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Bat Scoping Report

117 Elmer Road, Middleton on Sea

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Report Summary

1. The Ecology Co-op was commissioned to undertake a bat scoping assessment of 117 Elmer Road, Middleton on Sea, Bognor Regis PO22 6LJ (hereafter referred to as 'the site') by Bryan Butcher. This report presents the findings of the survey and identifies any potential ecological constraints to a planning application for the proposed alterations of buildings on the site.
2. An assessment of the site was carried out by Nick Gray on the 25th September 2019 to evaluate the site for its potential to support roosting bats.
3. The site comprises a detached single-storey bungalow and three small wooden sheds, set within gardens and located within an urban area, which is approximately 130m from the sea.
4. The buildings on the site were inspected to assess their potential to support roosting bats. No evidence of bats was found within the site during the assessment. The buildings were all found to have negligible potential to support roosting bats.
5. In accordance with current guidelines, no further surveys for bats will be required before the proposed works can proceed.
6. During construction, should any European hedgehogs found on site, then an ecologist must be contacted and these animals should be safely relocated away from the area. Care should also be taken to cover any temporary unattended ground holes.
7. Demolition and/or construction work on the site should take place outside of the nesting bird season (1st March – 31st August). If this is not possible, a nesting bird check by a suitably qualified ecologist should be carried out immediately before work commences.
8. An opportunity exists on the site to use planting schemes to encourage insect diversity and to include integral bat roosting opportunities into the building fabric, which would be considered favourably under planning policy.

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This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.



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1 INTRODUCTION

1.1 Purpose of the Report

The Ecology Co-op was commissioned to undertake a bat scoping assessment of 117 Elmer Road, Middleton on Sea, Bognor Regis PO22 6LJ (hereafter referred to as 'the site') by Bryan Butcher. This report presents the findings of a walkover survey and building inspection to assess the properties for their potential occupation by bats and other protected species. The survey was undertaken by Nick Gray BSc (Hons), Grad CIEEM (Natural England bat survey class licence WML CL18 number 2017-32546-CLS-CLS) on the 25th September 2019. It provides details on the potential for any protected species and/or habitats to be present on the site and provides an assessment of the potential ecological constraints to the proposed redevelopment of the site. Additional recommendations for further surveys that are likely to be required to inform a planning application, are provided where necessary. Where appropriate, measures to avoid, mitigate and/or compensate for negative ecological impacts are also outlined.

1.2 Background

The site is located at 117 Elmer Road, Middleton on Sea, Bognor Regis PO22 6LJ. The central grid reference for the site is SU 98284 00133 (see location map, Figure 1).



Figure 1. Site location. *Images produced courtesy of Apple maps (2019).*

The site comprises a single-storey detached bungalow, set within a moderately sized garden, located in an urban setting, which is approximately 130 m from the sea.



The survey area is understood to be the curtilage of the property, which includes the garden within the site.

The proposed development seeks to demolish the existing building and construct a replacement dwelling within the site (see Site plan, Figure 2).



Figure 2. Site plan, with site boundary indicated by a red line. *Images produced courtesy of Apple maps (2019).*

1.3 Policy and Legislation

Details of planning policy and legal protection applying to all UK bat species are outlined in Appendix 1 of this report.

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



2 METHODOLOGY

The methodologies used for this survey are in accordance with the bat survey guidelines produced by the Bat Conservation Trust¹.

2.1 Desk Study

A search of on-line mapping resources was undertaken to identify the location of any features of potential ecological interest and connectivity to woodland, scrub, and hedgerow networks (relevant to bats, dormice, great crested newts, reptiles etc) in the wider landscape around the site.

The MAGIC website resource (www.magic.gov.uk) was used to identify the location of designated sites for nature conservation and European Protected Species Licences (EPSLs) granted within a 2 km radius of the survey site. The Magic website can also be used to search for habitats of principal importance within close proximity to the site.

Habitats of principal importance are listed in Section 41 of the Natural Environment and Rural Communities (NERC) Act, 2006², which places a duty on Local Planning Authorities to have due regard to biodiversity.

Habitats of principal importance and ancient woodland are also afforded protection through the National Planning Policy Framework (NPPF) 2019³, Paragraph 174b, which states that council policies should “*promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity.*” The Office of the Deputy Prime Minister (ODPM) Circular 06/05⁴ also states that the potential effects of a development on nearby habitats or species listed as priorities in the UK Biodiversity Action Plan (BAP) (now Habitats and Species of Principal Importance) can be a material consideration in planning decisions.

2.2 Field Survey

Bats can use a wide range of features including loft spaces, cavity walls, loose tiles, mortice joints and

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

² HM Government (2006). Natural Environment and Rural Communities Act 2006. Available online at: <https://www.legislation.gov.uk/ukpga/2006/16/section/41>.

³ HM Government (2019). National Planning Policy Framework. Department for Communities and Local Government. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf.

⁴ HM Government (2005) ODPM Circular 06/05 Government Circular: *Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System*. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7692/147570.pdf.



cracks/gaps in a variety of built structures. They can also be found in natural structures, such as trees with holes, splits, cracks, cavities, ivy, and loose bark.

A detailed buildings inspection was carried out, looking for potential access points and 'Potential Roosting Features' (PRFs) that bats could use and any evidence indicating the presence of bats within the buildings, such as rub marks, staining or faecal pellets (droppings). This included a ground-based external inspection around the buildings and an internal inspection of any enclosed loft spaces or roof voids, where safe access was possible.

The external inspection was undertaken during daylight hours from ground-level using binoculars, an endoscope and a high-powered torch. Evidence was sought for the presence of potential access and egress routes for bats into and out of PRFs, and for evidence of their use by bats, such as scattered droppings, urine staining or scratching around openings.

The internal inspection was undertaken during daylight hours and was aided by a high-powered torch, a bat detector/recorder, a telescopic ladder and an endoscope. All accessible areas were searched for evidence of bats. Bats regularly utilise specific areas within buildings, such as dividing walls/chimney breasts, underneath ridge beams, beneath hip joints and junctions and timber/wall joints etc. The type of evidence sought included bat droppings, staining above/around gaps, feeding remains and other signs of use by bats including the presence of bats themselves. Internal signs of roost access and egress points were also identified, for example light shining into internal building spaces from the exterior of the building or damage to the internal lining of the roof. Roosting bats and signs of their presence are not always visible, so any potential bat roosting locations were also noted during the survey.

The potential for roosting bats for each feature, or group of features was assessed as either negligible, low, moderate, or high, in accordance with best practice. Any evidence confirming the presence of bats that was found was clearly recorded, including photos and samples taken (e.g. droppings) where appropriate.

The habitats surrounding the site and wider landscape were broadly assessed for their potential to support foraging and commuting bats.

2.3 Other protected and/or notable species

Habitats and features at the site were also evaluated for their potential to support other legally protected species. In addition, observations of any important plant communities, bird assemblages or other potentially valuable ecological features were recorded. Special attention was paid to notable species such as red-listed Birds of Conservation Concern (Eaton et al. 2015)⁵ and those species afforded special protection under the Wildlife and Countryside Act 1981 (as amended)⁶.

⁵ Eaton et al. 2015. *Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man*. British Birds 108. December 2015 pp. 708 – 746. Available online at: <https://britishbirds.co.uk/wp-content/uploads/2014/07/BoCC4.pdf>.

⁶ HM Government (1981). Wildlife and Countryside Act 1981 (as amended). Available online at: <http://www.legislation.gov.uk/ukpga/1981/69/contents>.



Whilst this survey focussed on bats and no specific searches were made with respect to other protected species, any evidence of other protected species that was encountered during the site visit was also recorded.

2.4 Survey Limitations

An initial site assessment such as this is only able to act like a 'snapshot' to record any flora or fauna that is present at the time of the survey. It is therefore possible that some species may not have been present during the survey but may be evident at other times of the year. For this reason, habitats are assessed for their potential to support some species, even where no direct evidence (such as droppings) has been found.

The desk study and data search should not be taken as a definitive list of the protected species and species of conservation concern that occur within the search area.

The bat scoping survey was undertaken at the optimal time of the year. There were no limitations to the survey in terms of the following:

- Available specialist survey equipment.
- Weather conditions (dry and sunny).
- Personal competence (qualifications, training, skills and experience).
- Time spent surveying.

There were no access limitations encountered during the survey.

3 RESULTS/OBSERVATIONS

3.1 Desk Study

The following statutory designated sites were found to be present within 1 km of the site. The site does fall within the impact risk zone for Bognor Reef Site of Special Scientific Interest (SSSI) (see Table 1 below).

Table 1. Designated sites within 2 km of the site.

Site Name	Habitat/Species Designation	Distance from Site
Solent and Dorset Coast Special Protection Areas (SPA)	Designated for the preservation and protection of seabird breeding colonies beyond the low water mark, including inshore feeding areas used by concentrations of birds (e.g. sea duck, grebes and divers) in the non-breeding season and offshore areas used by marine birds, probably for feeding but also for other purposes.	180 m south of the site.
Impact Risk Zones for Bognor Reef SSSI	To assess planning applications for likely impacts on SSSIs/SACs/SPAs & Ramsar	5.1 km south-west of the site.



	sites (England),	
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The following priority habitats, which are listed as habitats of principal importance, were identified within 1 km of the site:

- Coastal vegetated shingle
- Intertidal substrate foreshore
- Maritime cliff and slope
- Deciduous woodland

Providing the recommendations made within this report are followed, the proposed activities within the site are considered unlikely to have a negative impact on these habitats.

No EPSLs granted for mitigation projects concerning bats within 2 km of the site were shown on the Magic Maps website (www.magic.gov.uk).

3.2 Site context and surrounding habitats

The site comprises one detached single-storey bungalow, with front and rear gardens. The site is set within an urban residential area, which comprises similar housing and small to moderate sized gardens. Elmer Road passes along the southern boundary of the site. The wider area is dominated by urban residential housing. The site is located approximately 130 m north of the coastline. Poor habitat connectivity exists between the site and the wider landscape of agricultural fields and hedgerows, which are located 1 km to the north.

The gardens surrounding the bungalow mostly comprise very short amenity grassland with narrow borders of mature shrubs (Photo 1). There are three small wooden sheds located within the rear garden, to the north of the bungalow (Photo 2).

3.3 Buildings inspection for bats

An external and internal inspection of the buildings was undertaken to look for evidence of bats.

The detached bungalow was found to be constructed with rendered walls and a gabled apex roof. The gables at either end of the building comprised a single layer of unlined tongue-and-grooved wooden boarding. The roof was tiled with thin, close-fitting tiles, of a type likely to contain asbestos (Photo 3). The windows were all of uPVC casement design, with no gaps around the frames. Close fitting soffits were present behind the barge boards on the southern and northern gable elevations, these were also constructed from close fitting uPVC. The eaves, on the eastern and western sides of the building were exposed, behind uPVC fascias. A single brick chimney stack was visible in the centre of the roof. An entry porch, with a shallow sloping roof and a bitumen 'mineral' felt covering extended across the width of the building on its southern elevation.

The only potential access points for bats, which were found during the external inspection of the bungalow building, were associated with gaps located between the rafters, above the wall plate under



the eaves on both sides of the building (Photo 4).

An internal inspection of the bungalow building revealed a single attic void, accessed via a hatch in the hallway ceiling. This void was found to be large, extending over the entire area of the bungalow roof. The attic had two large windows, one in each of the gable ends, providing large amounts of natural light (Photo 5). Additional electric lighting was also present. Fifty percent of the attic floor was boarded and carpeted. Much of this area was used for the storage of numerous household items. A brick chimney stack was present in the centre of the attic, with a single (covered) water tank, located on its eastern side (Photo 6). A gas boiler was located beside the northern gable. The floor of the attic area was insulated with glass-fibre insulation (Photo 7). The roof was constructed with a timber frame and lined with bitumen felt (Photo 8). The attic was largely free of cobwebs and dust, suggesting regular access and use. Due to the large southern window and the presence of the gas boiler (Photo 9), the attic was found to be very warm with apparent low humidity.

During the internal inspection of the building it was noted that daylight was visible from under the eaves on the eastern and western sides of the attic, correlating with the gaps noted in these areas during the external inspection and presenting potential access points for bats.

No evidence of bats was found externally or internally during the inspection of the bungalow. Despite the identification of potential access points for bats into the attic void, the attic was found to be very well lit and not well suited to roosting bats.

The three small wooden sheds within the garden at this site were all inspected and were also considered unsuitable for roosting bats (Photo 2).

When taking account of the sparse availability of foraging and commuting habitat surrounding the site and the poor habitat connectivity (which affects the potential for bats to establish and favour roosts at this site), along with the poor suitability for roosting bats within the buildings and absence of any signs of past use as a roost, the bat roost potential at this site is hereby rated as 'negligible' in accordance with the bat survey guidelines produced by the Bat Conservation Trust¹.

3.4 Other protected and/or notable species

The urban setting and a lack of mature woodland, hedgerows and tree lines within and surrounding the site, indicated that there was negligible potential within the site to support hazel dormice *Muscardinus avellanarius*. There were no potential features in the building that might potentially accommodate house sparrow *Passer domesticus* and starling *Sturnus vulgaris*, which commonly nest in buildings. No evidence of active bird nests was found within the building.

There was no sign of badger *Meles meles* activity within the site.

The very short amenity grassland and the presence of a resident dog suggest that the site has very low potential to support European hedgehog *Erinaceus europaeus*. The European hedgehog is a species of principal importance, as listed under Section 41 of the NERC Act 2006².

There is negligible potential for the site to support species of reptiles and amphibians, with a lack of



suitable ground cover or potential hibernacula present. Further, there are barriers to movement present, presented by the roadway and walled gardens within the urban setting.

No protected or designated invertebrates or plants were recorded on the site during the survey. Very little habitat was found to exist within the site to support these species.

No non-native invasive species listed under Schedule 9, Section 2 of the Wildlife and Countryside Act, 1981 (as amended)⁶ were observed on site during the survey.

3.5 Photographs



Photograph 1. Showing amenity grassland and mature shrubs in the rear garden to the north of the bungalow.



Photograph 2. Showing three small wooden sheds within the rear garden to the north of the bungalow.



Photograph 3. Showing close fitting roof tiles on the bungalow.



Photograph 4. Gaps between the rafters above the wall plate, under the eaves of the bungalow.



Photograph 5. Showing one of two large windows into the attic of the bungalow.



Photograph 6. Showing a water tank beside the chimney stack within the attic of the bungalow.



Photograph 7. Showing glass-fibre insulation and hatchway within the attic of the bungalow.



Photograph 8. Showing bitumen felt lining and timber gable cladding, within the attic of the bungalow.



Photograph 9. Showing the gas boiler on the northern gable, within the attic of the bungalow.



4 ECOLOGICAL CONSTRAINTS AND OPPORTUNITIES

4.1 Bats

In accordance with the Bat Conservation Trust guidelines, **the overall potential for the Buildings within the site to support bats is rated as 'Negligible' and therefore, no further surveys for bats will be required to determine the importance of these building to bats.**

It's important that the potential for disturbance from artificial lighting is properly considered. The proposed development should include an 'ecologically sensitive lighting scheme' in accordance with guidance produced by the Bat Conservation Trust and Institute of Lighting Professionals⁷ (summarised in Appendix 2), to avoid the increased use of external lighting.

4.2 Other protected and/or notable species

The site comprises the building, mature shrubs and short mown amenity grassland. With the exception of birds, the risk of impact from this proposed development on reptiles, amphibians, hazel dormice and badgers is considered negligible and no other surveys are considered necessary.

It is recommended that habitats within the site are carefully searched to ensure that any European hedgehogs, if present, can be safely relocated away from the construction areas or move away into surrounding habitats of their own accord. Should any hedgehogs be identified during the construction phase of the development, then an ecologist should be contacted for advice. Care should be taken to cover any temporary ground holes when left unattended, to ensure that hedgehogs and other ground dwelling animals do not become accidentally trapped.

Since the buildings and shrubs have potential to support nesting birds, such as house sparrow and blackbird *Turdus merula*, demolition and/or construction work on the site should be timed to take place outside of the nesting bird season (1st March – 31st August). If this is not possible, the building and any shrubs to be disturbed should be subject to nesting bird checks by a suitably qualified ecologist, immediately before work is begun, as is appropriate to the proposed works. If an active nest is identified, a minimum exclusion zone for all works within 5 meters radius of the nest must be established to protect it from disturbance until the young have fledged. Further consideration should be given to minimise excessive noise within the site and for restricting the use of artificial lighting during construction (see Appendix 2).

4.3 Biodiversity Enhancement Opportunities

The proposed development represents an opportunity for habitat enhancement to benefit insects, birds, and bats. Any landscaping or planting scheme could include native shrub species and flowering species known to encourage insect diversity. Such enhancement measures are in line with the recommendations

⁷ Bat Conservation Trust and Institute of Lighting Professionals 2018. Guidance Note 08/18 - *Bats and artificial lighting in the UK*. Available online at: <https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/> (accessed September 2018).



of the NPPF (2019)³ and are also imbedded within Policy ENV SP1 of the Adoption Arun Local Plan 2011-2031 (July 2018), Arun District Council (2018)⁸, and would therefore be considered favourably when determining the planning application.

In line with Section 4.1 and further information provided in Appendix 3 of this report, the developer is also encouraged to consider including integral bat roosting opportunities into the fabric of the new building, such as bat tiles and internal voids/access points for bats.

If any protected species are found during the proposed activities, all work should be stopped and an ecologist must be contacted immediately for advice.

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

⁸ Arun District Council (2018). Adoption Arun Local Plan 2011-2031 (July 2018). Available online at: <https://www.arun.gov.uk/download.cfm?doc=docm93jlm4n12844.pdf&ver=12984> (accessed October 2019).



APPENDIX 1 – Wildlife Legislation and Planning Policy

The following text is intended for general guidance only and does not constitute comprehensive professional legal advice. It provides a summary of the current legal protection afforded to bats.

All bat species in the UK are included in Schedule II of the Conservation of Habitats and Species Regulations 2017⁹, which transpose Annex II of the Council Directive 92/43/EEC 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora ("The EC Habitats Directive")¹⁰. As such all bat species in the UK are defined as 'European Protected Species'.

Four species of bat (Bechstein's bat *Myotis bechsteinii*, Barbastelle bat *Barbastella barbastellus*, greater and lesser horseshoe bats, *Rhinolophus ferrumequinum* and *R. hipposideros*) are also listed on Annex IV of the EC Habitats Directive. This requires the designation of a series of sites which contain important populations of these species as Special Areas of Conservation (SACs).

All species of British bat are also fully protected under the Wildlife and Countryside Act 1981 (as amended)⁶, through inclusion in Schedule 5.

Seven species of bat (Barbastelle, Bechstein's, Noctule *Nyctalus noctula*, Soprano pipistrelle *Pipistrellus pygmaeus*, Brown long-eared *Plecotus auritus*, Greater horseshoe and Lesser horseshoe bat) are Priority species under the UK Biodiversity Action Plan and have also been adopted as Species of Principal Importance in England under Section 41 of the NERC Act (2006). Section 40 of this act places a statutory duty on all public bodies, including planning authorities to take or promote the taking by others, steps to further the conservation of habitats and species of principal importance for the conservation of biodiversity in England (commonly referred to as the 'Biodiversity Duty'). This duty extends to all public bodies the biodiversity duty of Section 74 of the Countryside and Rights of Way (CROW) Act 2000¹¹, which placed a duty only on Government and Ministers.

Under the above legislation it is an offence to:

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

⁹ Conservation of Habitats and Species Regulations 2017. Available online at: <https://www.legislation.gov.uk/uksl/2017/1012/contents/made>.

¹⁰ Council Directive 92/43/EEC 1992 on the Conservation of Natural Habitats and of Wild Fauna and Flora. Available online at: http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm.

¹¹ Countryside and Rights of Way (CROW) Act 2000. Available online at: <https://www.legislation.gov.uk/ukpga/2000/37/contents>.



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

An EPSL in relation to bats is required from Natural England for any work that would result in an otherwise unlawful activity (e.g. damage to a bat roost). A license can only be issued to permit otherwise prohibited acts if Natural England are satisfied that all the following three tests are met:

- The proposal is for 'preserving public health or public safety, or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment';
- There is no satisfactory alternative; and
- The action authorised by the license will not be detrimental to the maintenance of bat populations at a favourable conservation status in their natural range.

A bat roost is defined by the Bat Conservation Trust's Bat Surveys—Good Practice Guidelines 3rd Edition as "the resting place of a bat". In general, the word roost is interpreted as "any structure or place, which any wild bat uses for shelter or protection."

Bats tend to re-use the same roosts; therefore, legal opinion is guided by recent case law precedents, that a roost is protected, whether or not the bats are present at the time. This includes summer roosts used for breeding; or winter roosts, used for hibernating.

The NPPF (2019)³ sets out government policy on biodiversity in planning decisions. Under the NPPF (2019)³, the presence of a protected species is a material consideration when a planning authority is considering a development proposal. The NPPF (2019)³ is implemented through local planning policy under the Adoption Arun Local Plan 2011-2031 (July 2018), Arun District Council (2018)⁸.



APPENDIX 2 – Reducing Impacts of Artificial Light

Bright external lighting can have a detrimental impact upon foraging and commuting bat flight paths, but more importantly can also cause bats to remain in their roosts for longer. Artificial lighting can also cause significant impacts on other nocturnal species, most notably moths and other nocturnal insects. It can also result in disruption of the circadian rhythms of birds, reducing their fitness. Guidelines issued by the Bat Conservation Trust and Institute of Lighting Professionals⁷ should be considered while designing the lighting scheme. This includes the following measures:

Do not:

- provide excessive lighting. Use only the minimum amount of light needed for the task.
- directly illuminate bat roosts or important areas for nesting birds

Avoid:

- installing lighting in ecologically sensitive areas such as: near ponds, lakes, rivers, areas of high conservation value; sites supporting particularly light-sensitive species of conservation significance (e.g. glow worms, rare moths, slow-flying bats) and habitat used by protected species.
- using reflective surfaces under lights.

Do:

- consider employing a competent lighting designer who will apply the principals of providing the right light, in the right place, at the right time and controlled by the right system.
- minimise the spread of light to at, or near horizontal and ensure that only the task area is lit. Flat cut-off lanterns or accessories should be used to shield or direct light to where it is required.
- consider the height of lighting columns. It should be noted that a lower mounting height is not always better. A lower mounting height can create more light-spill or require more columns. Column height should be carefully considered to balance task and mitigation measures.
- consider no lighting solutions where possible such as white lining, good signage, and LED cat's eyes. For example, light only high-risk stretches of roads, such as crossings and junctions, allowing headlights to provide any necessary illumination at other times.
- use temporary close-boarded fencing until vegetation matures, to shield sensitive areas from lighting.
- limit the times that lights are on to provide some dark periods. The task being lit often varies, for example roads are less used after 23.00hrs and car parks are empty. A lighting designer can vary the lighting levels as the use of the area changes reducing lighting levels or perhaps even switching installations off after certain times. This use of adaptive lighting can tailor the installation to suit human health and safety as well as wildlife needs.



Further reading:

Buglife (2011) *A review of the impact of artificial light on invertebrates*. Available online at: https://www.buglife.org.uk/sites/default/files/A%20Review%20of%20the%20Impact%20of%20Artificial%20Light%20on%20Invertebrates%20docx_0.pdf

Royal Commission on Environmental Pollution (2009) *Artificial light in the environment*. HMSO, London. Available online at: <https://www.gov.uk/government/publications/artificial-light-in-the-environment>.

Rich, C., Longcore, T., Eds. (2005) *Ecological Consequences of Artificial Night Lighting*. Island Press. ISBN 9781559631297.

CPRE (2014) *Shedding Light: A survey of local authority approaches to lighting in England*. Available online at: <http://www.cpre.org.uk/resources/countryside/dark-skies/item/3608-shedding-light>.

Planning Practice Guidance guidance (2014) *When is light pollution relevant to planning?* Available online at: <https://www.gov.uk/guidance/light-pollution>.

Institution of Lighting Professionals (2011) *Guidance Notes for the Reduction of Obtrusive Light GN01:2011*. Available online at: <https://www.theilp.org.uk/resources/free-resources/>.



APPENDIX 3 – Bespoke Bat Roosting Features for New Buildings

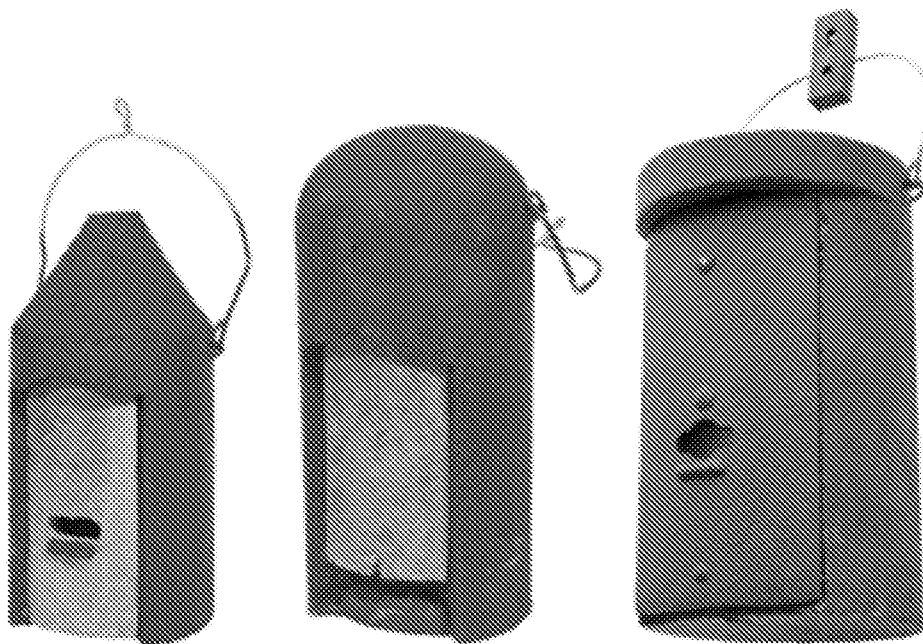


Figure 1. Left to right, the 2F, 2FN and the 1FS bat boxes produced by Schwegler. These and other brands are available at many on-line wildlife stores. These are constructed of ‘woodcrete’ (a mixture of cement and woodchip) and are designed to be durable and replicate the stable thermal properties of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

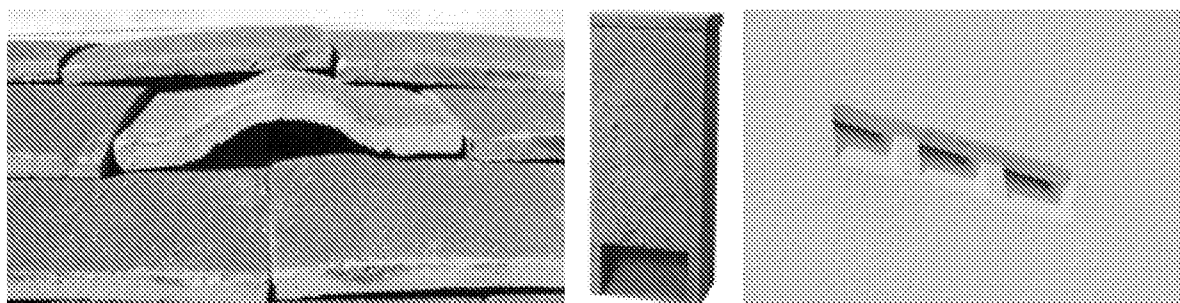


Figure 2. Examples of integral bespoke bat roosting features that may be incorporated into buildings during construction/renovation. From left to right: 1. An example of bat access tile into loft space. 2. The 2FR bat tube; 3. An example of 2FR bat tubes installed into a house wall in a series of three. Other brands and designs are available (see <https://www.wildlifeservices.co.uk/batboxes.html>).