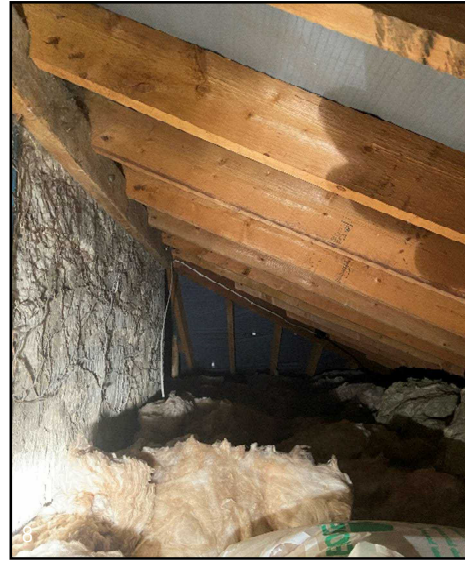


Plate 8. Internal view of the loft void in the extension.

Potential Bat-access Points

There are gaps under the roof and ridge tiles on the southern aspect of the Main Building that would provide bat-access to the gap between the tiles and the lining and into the loft void. The porch on the southern aspect also has gaps under the ridge tiles and around the wooden boarding at the base. There are also gaps in the stonework on the eastern gable wall that may be suitable for crevice-dwelling bats. The tiles on the extension are very tight with no obvious potential bat-access points. The internal areas of the building are sealed from potential bat-access.

Potential Roosting Locations

The space between the tiles and the lining on the Main Building is suitable for crevice-dwelling bats such as Common Pipistrelle. There are a small number of gaps and tears in the lining that could be used to access the loft space in the Main Building. The loft space is relatively small and therefore not ideal, but could be used by species that use an internal flight space such as Brown Long-eared Bat. The gaps in the eastern gable wall are also suitable.

Evidence of Bats

Six bat droppings were recorded scattered on the floor of the loft void in the Main Building. The droppings were of a size and shape indicative of Pipistrelle bats. The droppings were scattered and indicate that bats have been inside the loft void, although they were not concentrated that would suggest roosting. Given the presence of bat droppings and the potential for bats to roost between the tiles and the lining in the Main Building, the presence of other potential roosting locations on the external areas of the building and the suitable habitat in the vicinity of the building, the cottage was classified as having High Bat roosting Potential.

Workshops

There are a series of workshops in the north of the site. They are constructed of wood and breeze block and currently used for storage. They have some potential for night roosting or for feeding roosts and were classified as having Negligible to Low Bat Roosting Potential. The workshops were inspected and no evidence of roosting bats was recorded. The workshops will be retained and unaffected by the proposals and as such, a full description of the construction and potential bat roosting features is not necessary in this report.

Dusk Surveys

No bats were recorded emerging from the cottage during the dusk surveys.

During the survey on 29.06.22, individual Common Pipistrelle and Brown Long-eared Bats were suspected of emerging from the building, although analysis of the IR camcorder footage indicated bats only flying very close to the building (the front porch and the eastern gable wall respectively). The bats were both recorded close to known emergence times for their species, indicating roosts are present close to the site.

Activity around the cottage comprised individual bats sporadically foraging and commuting around the garden, although there were no prolonged periods of foraging from any bats. Common Pipistrelle were most frequently recorded around the site, foraging and commuting around the cottage. Low number of Noctule and Brown Long-eared Bat passes were recorded on all surveys.

A Serotine was also recorded during the survey on 06.06.22 foraging in the garden for approximately 2 minutes. The bat was recorded at 22:17, 56 minutes after sunset, long after the median emergence time for this species (20 minutes after sunset, Jones & Rydell, 1994) indicating the bat is unlikely to be roosting close to the site.

No Greater or Lesser Horseshoe Bats were recorded during any of the dusk surveys.

Bat Activity Surveys

The survey results from Bat Activity Survey 1 are shown in Table 3. The static detector at the cave entrance (SD1) shows the largest number of passes, which is to be expected given this is adjacent to the roost entrance and would capture multiple passes from the same bats as they light-sample and forage around the roost entrance. The static detectors at sample points SD2 and SD3 recorded a greatly reduced number of passes, likely to be a more realistic indicator of the number of bats using the habitat as individual bats pass the detector when commuting into the wider countryside.

Although both areas of habitat were used by both Greater and Lesser Horseshoe Bats, the northern boundary was used more with 11 passes of Greater Horseshoe, compared with 2 passes by the existing decking. Over 8 sampling nights, two Greater Horseshoe passes shows the decking area to be used for commuting on very rare occasions.

A similar result is shown for Lesser Horseshoe bats with 14 passes recorded on the northern boundary and only 1 adjacent to the decking.

Table 3. Results of the bat activity surveys between 25.04.22 and 02.05.22.

Species	Location		
	SD1 - Cave	SD2 – Northern Boundary	SD3 - Decking
Common Pipistrelle	18	55	103
Serotine	95	64	33
Noctule	4	6	15
Myotis sp.	0	1	2
Brown Long-eared Bat	0	2	1
Lesser Horseshoe	666	14	1
Greater Horseshoe	706	11	2

The survey results from Bat Activity Survey 2 are shown in Table 4. The surveyor at the cave entrance recorded the most passes by Greater and Lesser Horseshoe Bats. This was confirmed as being from individual bats light-sampling close to dusk with a few individuals repeatedly foraging around the canopy around the cave entrance following emergence.

Although the count was made difficult by bats regularly returning to the cave and emerging again and bats repeatedly passing and foraging by the cave entrance following emergence, surveyor observations (confirmed by the IR camera footage) recorded a total of 4 Greater Horseshoe bats and 6 Lesser Horseshoe Bats emerging from the cave. Lesser Horseshoe Bats were mostly observed flying from the cave down the mammal pathway to the south although most of these bats appeared to remain within the woodland canopy foraging, probably waiting until light levels reduced further before commuting into the open landscape. Other bats generally emerging later (mostly Greater Horseshoe) from the cave appeared to fly directly west and out into the grassland field.

Table 4. Results of Bat Activity Survey 2 on 11.05.22

Species	Location				
	SD1 - Cave	SD2 – Northern Boundary	SD3 - Decking	SD4 – Central	SD5 – Eastern Boundary
Common Pipistrelle	1	8	15	9	24
Serotine	2	0	10	8	19
Noctule	0	0	3	2	1
Myotis sp.	0	0	0	1	0
Lesser Horseshoe	141	3	0	5	0
Greater Horseshoe	40	6	0	0	0

Six Greater Horseshoe passes were recorded on the static detectors during the survey period, more than the 4 bats that emerged from the cave, most likely from the same bats passing the detector on multiple occasions. All of these were recorded by SD2, on the northern boundary. This is a similar result to the first bat activity survey, indicating that the northern boundary is the preferred commuting route to and from the cave.

Lesser Horseshoe were recorded mostly on the central detector which may indicate a preferred commuting route in this location. However, bats were observed foraging around the trees close to the cave entrance by the surveyor monitoring this area. It is possible that the central static detector may have picked up some of these bats foraging, rather than commuting away from the site.

No Greater or Lesser Horseshoe bats were recorded on the eastern boundary vegetation,

Trees

No trees are to be affected by the proposals other than two *Malus domestica* (Apple) present in the existing garden. No potential bat roosting features were recorded in the trees to be affected or in the immediate vicinity of the site.

3.3.3 Great Crested Newt

There are no ponds present on the site.

Although there is a good amount of Great Crested Newt terrestrial habitat on the site, the development area contains only buildings, hardstanding and some garden bedding and shrubs. These represent very low or negligible potential as Great Crested Newt terrestrial habitat. The more suitable areas in the grassland in the north of the site will remain unaffected by the proposals. There are three records of this species in the village of Whiteshill returned from the 2020 data search, located a minimum of 100 m to the south and south-east of the site. The areas are likely located to the east of Main Road within residential development and so would be separated from the site by physical barriers that is likely to prevent newts from entering the site. There are other ponds to the west and north-west that have better connectivity to the site and have no records of being surveyed for newts to date. However, the small amount of newt habitat of low quality to be affected would mean a very low likelihood of newts being impacted by the proposals. As a result, no further surveys, specific mitigation or Natural England development licence would be required in this instance. Great Crested Newts are therefore not considered further in this report. In the unlikely event that a Great Crested Newt is observed during construction, works should pause and an appropriately qualified ecologist contacted for advice.

3.3.4 Dormouse

It is possible that Dormouse are present in the area and the site is connected to larger areas of suitable Dormouse habitat. As such, this species could be present on the site. However, the proposals will affect only a small amount of garden shrubs and trees and as such, there is an extremely low risk of encountering this species during clearance works. Dormouse are therefore unlikely to be affected during the proposals and as such, no further survey or mitigation would be required for this species.

3.3.5 Breeding Birds

The trees and more dense areas of shrubs to be affected by the proposals have some limited suitability for nesting by common garden bird species.

3.3.6 Common Reptiles

There are records of Slow-worm in the area and the site contains habitat suitable for this species in the form of the species-rich grassland in the north of the site. The area to be affected by the proposals contains only garden bedding areas and some shrubs and garden lawn and as such, is unlikely to support anything other than individual reptiles.

4 Evaluation and Conclusions

4.1 Designated Sites

4.1.1 Woodchester Park SSSI

Hibernating bats using the cave on the site are known to use Woodchester Park SSSI, located approximately 5.8 km south of the site. Bats using the SSSI are also known to hibernate within the Wye Valley and Forest of Dean Bat Sites Special Area of Conservation (SAC) (Steering Group, 2016), a European Protected Site. Proposed developments within the vicinity of European Protected Sites may be subject to a Habitat Regulations Assessment (HRA) screening to assess any potential impacts from new developments. The cave on the site may therefore be treated as an extension of the SSSI and potentially the SAC given they are intrinsically and functionally linked and may therefore require a HRA. Potential direct and indirect effects on the cave are described below.

Potential Direct Effects

A development on the site has the potential to affect the cave directly due to impacts from construction activities (e.g. vibrations and noise), if the tunnels are within the vicinity of the site. It is not known how deep the tunnels go or in which direction (the cave entrance is grilled and locked with no available key) although they are unlikely to extend in the direction of the development site. However, no piling works are required for the construction works. Footings for the proposed dwelling will be constructed using traditional excavations filled with concrete and are extremely unlikely to extend to a depth that would affect any potential tunnels below ground. The cave entrance is located approximately 62 m from the proposed footings at its nearest point. Studies on types of machinery typically used on construction sites and their vibration levels show that large excavators and moving trucks would fall below the threshold of perception before 62 m (Wiss, 1981) and as such, there should theoretically be no impacts from construction vibrations. However, to avoid any doubt and as a precaution, we would suggest groundworks are completed outside of the winter hibernation period (November to February inclusive). This would ensure any hibernating Horseshoe bats that use the SSSI remain unaffected by the works.

Potential Indirect Effects

Indirect impacts of a development on the site may also affect the integrity of the designated sites. There is potential for bats to be adversely affected by the introduction of lighting onto bat flight-lines. Horseshoe bats are known to be sensitive to the introduction of artificial lighting, which can cause bats to alter commuting and foraging routes, or even abandon roosts altogether ([REDACTED] 2009).

The site has good bat foraging and commuting potential although the development area around the garden and cottage is already subject to lighting when in use from the cottage windows and external lighting.

The results of the bat activity surveys indicate that the line of trees on the northern boundary of the site is likely to be the main commuting route to and from the cave from the wider landscape. Cattle grazed pasture is the most preferred habitat for Greater Horseshoe Bats (Duvergé and Jones, 1994) and there are pasture fields associated with Hill Farm in the Ruscombe Valley to the south-west. The fields are grazed by a mixture of horses and low intensity rare breed cattle. The line of trees on the northern boundary of the site would lead to the woodland down The Throat and the grazing pasture of Hill Farm below. The direction of flight from the cave towards the existing cottage (and development area) would lead bats in the direction of increasingly dense residential development in Whiteshill.

In order to mitigate any potential affected of artificial lighting on the habitats to the north of the proposed dwelling, planting screens will be created around the northern and western boundaries of the new garden, which will reduce or eliminate light spill and retain the adjacent habitats as dark corridors to continue to be available for light-sensitive bat species.

Very limited or no use by light sensitive species (during both the bat activity surveys and dusk surveys) was recorded to the west or south of the existing cottage. As a result, glazing has been proposed on the western elevation of the new extension to allow open views over the landscape in the Ruscombe Valley. The survey results indicate that this will have negligible impact to bats and as such, would allow owners to achieve one of the largest aims of the building design, whilst ensuring bats are able to continue to move around the site.

Construction works will take place in the daytime and as such, there will be no requirement for artificial lighting to be used during the construction period.

Best practice will be followed with regard to external lighting design, as outlined in Bats and Artificial Lighting in the UK - Guidance Note 08/18 (ILP and BCT, 2018). The number of external lights has been minimised on the northern and eastern elevations and any external lights will be facing downwards and on PIR sensors on short (1 minute) timers.

The northern boundary vegetation that is being used by commuting Greater and Lesser Horseshoe bats will remain unaffected from the proposals and as a result, the proposals are unlikely to have a significant impact on the integrity of the designated sites.

4.1.2 The Throat Meadows & Quarry LWS

The Throat Meadows & Quarry LWS includes a section of woodland that lies within the site. However, the woodland is outside the development area and will not be directly affected by the proposals. The woodland lies on a steep slope within the site and is generally inaccessible and is not likely to be affected by the construction works or any works in the future.

The grassland section of the LWS lies outside the site boundary to the north, although the grassland within the site is of similar characteristic to the grassland in the LWS and it has been suggested this area is treated as an undesignated site of interest. The grassland will not be directly affected by the proposals and is located approximately 50 m to the north of the proposed footprint of the new extension, with the existing workshops (to be retained under the proposals) located between the grassland and the construction area. As a result, there is no risk of accidental encroachment during the construction period and as such, there is no requirement to erect fencing or similar barriers between the grassland and the construction area.

4.2 Habitats and Plant Species

4.2.1 Habitats

There are habitats of significant nature conservation interest on the site, including the woodland within the LWS and the grassland in the north of the site, although both of these features will remain unaffected by the proposals, as discussed in Section 4.1.2 above.

Habitat to be affected by the proposals comprises garden habitats such as amenity lawn, shrubs, perennial bedding areas and amenity hedgerows. These habitats contain common and easily replaceable species and generally offer low or negligible nature conservation interest. The loss of

these habitats is not considered significant due to the very small size of impacted habitat in the context of the surrounding area and the quality of the remainder of the habitats recorded in the site.

Other than the loss of two *Malus domestica* (Apple) trees, all other trees in the garden and boundaries around the site will remain unaffected by the proposals.

New Planting and Enhancement

New landscaping will be created around the northern and western boundaries of the new gardens. This will comprise new trees on the northern boundary of the property including *Sorbus aucuparia* (Rowan), *Prunus avium* (Wild Cherry) and two *Betula utilis* (Himalayan Birch). In addition to providing compensation for the lost trees and enhancement of the existing habitat, the hedgerow and trees will act as a natural screen to reduce lighting impacts from windows in the new dwelling.

Additional new planting areas will be created to the south-west of the new dwelling. The two new areas of landscape planting will include shrubs including *Cornus sanguinea* (Dogwood) and *Pyracantha* sp. (a Firethorn). Bedding areas should include night-scented species such as *Oenothera biennis* (Evening Primrose), climbing plants such as *Lonicera periclymenum* (Honeysuckle) and scented herbs such as *Melissa officinalis* (Lemon Balm).

The new lawns should be seeded with a species rich amenity mix such as WFT-Species-Rich-26 from Wildflower Turf (www.wildflowerturf.co.uk) which can be regularly mowed and fertilized, but contains flowering species which are able to survive and thrive with this regime.

In order to replace the loss of the two *Malus domestica* (Apple), we would suggest three replacement trees are planted in the garden comprising a historical variety of local Apple tree. Information on variety can be found at Gloucestershire Orchard Trust (www.glosorchards.org) but we would suggest a variety such as Lodgemore Nonpareil, an endangered desert apple variety from Stroud.

4.2.2 Plant Species

No rare or Nationally Scarce plants were recorded.

4.2.3 Invasive Plant Species

No invasive species were observed during the survey.

4.3 Protected Species

4.3.1 Bats

Foraging and Commuting Habitat

As discussed in Section 4.1.1, there is potential for bats to be adversely affected by the introduction of lighting onto bat flight-lines around the site. There are roosting Greater and Lesser Horseshoe bats and other light sensitive bat species on the site which are known to be disturbed by the introduction of artificial lighting (Stone et al, 2009). The landscaping proposals have been designed to reduce or eliminate light spill to the habitats to the north and east of the proposed building which will allow light-sensitive bat species to continue to forage in the site and commute through the site into the wider landscape.

The new planting scheme discussed in Section 4.2.1 will ensure there is no net loss in available foraging habitat as a result of the proposals and the increase in native species is likely to result in a net gain in invertebrates on the site which will in turn increase the amount of insect prey for bats.

Bat Roosts

No bats were recorded roosting in the cottage and as such there is no requirement for compensatory roost provision, specific mitigation or European Protected Species (EPS) development licence. However, given the presence of droppings in the loft void and potential for bats in the building, it is still possible that bats may use the building on occasion and have just not been recorded during the dusk surveys, which are only a snapshot of activity on any one night. Given that bats move roosts regularly and it is still possible that bats use the building on an occasional basis, we would suggest a precautionary approach to works when removing the roof of the cottage. A Precautionary Working Method Statement (PWMS) has been provided in Appendix 2 to be followed when removing the tiles on the southern pitch of the cottage.

4.3.2 [REDACTED]

[REDACTED]



4.3.3 Nesting Birds

The more dense areas of garden shrubs and trees to be affected by the proposals have some limited suitability for nesting by common garden bird species. All wild birds are protected by law when nesting and as such, the clearance of any suitable nesting habitat should be carried out outside the bird nesting season (March to August). In the event that clearance works are due to commence inside this period, a check for nests should be carried out prior to clearance. If any active nests are recorded, the nest should be left undisturbed until the chicks have fledged.

Provisions for nesting birds should be made on the site as part of a package of ecological enhancements detailed in Section 4.4.

4.3.4 Reptiles

The area to be affected by the proposals contains only garden bedding areas and some shrubs and garden lawn and as such, is unlikely to support anything other than individual reptiles.

We would therefore suggest that initially any longer areas of weeds, perennials or tall ruderal or shrubs should be cut to no more than 10 cm in height. Arisings should be removed and stored outside of the works area. This will allow any reptiles present to move out of the works area. A second cut at least three days later should remove the remaining vegetation down to ground level. Any debris or wood piles should be left undisturbed during the winter period (November to March) to avoid disturbing hibernating reptiles. Refugia should then be dismantled by hand and moved outside the works area.

4.4 Ecological Enhancements

In addition to the compensatory planting and provision of bat roosting enhancements suggested in Sections 4.2.1 and 4.3.1, additional ecological enhancements could be included as part of the proposals:

Three bat boxes installed on trees on the boundaries of the site such as Eco Kent Bat Box, which are relatively light in weight would be suitable for installing on the trees (e.g. <https://www.wildcare.co.uk/10691-eco-kent-bat-box.html>);

Three mixed bird boxes (e.g. one general purpose woodstone bird box and one open fronted bird box) to be erected on trees in the woodland;

A hedgehog house (there are records in the area) and two insect houses will be located on the boundaries of the gardens.

5 References

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6 Figures

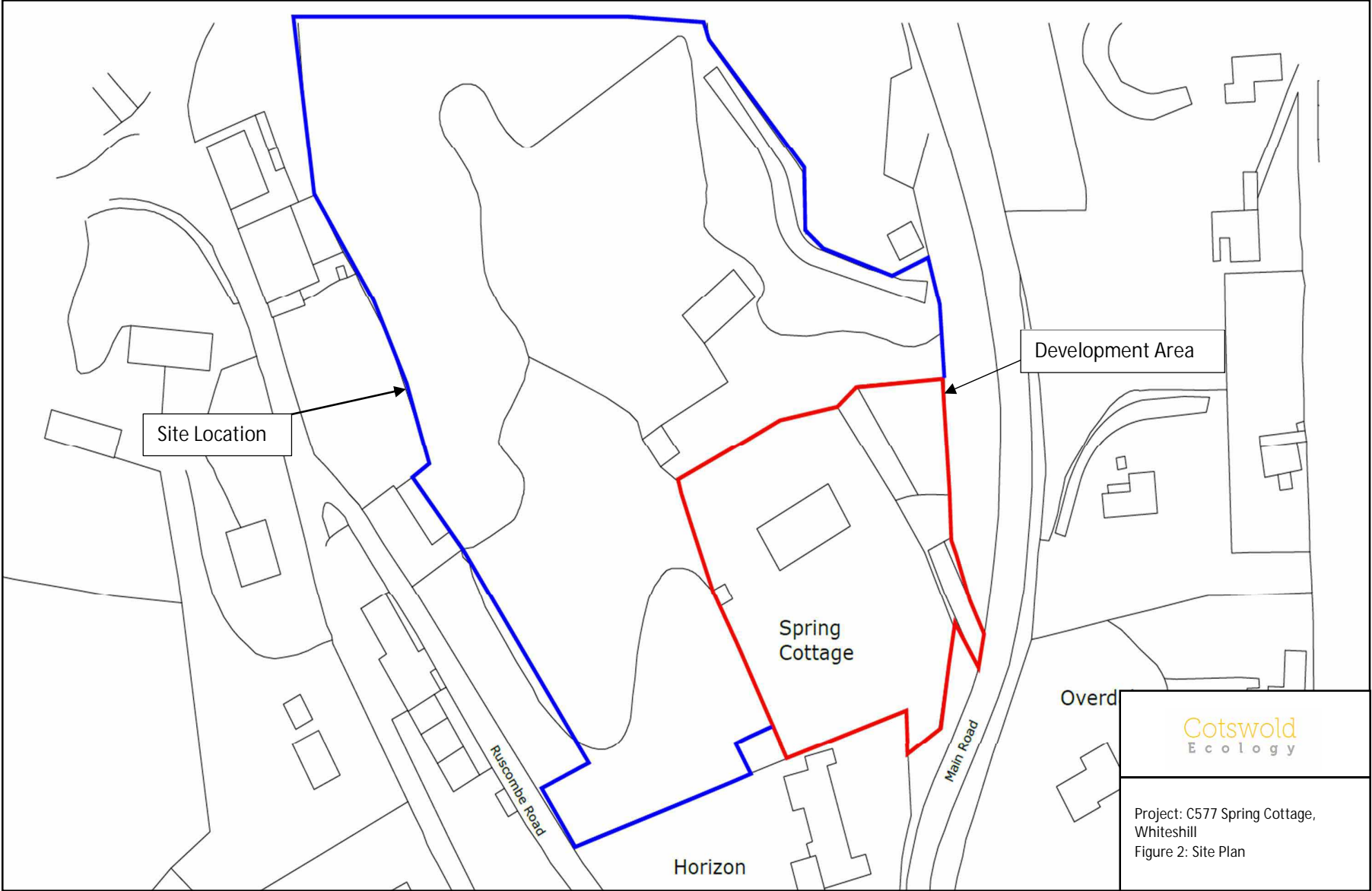
Figure 1. Site Location Plan

Figure 2. Site Plan

Figure 3. Dusk Surveyor Locations

Figure 4. Bat Activity Survey Location





Cotswold Ecology

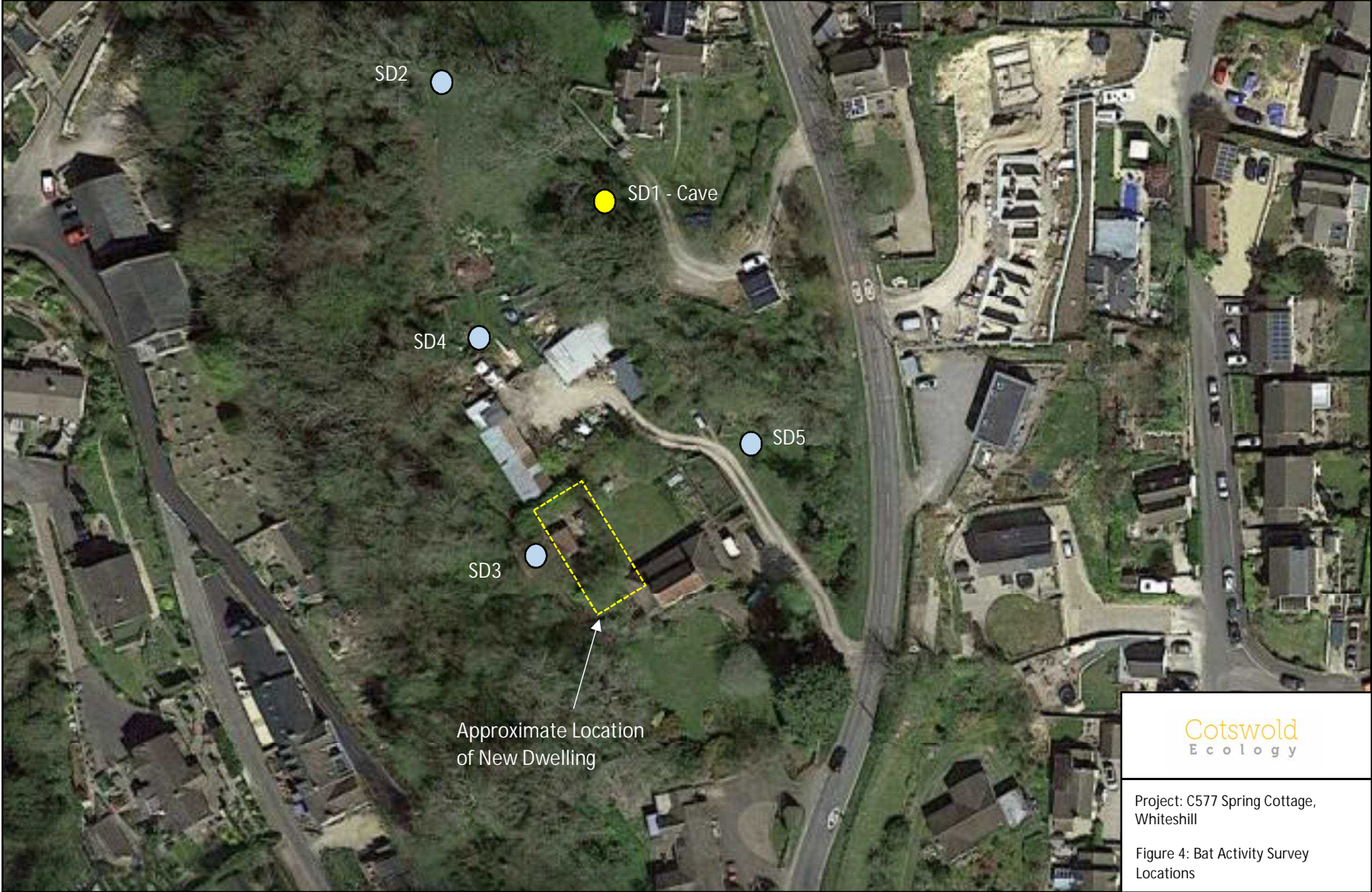
Project: C577 Spring Cottage, Whiteshill
Figure 2: Site Plan



Cotswold
Ecology

Project: C577 Spring Cottage,
Whiteshill

Figure 3: Dusk Surveyor Locations



APPENDIX 1. BACKGROUND DATA SEARCH RESULTS

APPENDIX 2 – Precautionary Working Method Statement

The following measures are been suggested to reduce the likelihood of bats being disturbed, killed or injured during the works. Enhancements have been suggested in Section 4.3.1 for new bat roosting features on the site. The measures should be followed for the removal of the tiles on the southern pitch of the cottage and the porch on the southern elevation. The single storey extensions have very limited, if any, bat roosting potential and works can continue to these areas of the building without further regard to bats.

6.1.1 Timings

Pipistrelle bats are known to hibernate in relatively exposed locations and, although the roosts are not ideal for hibernation, their use during the winter months cannot be discounted. We would therefore suggest that the works to the roof avoid the winter hibernation period if possible (November to February inclusive).

6.1.2 Toolbox Talk

Immediately prior to the commencement of the removal of the roof tiles, a site briefing will be given by a bat licensed ecologist to ensure that all contractors are fully aware of the presence of bats and their legal protection. This 'toolbox' talk will be held with the construction team before any roof work is undertaken and will discuss the adoption of appropriate methodologies to remove the features to ensure no harm to bats occurs.

6.1.3 Ecologist Watching Brief

A watching brief will be carried out by a licenced and experienced bat ecologist during the removal of the roof tiles. The loft void of the cottage will be inspected prior to roof works commencing. If no bats are present, the tiles will be removed. In the unlikely event that any bats are recorded, any bats will be placed in a pre-erected bat box on a mature tree on the site. Works may then need to cease depending on the works remaining to be completed and the potential likelihood of finding more

roosting bats. The ecologist should inform Natural England of the findings and gain support in their decision making and the process moving forward.