

Kenavon Drive, Reading Bat & Bird Box Specification April 2020 Job No. 9704	
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Date: 09 April 2020	Written by: Andrew Lewis BSc MSc ACIEEM

1 INTRODUCTION

Background

- 1.1 This is a memorandum report by the Ecology Consultancy for Berkeley Homes Ltd which documents the specification for a selection of boxes targeting a variety of bird species including house sparrow, sand martin and swift, two crevice dwelling bat species and a variety of invertebrates for the development at Kenavon Drive, Reading, RG1 3DH.

1.2 Berkeley Homes Ltd have been granted planning permission to demolish several existing buildings on site, and construct new residential units, including commercial space and works to the riverside public realm.

1.3 The planning permission is subject to a number of conditions. Condition 42 relates to the siting and quantity of bird, bat and invertebrate boxes, and states that:

“Condition 42: No dwelling/building hereby permitted (within the relevant phase of development – a) phase 1, b) phase 2, c) phase 3, as per Site Phasing Plan F367AA5990C-SW-00-A-5030 Rev P 02, as received 09/05/2019 shall be occupied until details of biodiversity enhancements (including in total across the development a minimum of 6 wall boxes for bats and 70 bird nesting sites as shown on Fig 9.3 of the ES, and the bug hotels detailed in 9.6.24 of the ES) has been submitted to and been approved in writing by the Local Planning Authority. No building or use hereby permitted shall be occupied or the use commenced (within the relevant phase of development) until the approved biodiversity enhancements (within the relevant phase of development) have been completed. The biodiversity enhancements shall be maintained as such thereafter.”

1.4 The following document provides details on the number, type/model, location, installation/attachment method and maintenance of bird nesting and bat roosting boxes. A plan showing the location of boxes is included as Appendix 1.

Site Context and Status

1.5 The development site is centred on Ordnance Survey National Grid reference SU 72279 73602 and is located approximately 600m southeast of Reading train station.

1.6 The site comprises 2.8 ha of flat land with predominantly hardstanding and two large warehouse-type outlet retail units. The periphery of the site features landscaping of planted mid-size trees and shrubs, while the River Kennet adjacent to the southern boundary of the site provides connectivity to areas of greenspace further afield. At its closest point, the Reading to London railway corridor, which includes a range of habitats such as scrub, linear woodland, grassland and ruderal vegetation, is approximately 60m to the north of the site. Besides this, the immediate surroundings of the site mainly comprise industrial landscape with limited areas of greenspace.

Birds

- 2.1 Bird Species of Principal Importance to the Conservation of Biodiversity in England (SPI) identified within the Reading Biodiversity Action Plan (BAP), for which the site could provide suitable habitat include swift, sand martin and house sparrow. Grey Wagtail is also a target species as well as a variety of others (Temple, 2018). All nesting birds are protected by the Wildlife and Countryside Act 1981 (as amended) (see Appendix 3).

Bats

- 2.2 Boxes to attract common pipistrelle and soprano pipistrelles bats have been specifically chosen as these species are known to utilise domestic buildings and are also of conservation concern (JNCC, 2016) . They have also been recorded on site during the Bat Activity survey conducted in 2018 (Temple, 2018). Estimates from the National Bat Colony Survey suggest that pipistrelle species have undergone a population decline of approximately 70% between 1978 and 1993 (SBP, 2011). All bat species are Reading BAP Priority Species. Soprano pipistrelle is an SPI.

- 2.3 Bats are European Protected Species protected by the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017 (as amended) (see Appendix 3).

Invertebrates

- 2.4 Insect hotels have been chosen to attract colonisation by a variety of invertebrates including bees, ladybirds and lacewings (Temple, 2018).

Approach

- 3.1 It is recommended that both hanging boxes and those integrated into the building structure are incorporated. The integrated system requires less maintenance, is more durable with a life span equal to the building's fabric and with a less visible alteration to the building.
- 3.2 Each bird and bat species require different box types with different designs, sized opening and positioning. The table in Appendix 2 shows the requirements of each species and the optimum location and positioning for each box.

4 GUIDELINES

- 4.1 The following ecological and design requirements were considered in choosing the type, location, orientation and number of bird and bat boxes:
- Boxes will have no impact on the building's performance;
 - Locating swift boxes on aspects out of direct sunlight, built in under eaves/soffits (if present) for increased protection from the elements and away from predators (cats, magpies, squirrels, rats) and vandalism;
 - Spacing of bird boxes on trees to increase uptake by non-communal species (most birds);
 - Grouping house sparrow boxes and grouping of swift boxes and sand martin tubes to maximise uptake by these colonial nesting species;
 - Avoiding (where possible) locating boxes on front elevations of buildings, above windows/balconies or where boxes are easily overlooked/disturbed or in close proximity to mechanical outlet extractors;
 - Avoiding locations likely to be subject to increased light levels;
 - Presence of an uninterrupted drop below swift boxes of a minimum of 5m; and
 - Locating bird boxes in close proximity to green space and potential foraging habitat.

5 BOX TYPES

Birds

Swift

- 5.1 Swifts are a bird species that are commonly associated with urban areas. For many years they have depended on the voids in roof structures for nesting, but their populations are now in serious decline. This is partly because of problems they face in finding nest places in modern designed buildings e.g. roof tiles are replaced with modern equivalents or flat roofs, and wooden soffits replaced with uPVC. Swifts are an Amber List Bird of Conservation Concern (BoCC4)¹ (Eaton *et al.*, 2015) species.

¹ Birds of Conservation Concern status is prioritised into high concern (Red), medium concern (Amber) and low concern (Green) (Eaton *et al.*, 2015). Red-list species are those that are globally threatened according to the IUCN criteria; those whose population or range has declined rapidly in recent years; and those that have declined historically and not shown a substantial recent recovery. Amber-list species are those with an unfavourable conservation status in Europe; those whose population or range has declined moderately in recent years; those whose population has declined historically but made a substantial recent recovery; rare breeders; and those with internationally important or localised populations. Green-list species are those that fulfil none of the criteria.

5.2 Fortunately, swift nest boxes and nest bricks that can be built into walls, eaves and soffits are now widely available and in several different forms. Schwegler Type 16S Swift Refuge boxes are recommended. These are self-contained and self-maintaining, and can be incorporated into the building design with no impact on the building's performance (see examples below and the Swift conservation advise leaflet (Swift Conservation, 2019). Integrated features are preferable as these have potentially more stable thermal qualities than boxes attached to the exterior of the new build.

5.3 Swift boxes need to be installed at least 5 metres (m) above ground level and have unobstructed airspace in front of the box entrance to allow for uninterrupted ingress/egress.



House sparrow

5.4 House sparrows have suffered catastrophic decline in their numbers over recent years, and the loss of nest sites through redevelopment and refurbishment may be partly responsible. Nest boxes specifically designed for this species are available, which provide for the colonial nesting of two or more pairs (see examples below). House sparrow is a Species of Principle Importance and Red List BoCC4 (Eaton et al., 2015).



5.5 We recommend the terrace style nest boxes, with multiple nesting boxes per unit, ideal for the social nature of the house sparrow. The EcoSurv Sparrow nest box or Terraced Sparrow Box is recommended, in addition to the 1B Schwegler House Sparrow Nest Box suitable for trees. These boxes should have a 32mm entrance

hole attractive to house sparrows in addition to other species such as blue tits and great tits.

Sand Martin

- 5.6 Sand martins historically experienced several crashes in their numbers, but in recent years they have experienced a resurgence and are now named on the Green List BoCC4 (Eaton et al., 2015). Nevertheless, Sand Martin are still a Reading BAP Priority Species.

We recommend installing the Schwegler Sand Martin Nest Tubes into the River Wall.

5.7



Grey Wagtail and other species

- 5.8 Grey wagtails have experienced declines in recent years and are now named on the Red List BoCC4 (Eaton et al., 2015), after having previously been on the Amber List. To provide suitable nesting sites for grey wagtails, and other species, we recommend a variety of different nest boxes in addition to the above, which are suitable for a range of species such as the Schwegler 2HW Nest Box, Schwegler No. 19 Nest Box, Schwegler Deep Nest Box 1N, Schwegler 1B Nest Box, and Schwegler 1MR Bird House.



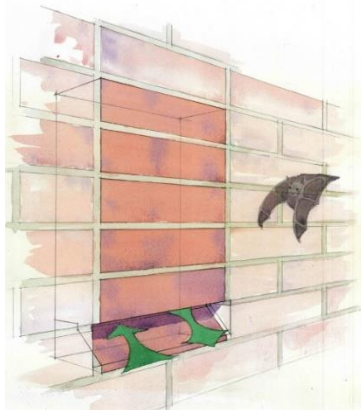
Bats

5.8 *Crevice dwelling*

Man-made roosts can provide stable micro-climates for bats. Loss of natural roosts has increased the importance of man-made structures for bats to the point that artificial roosts are becoming essential for the survival of many bat species.

5.9 There are numerous styles and designs of bat boxes that can be positioned on houses both externally and internally. The fully integrated bat box by Ecosurv Habibat (see below) is recommended.

5.10 These boxes are designed with an angled internal floor allowing droppings to fall out of the entrance slot, removing the need for cleaning (by licensed bat ecologists) and creating a grip-able surface for bats to enter. Both boxes have an integrated V system to increase the surface for bats to roost against and allowing them to move around. The integrated Ecosurv box can be faced with a number of products to suit the design build including, brick, block, stone, wood or a rendered finish, ensuring the box is unobtrusive and aesthetically pleasing.



Invertebrates

Solitary Insect

Most species of Hymenoptera (Bees & Wasps) that live in hollows and recesses use existing holes, made by certain types of Beetles, in which they construct their brood cells. Hymenoptera are of major ecological importance because they regulate numbers of pest insects and are important pollinators. Much of our countryside has been cleared and cultivated and consequently there are not enough natural nesting places for these insects. We recommend artificial nesting sites for these insects are implemented on site, such as the Schwegler Clay and Reed Insect Block.

- 6.1 To provide suitable nesting possibilities for each of the target species the following quantity of boxes for each species is recommended:

Building/ River wall integrated boxes

15 x Schwegler Sand Martin Nesting Tubes

10 x Ecosurv Sparrow Nest Box

6 x EcoSurv Habitat 001 bat Box

4 x Schwegler Clay and Reed Insect Block

Tree boxes

5 x Schwegler 1B bird nest box

5 x Schwegler 1N deep nest box

2 x Schwegler 2HW bird nest box

2 x Schwegler No. 19 nest box

9 x Schwegler 1 MR Bird House

10 x Schwegler Type 16S Swift Box

- 6.2 As several of the target species are gregarious species their nesting boxes have been grouped together to allow communal nesting (see Appendix 1).

- 6.3 The positioning of each box follows the requirements for each target species in accordance with the Design for Biodiversity guidelines (Gunnell *et al.*, 2013).

BIRDS

Swift

- 6.4 The swift box should be positioned as close to roof level as possible on a northern and/or eastern elevation of the West and East Block buildings (see Appendix 1). This allows the highest uninterrupted drop from the boxes and is out of direct sunlight which should prevent overheating of the nests.

House sparrow

- 6.5 There will be ten house sparrow boxes positioned on the northern elevation of the Middle Block building (see Appendix 1). This elevation has a space on that is devoid of windows and therefore presents the least amount of disturbance both to the birds

and residents. It is also located adjacent to landscaping and gardens with amenity grassland and scattered trees that are connected to other areas of suitable forage.

- 6.6 The boxes will need to be positioned as close to the roof line as possible, under any gutters or soffits to allow maximum height and protection.

6.7 *Sand Martin*

There will be fifteen sand martin boxes integrated into the river wall to the south west of the site (see Appendix 1). Sand martins nest in colonies of at least 12 pairs, so if the aim is to attract a new colony ensure at least 12 nest tunnels are grouped. They should be positioned high enough above the water level (at least 1m above summer water level) to not risk flooding.

6.8 *Grey Wagtail and others*

There will be a number of nest boxes in addition to the above targeting a wide range of different bird species (see Appendix 1). The Schwegler 2 HW and No. 19 bird boxes will be placed on the river wall to attract cavity nesting species like wagtails and flycatchers, and should be placed high enough above the water level to not risk flooding.

- 6.9 The Schwegler 1B and 1N nest boxes will be positioned on the mature trees in the south of the site, along the river frontage within close proximity to other soft landscaping. Lighting is likely to be reduced in this area and it is located away from the main access road and carparking. The Schwegler 1MR bird houses will be placed on the retained trees in the northern and eastern boundaries of the site, close to other areas of soft landscaping.

- 6.10 The boxes placed on trees should be placed on the trunk at least 2m in height, facing south-east as this allows exposure to the sun in the morning, but allows relief from constant, direct sunlight in the afternoons. They should be attached using adjustable straps to take into account annual incremental growth of the tree's stem, and primary and secondary lateral branches.

- 6.11 Most bird species, including grey wagtails are territorial and non-communal. To increase uptake to nest sites, nest boxes should be spaced out to accommodate this. Approximately 25 feet between the same two bird box models should prevent competition.

Bat – Crevice dwelling.

6.12 Six integrated bat boxes (EcoSurv 001) will be positioned in two groups of three within the south east elevation of the East block building (see Appendix 1). The boxes will need to be positioned as high as possible (minimum of 5m), close to the roof line, underneath any gutters to allow maximum uninterrupted drop from the box and should be positioned as far away from the emergency exit lighting and door as possible.

6.12 A south east elevation was chosen as warm roost temperatures are important in summer for pregnant and lactating females and their young. This location is likely to be sheltered from strong winds and exposed to the sun for part of the day, and is close to the river corridor. A number of suitable trees are also present adjacent providing suitable forage and commuting routes to the river. Other foraging habitats including grassland are nearby, likely to attract a wide variety of insects for bats to prey on.

6.13 *Invertebrates*

Four invertebrate Schwegler Clay and Reed insect blocks will be incorporated into the river wall (see Appendix 1). There are no hard and fast rules for siting but care should be taken to select a sunny site that is protected from wind and rain.

7 MAINTENANCE

7.1 Any building works in the vicinity of the bird boxes, or maintenance to them, should be timed to avoid breeding periods, which are as follows; common nesting birds March-August (inclusive) (Newton *et al.* 2011).

7.2 All multi-purpose nest boxes should be cleaned out on an annual basis (or at least bi-annually) at the end of the breeding season (autumn-winter), removing the old nests, dead birds etc. Swift boxes, Sand Martin tunnels, and integrated bat and sparrow boxes are self-maintained and do not need cleaning out. Insect boxes are self-maintained and do not require cleaning.

7.3 Fixings/attachments of all boxes should be checked for safety and effectiveness on an annual basis (autumn-winter).

- 7.4 The design of the bat boxes means that cleaning and maintenance of them is not required. However, if there is need for the boxes to be moved in future this must be carried out by a licenced bat ecologist.
- 7.5 The access/egress points on the boxes must not be obscured by vegetation or other obstructions. Bats and birds will cling to the surface immediately beneath the egress/ingress before accessing the box, so it is important that this area remains clear.
- 7.6 Artificial lighting must not directly illuminate the bird and bat boxes to be installed as part of the development. Light spill should be limited within the trees and areas of proposed new landscaping. Lighting recommendations (See Appendix 4) should be incorporated into the design in order to improve the likelihood of bats utilising these boxes and increase levels of bat activity in the vicinity.

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The Mayor of London's Office and the Biodiversity Partnership (2007) London Biodiversity Action Plan

Appendix 1: Proposed plans

Figure 1 : Location of bird, bat and invertebrate boxes – site plan



Key:

Taxon	Total No.	Symbol	Elevation
Sand Martin Nesting Tubes	15 No.		River Wall (see elevation)
Schwegler 2HW bird nesting refuge	2 No.		River Wall
Schwegler 19 bird nesting refuge	2 No.		River Wall
Schwegler clay and reed insect hotel	4 No.		River Wall
Schwegler 1N deep nest box and Schwegler 1B nestbox	10 (5 of each)		On mature trees; moved over time as required with tree replacement strategy
Schwegler 1 MR bird house	9 No.		On retained trees to eastern and northern boundaries
EcoSurv sparrow nest box	10 No.		Built Façade (see elevation)
Schwegler Type 16S Swift refuge	10 No. in two groups of 5		Built Façade (see elevation)
Ecosurv Habitat access box 001	6 No. in two groups of 3		Built Façade (see elevation)

Appendix 2: General outline of roosting and nesting requirements (taken from Gunnell et al., 2013 and RSPB)

Species	Access dimensions	Roost/nesting dimensions	Height of entry	Aspect of roost	Materials and other comments
Bats	20-50mm (w) x 15-20mm (h)	Any size as long as some components of the area are crevices in the region of 20-30mm. Greater total areas of about 1 sq. m would be useful for nursery (summer) roosts. Male roosts contain smaller numbers of bats or even individual bats.	2-7 m	Summer nursery roosts on most southerly or westerly aspect for solar heating. However, the risk of overheating should be considered. A location that provides a stable microclimate may work better than one that heats up quickly and loses heat quickly. Male roosts and winter hibernation roosts on northerly aspects.	Rough (for grip), natural materials such as untreated timber, stone or masonry is preferred. Not toxic or corrosive with no risk of entanglement. Suitable thermal properties (reducing 24-hour fluctuations), but allowing suitable thermal gain for summer roosts. North facing boxes used for hibernating will benefit from using insulating materials. Large crevice spaces (particularly in the vertical dimension) can provide a range of temperatures, which will allow the bats to move according to their temperature needs. Access not lit by artificial lighting.
Swift	At least 65mm (w) x 33mm (h). This excludes starlings. The bottom of the hole should be no more than 5cm above the floor of the nest.	Floor area at least 350cm ² e.g.: 12cmx30cm, 17.5cmx20cm, 15cmx25cm Preferably larger where space is available. Headroom as low as 75mm when space is constrained; recommended greater than 100mm where space is available.	At least 5m above ground and away from obstructions and creepers. Preferably integrated in to buildings, but where not possible external (under the eaves).	In shade, out of direct sunlight and away from windows.	Boxes made from concrete, masonry or marine ply or else compartments created within a suitable part of the building. It is important to have several potential nest sites for swifts in one area.
House sparrow	32mm diameter round hole. Bottom of the hole must be no less than 150mm from the base of the box.	150mm (w) x 250mm (h) x 150mm (d).	Ideally within the structure at soffit/eaves level, but otherwise as an external box at the same location. At least 3m high for starlings and 2m for sparrows.	Out of direct sun; preferable east-facing.	It is important to have several potential nest sites in one area. Can be as close as 150mm apart.
Sand Martin	6cm internal diameter set in rows 30cm apart with the pipes at 20cm spacing, and the bottom row at least 1m above summer water level. The pipes should be no more than 1m long	6cm (w) x <1m (l)	1m above summer water level. sloping very slightly up into the bank (to prevent rainwater flooding the nest chamber) with the opening flush to the cliff face.		Gregarious in nature, at least 12 nest boxes placed close to one another.

Appendix 3: Legislation

BATS

All species of bat are fully protected under The Conservation of Habitats and Species Regulations 2017 (as amended) through their inclusion on Schedule 2. Regulation 41 prohibits:

- Deliberate killing, injuring or capturing of Schedule 2 species (e.g. all bats)
- Deliberate disturbance of bat species as:
 - a) to impair their ability:
 - (i) to survive, breed, or reproduce, or to rear or nurture young;
 - (ii) to hibernate or migrate
 - b) to affect significantly the local distribution or abundance of the species
- Damage or destruction of a breeding site or resting place (strict liability)

Bats are also currently protected under the Wildlife and Countryside Act 1981 (as amended) through their inclusion on Schedule 5. This is subject to the defence: incidental result of an otherwise lawful operation. Under this Act, they are additionally protected from:

- Intentional or reckless disturbance of an animal or obstruction of access to any place of shelter or protection,

The NERC Act 2006 states that ‘every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity’, otherwise known as the Biodiversity Duty. Under Section 41 of the Act, the Secretary of State must publish a list of the living organisms and types of habitat which in the Secretary of State’s opinion are ‘Species of Principal Importance for the purpose of conserving Biodiversity’ (SPIBs). This list is based on priority species recognised by the UK Biodiversity Action Plan (BAP), and in addition to Annex II species listed under The Conservation of Habitats and Species Regulations 2010 (as amended). The S41 SPIBs list replaces the list published under Section 74 of the Countryside and Rights of Way (CROW) Act 2000 as those species of material consideration to the planning process.

How is the legislation pertaining to bats liable to affect development works?

A European Protected Species Mitigation (EPSM) licence issued by the relevant competent authority (e.g. Natural England) will be required for operations likely to result in a level of disturbance which might impair their ability to undertake those activities mentioned above (e.g. survive, breed, rear young and hibernate). The licence is to allow derogation from the relevant

legislation but also to enable appropriate mitigation measures to be put in place and their efficacy to be monitored.

The legislation may also be interpreted such that, in certain circumstances, important foraging areas and/or commuting routes can be regarded as being afforded *de facto* protection, for example, where it can be proven that the continued usage of such areas is crucial to maintaining the integrity and long-term viability of a bat roost.

BIRDS

With certain exceptions, all birds, their nests and eggs are protected under Sections 1-8 of the Wildlife and Countryside Act 1981 (as amended). Among other things, this makes it an offence to:

- Intentionally kill, injure or take any wild bird
- Intentionally take, damage or destroy the nest of any wild bird while it is in use or being built
- Intentionally take or destroy an egg of any wild bird

Certain species of bird, for example the barn owl, black redstart, hobby, bittern and kingfisher receive additional special protection under Schedule 1 of the Act and Annex 1 of the European Community Directive on the Conservation of Wild Birds (2009/147/EC). This affords them protection against:

- Intentional or reckless disturbance while it is building a nest or is in, on or near a nest containing eggs or young
- Intentional or reckless disturbance of dependent young of such a bird

To avoid contravention of the Wildlife and Countryside Act 1981 (as amended), works should be planned to avoid the possibility of killing or injuring any wild bird, or damaging or destroying their nests. The most effective way to reduce the likelihood of nest destruction in particular is to undertake work outside the main bird nesting season which typically runs from March to August. Where this is not feasible, it will be necessary to have any areas of suitable habitat thoroughly checked for nests prior to vegetation clearance.

Those species of bird listed on Schedule 1 are additionally protected against disturbance during the nesting season. Thus, it will be necessary to ensure that no potentially disturbing works are undertaken in the vicinity of the nest. The most effective way to avoid disturbance is to postpone works until the young have fledged. If this is not feasible, it may be possible to maintain an appropriate buffer zone or standoff around the nest.

Appendix 4: Best Practice Lighting Recommendations for Bats

Lighting

The following mitigation strategies have been taken from Bat Conservation Trust Landscape and Urban Design for Bats and Biodiversity (Gunnell *et al.*, 2012) and other referenced sources:

- Minimise light spill by eliminating any bare bulbs and upward pointing light fixtures. The spread of light should be kept near to or below the horizontal plane, by using as steep a downward angle as possible and/or shield hood. Flat, cut-off lanterns are best;
- Use light sources that emit minimal ultra-violet light (Langevelde *et al.*, 2001) and avoid the white and blue wavelengths of the light spectrum, so as to avoid attracting insects and thus potentially reducing numbers in adjacent areas, which bats may use for foraging;
- Limiting the height of lighting columns to eight metres and increase the spacing of lighting columns (Fure, 2006) can reduce the spill of light into unwanted areas such as the aforementioned habitats;
- For pedestrian lighting, low level lighting that is directional and below three lux at ground level, but preferably below one lux should be used;
- Use embedded road lights to illuminate the roadway and light only high-risk stretches of roads (crossings and junctions);
- Avoid using reflective surfaces under lights or light reflecting off windows (e.g. onto bat flight lines);
- Only the minimum amount of light needed for safety and access should be used and or turned off when the site is not in use;
- Artificial lighting proposals should not directly illuminate tree lines, which may be of value to foraging or commuting bats and birds (e.g. the trees along the northern and western boundaries of the site);
- Artificial lighting should not directly illuminate any bat roosting features that are installed within the proposed development;
- Lux levels should be below five lux and the lights should be controlled via a passive infrared (PIR) sensor, only operating when activated by motion within proximity of the light;
- Lighting that is required for security reasons should use a lamp of no greater than 2000 lumes (150 Watts) and be PIR sensor activated, to ensure that the lights are not on only when required (Jones, 2000; BCT, 2008);

- Uplighters should be avoided, particularly at the base of trees and within the aforementioned habitats; and
- If possible 'dark zones' could be created by limiting or removing lighting within a 5 - 10m buffer between lit areas and the dark, vegetated boundary habitat. Scattered 'dark zones' and dark corridors bisecting the site should also be provided to further enhance commuting/foraging behaviour for bats.



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The Ecology Consultancy is part of the Temple Group.

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