THE BAT SURVEYOR

Mr and Mrs Scott

Preliminary Roost Assessment

Hall Farm Barn

Hall Lane, Litton, Derbyshire, SK17 8QP

Project number 027

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Non-technical summary

Non-Technical Summary
Background
In August 2020, Jo Pedder was instructed by Mr and Mrs Scott to undertake a Preliminary Roost Assessment of Hall Farm Barn, Hall Lane, Litton, Derbyshire, SK17 8QP (Ordnance Survey (OS) grid Reference SK 16482 75079).
Aims
• Identify Potential Roosting Features on structures at the Site • Assess the potential value of those features for bats following best practice • Identify signs of nesting birds • Recommend further surveys if necessary • Recommend mitigation, compensation, and enhancement measures.
Site Description
The Site is a two-storey, stone built, agricultural building with a cement-tiled, pitched, roof. The roof is lined with bitumen felt and possibly a second layer of a breathable membrane. It also has a small cement block addition with a mono pitched, corrugated asbestos roof. The Site is part of a complex of barns at Hall Farm which were converted into housing in the 1970s. The surveyed building is attached to converted buildings but has not been renovated. The ground floor is currently used for storage and the first floor is unused. Some of the external walls have recently been repointed up to approximately 2 m. The owner has purposefully stopped at that level to avoid impacts to bats.
Development Proposals
The proposals are to renovate the property as a residential house. The roof will be replaced, and a new structure will replace the existing lean-to
Information used for the assessment
• Preliminary Roost Assessment • Internet based desk search • Plans supplied by Axis Architecture
Outline Assessment and Recommendations
The building is used by bats as a feeding perch. Bats may also roost in the building, and additional surveys are required to demonstrate whether this is the case. If bats do roost here, there are licencing procedures that will allow the renovation to be completed, but mitigation and compensation will be required.

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1 Introduction

1.1 Terms of Reference

In August 2020, Jo Pedder was instructed by Mr and Mrs Scott (the Client) to undertake a Preliminary Roost Assessment of Hall Farm Barn, Hall Lane, Litton, Derbyshire, SK17 8QP (Ordnance Survey (OS) grid Reference SK 16482 75079) (The Site).

Information for the assessment was obtained from:

- Preliminary Roost Assessment
- Internet based desk search
- Plans supplied by Axis Architecture

The Site is a two-storey, stone built, agricultural building with a cement-tiled, pitched, roof. It also has a small cement block addition with a mono pitched, corrugated asbestos roof. The Site is part of a complex of barns at Hall Farm which were converted into housing in the 1970's. The surveyed building is attached to converted buildings but has not been renovated. The ground floor is currently used for storage and the first floor is unused. Some of the external walls have recently been repointed up to approximately 2m. The owner has purposefully stopped at that level to avoid impacts to bats.

The proposals are to renovate the property as a residential house. The roof will be replaced, and a new structure will replace the existing lean-to.

1.2 Aims and Objectives

The aims of the study were to:

- Identify Potential Roosting Features on structures at the Site
- Assess the potential value of those features for bats following best practice
- Identify signs of nesting birds
- Recommend further surveys if necessary
- Recommend mitigation, compensation, and enhancement measures.

2 Methodology

2.1 Personnel

The survey was led and reported by Jo Pedder. Jo Pedder BSc. hons MCIEEM is an ecologist with over 15 years' experience in the environmental consulting sector. Jo holds survey licences for bats (level 2) and great crested newts (level 1) and development licences for bats and newts. Jo has experience in a range of projects from barn conversions to sites over 300 ha and has worked in the minerals, housing, and energy sectors.

2.2 Preliminary Roost Assessment

A Preliminary Roost Assessment (PRA) was undertaken on the 04/08/2020. The PRA followed the Bat Conservation Trust (BCT) guidelines criteria[1] (see Appendix 1). This entails inspecting a structure (e.g. a building or tree) for field evidence of roosting bats such as feeding remains, droppings, urine staining and Potential Roosting Features (PRFs) such as voids, cracks, and crevices. The survey is undertaken from the ground level (or floor level within buildings).

Any direct evidence, type, and number of PRFs and the Site's environment is then used to grade the structure's suitability for bats. The assessment is based on the potential value of a roost in the structure, not the likelihood of a bat roost at the structure. A low suitability structure would, at most, have features that individual bats could roost in opportunistically. Structures with a moderate suitability may support bats regularly but are not likely to include hibernation or maternity roosts. A high suitability structure would have one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis.

2.3 Desk Study

Given the limited scale of the proposals and limited potential for impacts to arise outside the Site, a full data search was not commissioned for this stage of the project. Ordnance Survey maps and online aerial photos were used to provide site context and the online Multi-Agency Geographical Information Centre[2] (MAGIC) was used to identify any internationally and nationally statutory protected areas within 1 km of the Site.

2.4 Survey Constraints

Any ecology assessment must be considered as a 'snapshot' of the site conditions at the time of the survey. Ecological constraints will change over time and therefore the findings of this report are considered to be valid for a period of one year, after which the report should be reviewed to assess whether the survey should be updated.

The first floor of the building could not be fully accessed due to a potential unsafe floor. However, ladder access was available in two opposite corners and the survey was conducted with a high-powered torch and binoculars.

[1] Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn). The Bat Conservation Trust, London

[2] www.magic.go.uk (Accessed 04 August 2020)

No constraints were such that they affect the overall conclusions and recommendations made herein.

3 Results

3.1 Surrounding Area

The Site is located in the White Peak National Character Area (NCA). The NCA is a raised, undulating limestone plateau deeply incised with steep-sided limestone valleys. It has a strong sense of place arising from the effect of the underlying geology on landform and its influence on natural and manmade landscape features such as caves, crags, drystone walls, and traditional buildings. The dales are of significant wildlife value, particularly because of their flower-rich limestone grassland and ash woodland, and many contain clean, clear rivers which support species such as white-clawed crayfish, bullhead, lamprey, and dipper.

Habitats within 100 m of the Site are predominantly pasture, with farm buildings and the village of Litton.

Figure 1, an aerial photograph of the Site, shows the Site in context with the surrounding landscape.

Figure 1 – Site Location

Table 1 – Designated Wildlife Sites

Designation / Location	Ecological Feature
Local Nature Reserves	
None	n/a
Nation Nature Reserves	
Derbyshire Dales	limestone scenery, diverse flora and the wide range of butterflies and other insects this supports. Main habitats: limestone grassland, scrub, and valley woodlands; also hay meadows, streams and dew ponds, scree, acid grassland and small areas of 'limestone heath'
Sites of Special Scientific Interest	
Cressbrook Dale	Limestone habitats, rare plants and insects, lichens.
The Wye Valley	Ancient woodlands, scree habitats, grasslands
Special Areas of Conservation	
Peak District Dales	Semi-natural grasslands, calcareous forests.
Special Protection Areas	
None	n/a
Ramsar Sites	
None	n/a

3.2 Site's Habitats

The Site is a two-storey, stone built, agricultural building with a cement-tiled, pitched, roof. The roof is lined with bitumen felt and possibly a second layer of a breathable membrane. It also has a small cement block addition with a mono pitched, corrugated asbestos roof. The Site is part of a complex of barns at Hall Farm which were converted into housing in the 1970s. The surveyed building is attached to converted buildings but has not been renovated. The ground floor is currently used for storage and the first floor is unused. Some of the external walls have recently been repointed up to approximately 2 m. The owner has purposefully stopped at that level to avoid impacts to bats.

Photos taken during the survey are shown in Appendix 2 and detailed survey results are in Appendix 3.

The building was found to be suitable for roosting bats. There are numerous locations which crevices roosting bats could roost e.g. in cavities in the stone walls, between lintel timbers, and between roof tiles and roof felt. Direct evidence of bats was found; discarded moth and butterfly wings indicate that the building is used as a feeding perch (mostly likely by brown long-eared bats), staining and scratch marks were also recorded at the ridge beam above a pile of wings. No bat droppings were found at the Site but as the first floor could not be fully accessed it is quite possible that further evidence of bats is present but was not observed during the survey.

As potentially large roosts, including a maternity colony could occur at the building, it has been assessed as of **High Potential Value** for bats.

Signs of nesting birds were recorded within the building – several very old moss nests were found in crevices and broken eggs and an old pigeon chick carcass was found on the first floor. No nests appeared to be from this season.

Figure 2 – Site Layout

4 Assessment

4.1 Project Proposals

The proposals are to renovate the property as a residential house. The roof will be replaced, and a new structure will replace the existing lean-to.

4.2 Further Surveys Required

The following surveys are recommended in line with best practice to complete an assessment of the likely ecological impacts of the project.

Three dusk or pre-dawn bat roosts surveys (including at least one pre-dawn survey). Two visits must be between May and August and one visit between May and September.

4.3 Ecological Constraints

4.3.1 Bats

Reasonable Worst Case

In order to aid the assessment of impacts arising from the proposal based on this initial assessment, and therefore allow the Client to prepare for the recommendations in this report, it is useful to consider a 'reasonable worst case' for the presence of bats. **The worst-case assessment is not a substitution for complete surveys and the local authority will not determining the application prior to completing surveys.**

If bats are present at the Site, they could be any species which commonly roost within buildings as there are structures favoured by crevice roosting bats and void roosting bats. The building is probably too light during the day for light averse species (such as brown long-eared bats) to roost here (although it is almost certain that this species uses the building as a feeding perch at night).

A reasonable worst-case scenario is that the building supports a maternity roost of common or soprano pipistrelle bats which roost under roof tiles, small roosts of myotis bats in wall crevices and a brown long-eared bat feeding perch.

As bats and their roosts are protected, there are procedures that must be followed to lawfully undertake works that might affect them. Natural England are able to grant licences which allow impacts to occur that would otherwise by unlawful. These licences are applied for after planning has been granted.

Note that this section is based on the worst-case scenario: it is quite possible that no bats will be found, and a licence, mitigation and compensation will not be required.

In order for a project to be granted planning permission by a Local Planning Authority (LPA) or for a license to be granted by Natural England (NE), evidence must be presented to satisfy the three 'derogation tests' applied to European Protected Species (EPS) under the Conservation of Species and Habitat Regulations 2010.

The tests of 'overriding public interest' and 'no satisfactory alternative' are planning issues and are beyond the scope of this report. However, the recommendations given in this report aim to address the third test - 'maintenance of the favourable conservation status of the species.'

More information on legislation, licensing and the derogation test is provided in Appendix 1.

The licence application is accompanied by a method statement, which would include (but not be limited to) the following measures:

Capture and Release

- Timing of works: Works that may impact bats should avoid the maternity season (May to September) and hibernation season (November to February).
- Installation of temporary bat box to move any captured bats.
- Pre-works inspection by ecologist: Pre-inspection required prior to further re-pointing of the walls, removal of timbers or roof materials. If bats are found and accessible, they will be removed by hand or hand net.
- Use of temporary or permanent exclusion measures: one-way exclusion devices will be attached to the roost entrances and left in place for five consecutive days/nights during suitable weather conditions
- Supervised soft-strip of features where bats may be encountered under ecologist's supervision and during suitable weather conditions. Where applicable, materials will be lifted away and not rolled, scraped, or sprung and underneath of the materials will be inspected by the ecologist prior to removal.

Retention of Roosts

- Key roosting areas accessed from gaps in mortar on external walls will be retained.

Modification of Existing Roosts

- Existing roosts under roof tiles will be recreated in-situ by using slate bat access tiles.
- Breathable roofing membranes will not be installed into any roof where bats are being provided access. If the use of roof membranes is necessary, only Bitumen type 1F felt with a hessian matrix will be permitted.
- No lighting will be positioned which will directly illuminate roost features, or flight ways to/from the entrance points.

Note that this section is based on the worst-case scenario: it is quite possible that no bats will be found, and a licence, mitigation and compensation will not be required.

New Roost Creation

- Two integral bat boxes will be created within the walls of the part of the building which will replace the lean-to (see suitable examples in Appendix 4).

Lighting

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. In the public realm, while lighting can increase the perception of safety and security, measurable benefits can be subjective.

A lighting scheme for the Site should be produced based on advice given in *Bats and artificial lighting in the UK*[3].

The guidance sets out five steps to mitigating impacts on bats from lighting:

1. Determine whether bats could be present on site.
2. Determine the presence of – or potential for – roosts, commuting habitat and foraging habitat and evaluate their importance.
3. Avoid lighting on key habitats and features altogether.

[3] Bat Conservation Trust and Institute of Lighting Professionals (2018) *Guidance Note 08/18 Bats and artificial lighting in the UK Bats and the Built Environment series*

Favourable Conservation Status

It is my opinion that the outline mitigation/compensation given above would be sufficient for the Favourable Conservation Status (FCS) of bats (as per the reasonable worst-case scenario) to be maintained. The details of the mitigation proposals draw directly from our experience of successful EPSL applications elsewhere and our detailed knowledge of bat ecology and roosting requirements.

4.3.2 Birds

Birds may nest within the building. Appropriate and pragmatic measures will be taken to avoid committing the offence of killing or injuring a wild bird or damaging or destroying its nest. Any operations that may disturb nesting habitat, such as demolition, will be undertaken outside the main breeding season (which is generally taken to run from March to August inclusive[4]). An alternative approach would be to check for nesting birds immediately prior to habitat removal by a suitably experienced ecologist. However, if the latter approach is taken and nesting is encountered there is a risk of delay since an 'exclusion zone' may need to be set up around nests until young have fledged.

4.4 Ecological Opportunities

Under the National Planning Policy Framework and the 25-year environmental plan the government has set out policies and aims to deliver a net gain in biodiversity through improved green infrastructure and increased opportunities for wildlife. In accordance with these policies enhancement measures are recommended for inclusion in the proposed development.

Enhancement measures should go beyond those required for mitigation and will create new opportunities for biodiversity at the Site.

For enhancement of the proposed development it is recommended that there is the provision of roosting and nesting habitat for birds and bats in the form of wildlife boxes.

At least one bat box could be integrated into the façade and one into the soffit boxes of the building. These would be installed at a minimum height of 4 m and should be south or east facing.

At least two bird boxes should be integrated into the façade of the proposed building. These would be installed at a minimum height of 3 m and can be integrated into the facades on any compass direction.

Examples of wildlife boxes are presented in Appendix 4.

[4] This is a general guide only. Different species may nest at different times, and prevailing weather conditions may limit or expand the breeding season. Some species, such as pigeons and owls, can breed throughout the year in suitable conditions.

Appendix 1 Legislation, Policy and Best Practice

Legislation

There are many active pieces of legislation which are aimed at protecting wildlife and habitats within the UK. These are summarised in Table 2.

Table 2 - Summary of Primary Legislation in the UK

Legislation	Description
The Wildlife and Countryside Act (WCA) 1981	The WCA is the primary piece of legislation relating to nature conservation in Great Britain. The Act is supplemented by provisions in the CRoW Act 2000 and the NERC Act 2006. It provides for the notification and confirmation of Sites of Special Scientific Interest by Natural England. It also sets out, in schedules, important and invasive species which are legally protected or require active management. The WCA consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the conservation of wild birds (Birds Directive) in Great Britain (NB Council Directive 79/409/EEC has now been replaced by Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (codified version)).
The Conservation of Habitats and Species Regulations 2017	The Conservation of Habitats and Species Regulations 2017 consolidate the Conservation of Habitats and Species Regulations 2010 with subsequent amendments. The Regulations transpose Council Directive 92/43/EEC, on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive), into national law. They also transpose elements of the EU Wild Birds Directive in England and Wales. The Regulations came into force on 30th November 2017 and extend to England and Wales (including the adjacent territorial sea) and to a limited extent in Scotland (reserved matters) and Northern Ireland (excepted matters).
The Countryside and Rights of Way (CRoW) Act 2000	The CRoW applies to England and Wales only, received Royal Assent on 30 November 2000, with the provisions it contains being brought into force in incremental steps over subsequent years. Containing five Parts and 16 Schedules, the Act provides for public access on foot to certain types of land, amends the law relating to public rights of way, increases measures for the management and protection for Sites of Special Scientific Interest (SSSI) and strengthens wildlife enforcement legislation, and provides for better management of Areas of Outstanding Natural Beauty (AONB). The Act is compliant with the provisions of the European Convention on Human Rights, requiring consultation where the rights of the individual may be affected by these measures.
Natural Environment & Rural Communities (NERC) Act 2006	The NERC places a duty on authorities to have due regard for biodiversity and nature conservation during the course of their operations. The NERC Act requires the Secretary of State to publish a list of habitats and species which are of principal importance for the conservation of biodiversity in England. The list replaces the UK Biodiversity Action Pans (UKBAP) and has been drawn up in consultation with Natural England, as required by the Act. The S41 list is used to guide decision-makers such as public bodies, including local and regional authorities, in implementing their duty under section 40 of NERC Act, to have regard to the conservation of biodiversity in England, when carrying out their normal functions. Fifty-six habitats of principal importance (HPI) are included on the S41 list. These are all the habitats in England that were identified as requiring action in the UK Biodiversity Action Plan (UK BAP) and continue to be regarded as conservation priorities in the subsequent UK Post-2010 Biodiversity Framework. Of most relevance to the Site, they include ponds, open mosaic habitats on previously developed land and lowland heathland. There are 943 species of principal importance (SPI) included on the S41 list. These are the species found in England which were identified as requiring action under the UK BAP and which continue to be regarded as conservation priorities under the UK Post-2010 Biodiversity Framework.

Protected Species

European Protected Species Licencing

The animal and plant species listed on Schedule 2 and 4 of The Conservation of Habitats and Species Regulations 2010 (as amended) are referred to as European Protected Species (EPS).

If a project is likely to impact a EPS and breach the Conservation of Habitats and Species Regulations 2010, and where best practice guidance avoidance measures either cannot be followed or are not applicable, licences can be obtained to allow persons to carry out activities that would otherwise be prohibited, without committing an offence. Natural England has powers to grant such licences in England if it meets three 'derogation tests'.

The three tests are that:

4. The activity to be licensed must be for imperative reasons of overriding public interest[5] or for public health and safety ('public' can in some circumstances be interpreted as an individual or family).
5. There must be no satisfactory alternative.
6. Favourable conservation status of the species must be maintained.

There are two licencing routes available (depending on the location of the project). A Project Licence, where the developer would apply for a licence for their project and be the licensee, or a District Licence, where a third party (a Natural England or a Local Authority) is already a licensee and grants permission for the development to be undertaken under their licence.

Project Licence

The licence application consists of three documents, Section one - Application details (a basic application form), Section two - Method Statement (MS) (specifying the proposals, mitigation, compensation and schedule and demonstrating how the project meets Test 3) and Section three - Reasoned Statement (RS) (demonstrating how the project meets Tests 1 and 2). The Application form and Method Statement are usually completed by your ecologist (who is included in the application as a Named Ecologist) and the Reasoned Statement by the client or their planning consultant or environmental lawyer.

The developer is usually the applicant and licensee and is legally responsible to carrying out the method statement. In order to protect other people working on the project (and also to legally tie them to the MS) contractors and consultants that may affect the EPS, such as demolition or construction contractors and the ecologist should be appointed as 'accredited agents' to the licence by the licensee.

Natural England aim to determine an application within 30 working days, at which point they make a Further Information Request (FIR) if there are uncertainties or they do not agree with the MS or RS. At the end of the licensable activities the licensee is required to submit a licence return (although this is usually completed on their behalf by the Named Ecologist), where they declare the success (or failure) of the mitigation and are obliged to report on breaches to the MS.

District Licence

District Licencing is a relatively new approach to licencing projects which impact great crested newts in the UK (and may be rolled out to other protected species). There are currently three schemes, which are being managed slightly differently. In each scheme a third party holds the district level licence and a developer applies to join the licence:

[5] This is usually arguable where the project meets an identified planning need, i.e. social housing. 'Public' can be interpreted as an individual or family.

- Cheshire and Kent, licensed and managed by Natural England,
- Woking Borough, licensed and managed by the local authority,
- South Midlands, licensed by the local authorities and managed by NatureSpace.
    - Central Bedfordshire, Bedford Borough, Milton Keynes, Aylesbury Vale, South Oxfordshire, Vale of the White Horse, Oxford City.

The developer pays the licensee, (or their agent in the case of the South Midlands District License) a fee, which funds off-site compensatory habitat creation. There is a first stage payment, which covers costs of assessing the application, and a second stage payment which funds the compensation works.

District licences do not need to be supported by survey information on local ponds (although this can help inform the licence) and on-site mitigation or compensation is typically reduced compared to an individual project licence.

BCT Roost Assessment Criteria

Suitability	Description of Roosting Habitats	Commuting and Foraging Habitats
Negligible	Negligible habitat features on site likely to be used roosting bats.	Negligible habitat features on site likely to be used by commuting or foraging bats.
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely be suitable for maternity or hibernation). A tree of sufficient size and age to contain PRFs but none seen from the ground or features seen with only very limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by another habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.
Moderate	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions, and surrounding habitat, but unlikely to support a roost of high conservation status6.	Continuous habitat connected with the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland, or water.
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat. A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions' and surrounding habitat.	Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses, and grazed parkland. Site is close to and connected to known roosts.

[6] With respect to roost type only - the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed.

Policy

National Planning Policy Framework (NPPF) (2018)

Chapter 15 of the National Planning Policy Framework (NPPF) aims at conserving and enhancing the natural environment and states that planning policies and decision should contribute to and enhance the natural and local environment. In terms of biodiversity this should be achieved by:

- protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils
- recognising the intrinsic character and beauty of the countryside, and wider benefits from natural capital and ecosystem services
- minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures

The NPPF states that to protect and enhanced biodiversity, [local] plans should:

- identify and safeguard components of wildlife-rich habitats and wider ecological networks
- promote the conservation and enhancement of priority habitats and ecological networks and the protection and recovery of priority species

The NPPF states that when determining planning applications, local planning authorities should refuse applications which:

- cause significant harm to biodiversity which cannot be avoided, adequately mitigated or as a last resort, compensated for
- plan to develop on land within or outside of a Site of Special Scientific Interest (SSSI) and which is likely to have an adverse effect on it (either individually or in combination with other developments)
- result in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees), unless there are wholly exceptional reasons and where a suitable compensation strategy exists

The local planning authority should support developments whose primary objective is to conserve or enhance biodiversity, especially where this can secure measurable net gains in biodiversity.

HM Government – 25 Year Environment Plan

The 25-year plan to improve the environment sets out what the government intends to do to increase biodiversity, reduce climate change and secure ecosystem services. It aims to deliver cleaner air and water, protect threatened species, and provide richer wildlife habitats.

Appendix 2 Photos

1 - East elevation

2 - East elevation - wall slits

3 - East elevation holes in stonework

4 - North elevation

5 - North elevation - lean to

6 - West elevation

7 - Internal - lean to

8 - Ground floor - Butterfly wings

9 - Ground floor - Gap at door lintel

10 - Ground floor - Gaps where timber enters stone wall

11 - First floor - gap at cement block wall

12 - First floor - gaps in felt

13 - First floor - staining and scratch marks

14 - First floor moth and butterfly wings

15 - First floor

Appendix 3 Results / Raw Data

Appendix 4 Enhancement, Compensation, Mitigation

Schwegler Bat Tube

The 1FR Bat Tube is designed to be installed on the external walls of buildings, either flush or beneath a rendered surface. It can also be painted to match your building with an air permeable paint if desired.

Comprised of Woodcrete with integrated wooden panel.

Dimensions: 200mm wide x 470mm high x 120 mm deep

Entrance Dimensions: 150 x 90 x 20 mm

Weight: Approximately 9.8 kg

Photo courtesy of Schweglar

Habibat Integrated Bat Box

These boxes can be built into the walls of new buildings to create purpose-built crevices for bats.

Facing products include:

a. Brick
b. Stone
c. Granite
d. Masonry
e. Slate
f. Terracotta
g. Tile
h. Timber

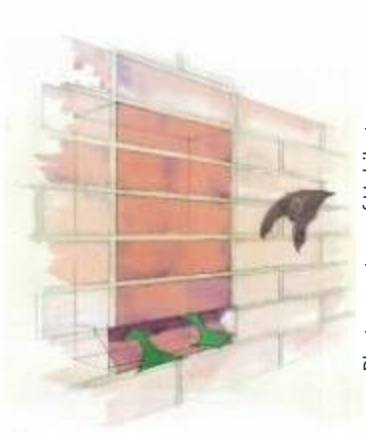

Photo courtesy of Habibat

Dimensions: 215 mm wide x 440 mm high x 102 mm deep

Weight: Approximately 7 kg

Habibat Bat Access Slate

The Habibat Bat Access Slate has been designed to fit seamlessly to slate roofs. The Bat Access Slate consists of a standard sized slate, with a capped vent which allows access to roof felt or roof space.

Habibat can supply a standard slate, but also provide a service whereby an exact match can be achieved.

Dimensions: 375 mm wide x 418 mm high x 80 mm deep

Entrance Hole Dimensions: 100 m wide x 200 mm high

Weight: Approximately 1.3 kg

Photo courtesy of Habibat

Schwegler Brick Nest Box Type 24 – Small Birds

A brick bird nest box comprised of a wood and concrete blend. The dimensions of the box allow for 1 cm layer of mortar enabling the boxes to be inserted into any new wall without needing to cut adjoining bricks. The box can be flush with the wall and rendered so that only the entrance hole is visible.

This model features an upright box with removeable entrance hole at the top. With an entrance hole diameter of 32mm, this box is suitable for many small birds including great, blue, marsh, coal and crested tits, redstarts, nuthatch, tree, and house sparrows.

Dimensions: 180 mm wide x 230 mm high x 180 mm deep

Weight: Approximately 7.3 kg

Photo courtesy of Schwegler

Schwegler Brick Nest Box 26 – Open fronted nest box

A brick bird nest box comprised of a wood and concrete blend. The dimensions of the box allow for 1 cm layer of mortar enabling the boxes to be inserted into any new wall without needing to cut adjoining bricks. The box can be flush with the wall and rendered so that only the entrance hole is visible.

Features an upright box with large open front. With a large open hole (110 x 80mm), this box will attract species that use open-fronted nest boxes, such as redstart, pied wagtail, spotted flycatchers and sometimes robin.

Dimensions: 980 mm wide x 980 mm high x 180 mm deep.
Weight: Approximately 5.4 kg

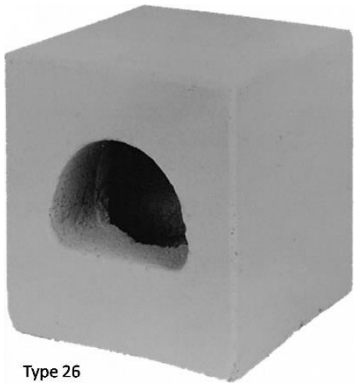

Photo courtesy of Schwegler

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A trading name of Jo Pedder, a freelance ecologist based in Belper, Derbyshire.