



ecosupport

Burndell Road, Yapton

Bat Mitigation Strategy

Author(s):
Aaron Domblides BSc Hons

Client:
Driftstone Developments

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Site Name	Land off Burndell Road, Yapton
Author(s)	Aaron Domblides BSc (Hons)
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1.0 INTRODUCTION

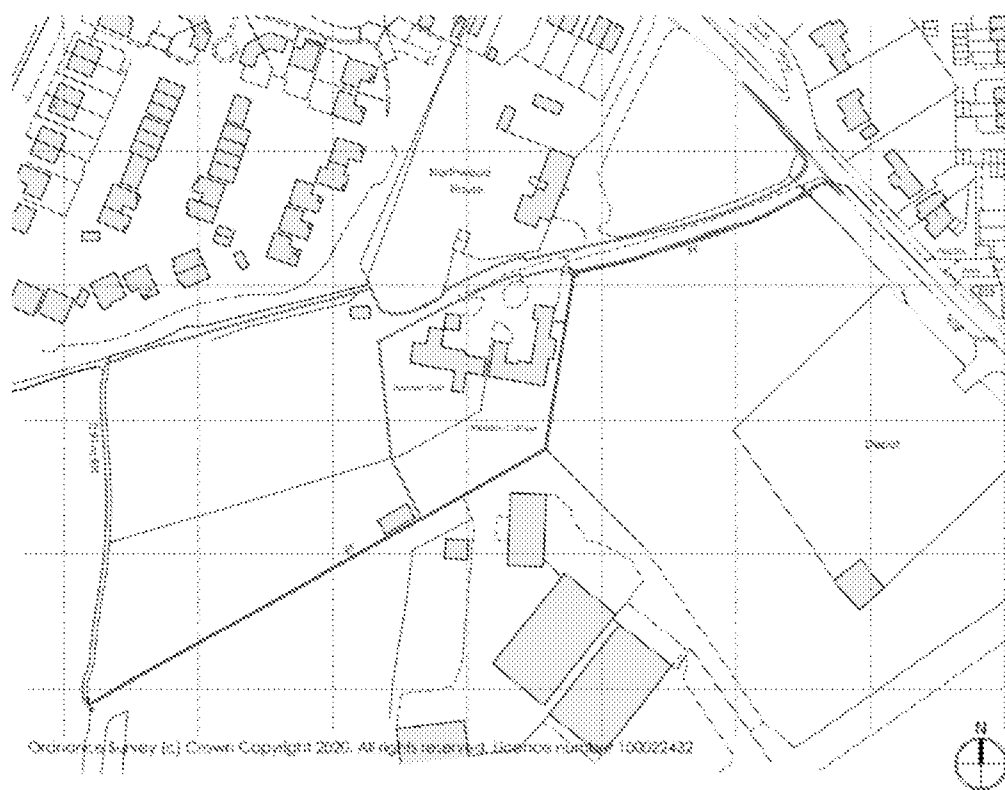
1.1 Background

This document outlines the results of the bat activity works and emergence survey carried out by Ecosupport Ltd over the 2020 active season, completed in support of a planning application for a new development on a parcel of land located off of Burndell Road, Yapton. These surveys were recommended within the Preliminary Ecological Appraisal report prepared by Ecosupport Ltd (2021) based on the presence of suitable habitat for roosting within the horse stable and the identification of suitable foraging and commuting bat habitat.

1.2 Site Description & Location

The site comprises the land located to the rear of the 2 dwellings located to the west of Burndell Road, Yapton, BN18 0HR (centred on OS grid reference SU985027) (**Fig 1**). The eastern boundary of the site is marked by 2 cottage dwellings with an access track leading to Burndell Road beyond, the north of the site by a new residential development the west by an arable field and the southern by a recycling centre.

Figure 1. Redline location plan of the site.



1.3 Brief Description of the Proposals

The proposals entail the demolition of the outbuildings on site and the creation of a new residential development with access via Burndell Road.

2.0 RELEVANT LEGISLATION & POLICY

2.1 Legislation & Policy Context

2.1.1 Relevant Legislation

The Wildlife & Countryside Act 1981 (as amended) is the primary piece of legislation by which biodiversity in the UK is protected. The most relevant areas of the Act to development related activities are:

- The protection of certain species listed in Schedule 5, which prohibits killing, injury, disturbance, damage and / or destruction of breeding sites and / or resting places and sale (it should be noted that all parts of this protection do not apply to all Scheduled species).

The Natural Environment and Rural Communities (NERC) Act 2006 requires that public bodies to have regard to the conservation of biodiversity. This means that Planning Authorities must consider biodiversity when planning or undertaking activities. Section 41 of the Act lists species found in England which were identified as requiring action under the UK Biodiversity Action Plan and which continue to be regarded as conservation priorities under the *UK Post-2010 Biodiversity Framework*.

2.1.2 National Planning Policy

Section 15 of the National Planning Policy Framework (NPPF) 'Conserving and enhancing the natural environment' states that planning policies and decisions should contribute to and enhance the natural environment. They should do this by protecting and enhancing sites of biodiversity and minimising impacts on and providing net gains for biodiversity, including establishing coherent ecological networks.

The plan states to protect and enhance biodiversity plans should identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks. This includes the hierarchy of international, national and locally designated sites of importance for biodiversity, wildlife corridors and stepping stones that connect them. Plans should identify the protection and recovery of priority species and opportunities for securing measurable net gains for biodiversity.

When determining planning applications, local planning authorities should apply the following principles:

- if significant harm to biodiversity resulting from a development cannot be avoided, adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact;

- development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and
- development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.

2.1.3 Local Planning Policy- Adopted Arun Local Plan 2011 – 2031 (July 2018)

Policy ENV DM5 Development and biodiversity

“Development schemes shall, in the first instance, seek to achieve a net gain in biodiversity and protect existing habitats on site. They shall also however incorporate elements of biodiversity including green walls, roofs, bat and bird boxes as well as landscape features minimising adverse impacts on existing habitats (whether designated or not). Development schemes shall also be appropriately designed to facilitate the emergence of new habitats through the creation of links between habitat areas and open spaces. Together, these provide a network of green spaces which serve to reconnect isolated sites and facilitate species movement. Where there is evidence of a protected species on a proposed development site, planning applications shall include a detailed survey of the subject species, with details of measures to be incorporated into the development scheme to avoid loss of the species. This involves consideration of any impacts that will affect the species directly or indirectly, whether within the application site or in an area outside of the site, which may be indirectly affected by the proposals. All surveys shall be carried out at an appropriate time of year and shall be undertaken by a qualified and, where appropriate, suitably licensed person. All developments shall have regard to Natural England's standing advice for protected species.”

3.0 METHODS

3.1 Emergence Surveys

As per the recommendations within the PEA (Ecosupport 2021), a single emergence survey was undertaken on the Stable building on site. This survey was led by Lewis Lakudzala on the 11th August 2020 with assistance from Robert Todd, both experienced surveyors with ecosupport. Both heterodyne (Bat Box Duet and Elkon Batscanner) and time expansion (Anabat Express) detectors were used for identifying species calls. The dusk emergence survey began approximately 15 minutes prior to sunset and continued until approximately an hour and 30 minutes after sunset. Survey sheets were used to record the following information:

- Time of call registration
- Species (if possible to identify using heterodyne detector)
- Location / activity
- Direction of flight (if seen)

3.2 Walked Transects

For a development where the habitat has been assessed as being of moderate potential for foraging and commuting bats, the current Bat Conservation Trusts (BCT) *Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd Edition* (Collins (ed) 2016) suggest activity transect surveys should be conducted throughout the active season (up to two visits per month April – October) to qualitatively assess the bat activity within the site.

Based on the sites area and available habitat, a single transect was considered sufficient to cover the whole site with a total of 7 listening stations used (**Fig 2**). One visit per month was undertaken between July and October 2020.

Figure 2. Walked transect route (dashed yellow line) with numbered listening points (red dots) used.



Approximately 17 minutes were spent at each listening point during which passes of species were noted. Any passes recorded whilst walking between points were also noted. Both a Bat Box duet / Elkon Batscanner heterodyne and Anabat frequency division (for analysis of calls via sonogram) detector was employed during all surveys. The surveys were carried out by Lyndsey McBean, Greg Barratt, Lewis Lakudzala, Robert Todd, Aaron Domblides and Gemma Nixon, all experienced surveyors with Ecosupport.

3.3 Static Monitoring

An additional aspect of the recommended bat monitoring within the new BCT guidelines is for static detectors to be placed at different locations along the transect route for 5 consecutive nights each month (only done from July - October due to the lateness of the instruction). The detector used for this was an Anabat Express and the locations of the statics during different months is provide below (**Fig 3**).

Figure 3. The approximate locations of Anabat Express static detectors across the site. A=July, B=August, C=September, D = October



3.4 Limitations

With the bat activity survey work only commissioned in July, the early part of the season was not covered (April – June) representing a minor deviation from best practice guidance (Collins (ed) 2016) and potential limitation. Notwithstanding this, a total of approximately 8 transect hours was undertaken at the site which equates to an effort of 7 hours / ha. It is considered the survey information obtained present an accurate reflection of the use of the site by foraging and commuting bats which would likely not materially change should additional surveys be undertaken. Additionally, given the retention of the majority of boundary vegetation on site and the lost habitat is primarily managed amenity grassland and ornamental managed hedges, this is not considered to alter the validity of the results or recommendations.

4.0 RESULTS

4.1 Emergence Surveys

The stable building on the southern boundary was considered to be of **Low** roost potential and one survey was required to determine presence / likely absence. The results of the survey is provided below (Tables 1 and 2).

Table 1. Relevant information from the emergence surveys on the southern stable.

Date	Temp (°C)	Cloud Cover (%)	Wind (beaufort scale)	Start time	Finish time	General information
11/08/2020	26	50	0	20:16	22:01	Very warm, humid

Table 2. Results from the emergence survey of the southern stable block. HNS = Heard Not Seen

Survey Date	Recorded Bat Roost	General Bat Activity on Site		
11/08/2020	No emergences	Species	First Pass	Last Pass
		Common Pipistrelle	21:02	21:40
		Soprano Pipistrelle	21:24	21:43
		Noctule	21:30	21:30
		<i>Plecotus Spp.</i>	21:41	21:41
		<u>Summary:</u>		
		Overall activity levels were low during this survey and restricted to individual commuting and briefly foraging bats. Species diversity was however moderate with a total of 4 species recorded.		
The first recorded bat was a Common Pipistrelle (<i>Pipistrellus pipistrellus</i>) which was first recorded briefly foraging around the barn at 21:02. Following this, between 21:26 and 21:40, a further 7 Common Pipistrelle were recorded either commuting past the stables or briefly foraging nearby.				
The second species recorded was a Soprano Pipistrelle (<i>Pipistrellus pygmaeus</i>) which was first recorded at 21:24 commuting along the hedgerow in an easterly direction. Following this only one other Soprano Pipistrelle was recorded commuting along the hedgerow in a westerly direction.				
The third species recorded was a single Noctule (<i>Nyctalus Noctula</i>) which was HNS commuting to the east of the stables at 21:30.				

		The Fourth and final species recorded was a <i>Plecotus spp.</i> which was recorded commuting to the east of the stables at 21:41.
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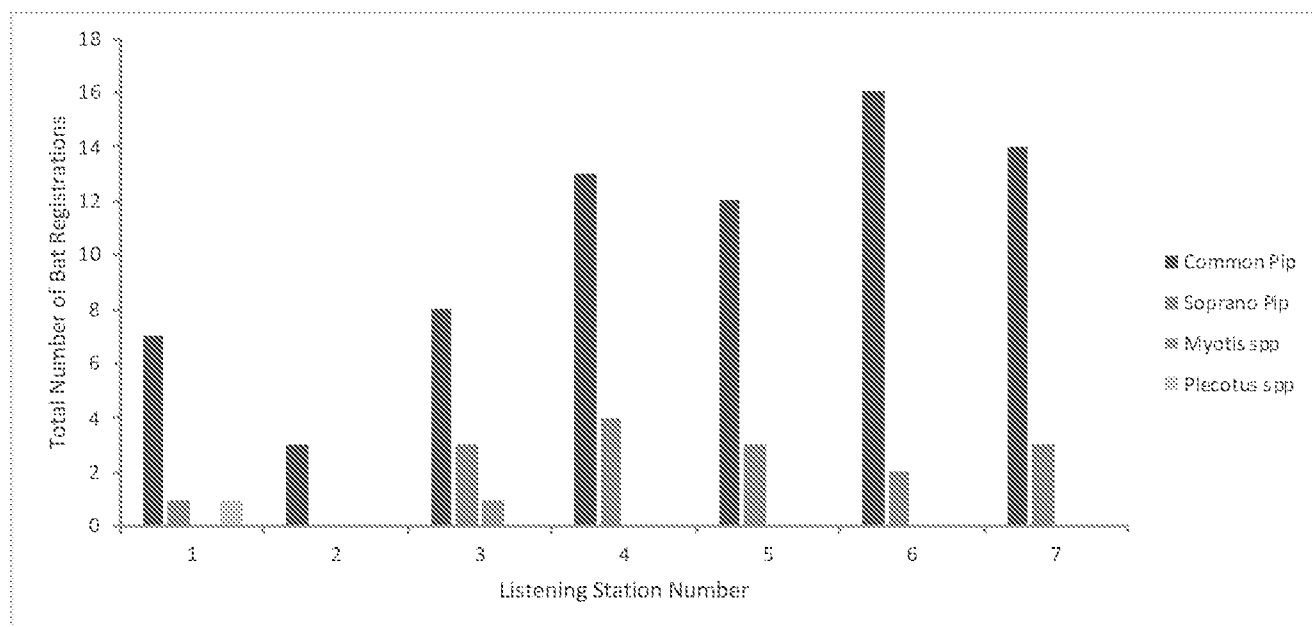
4.2 Transect Surveys

Table 3 below indicates the dates and other relevant information recorded during the transect surveys with the results presented below in **Fig 4**.

Table 3. Relevant information recorded during the transect surveys. Wind speed is approximated in the Beaufort Scale.

Date	Temp (°C)	Cloud Cover (%)	Wind (beaufort scale)	Start time	Finish time	Starting point / direction
29/07/2020	16	35	2	20:53	22:53	1 Clockwise
20/08/2020	17	80	4	20:04	22:04	3 Clockwise
23/09/2020	14	60	5	19:00	21:00	5 Clockwise
12/10/2020	11	100	3	18:14	20:14	7 Anti-clockwise

Figure 4. The number and species composition of bat recordings noted during the walked transects (n = 4) at the different listening points from all the surveys (July –October 2020) totaled.



As shown in **Fig 4** above, the most common recorded species by a significant margin was Common Pipistrelles. The activity transects would indicate that listening stations within the northern portion of the site were used more frequently by bats than the remainder of the site, likely due to the greater variety of habitats within these areas, with listening station 6 being the most frequently used (with low numbers of bats recorded foraging and commuting within

this area). Although this station had the highest total number of bat registrations, listening station 1 and 3 (along the southern boundary) had the highest species diversity with 3 separate species recorded including Common Pipistrelle, Soprano Pipistrelle (*Pipistrellus pygmaeus*), *Myotis* spp and *Plecotus* spp. However given the low numbers of *Myotis* and *Plecotus* recorded (max of 1), this would likely have evened out across the site had additional survey work been undertaken.

4.3 Static Monitoring

The results of the static detector monitoring carried out between July and October 2020 are provided in **Table 5** below.

Table 5. Analysis from Anabat Express static deployment from July – October 2020 (see **Fig 3** for approximate location).

Location	Date	Species	Total passes	Average passes per night	Average passes per hour
A	24 th – 29 th July 2020	C.pip	147	24.5	3.0
		S.pip	8	1.3	0.2
		Noctule	2	0.3	0.0
		<i>Plecotus</i> spp.	7	1.2	0.1
		<i>Myotis</i> spp.	5	0.8	0.1
B	13 th – 18 th August 2020	C.pip	67	11.2	1.2
		S.pip	10	1.7	0.2
		Noctule	6	1.0	0.1
		Serotine	4	0.7	0.1
		<i>Plecotus</i> spp.	7	1.2	0.1
		<i>Myotis</i> spp.	1	0.2	0.0
C	11 th – 15 th September 2020	C.pip	207	41.4	3.7
		S.pip	4	0.8	0.1
		<i>Plecotus</i> spp.	6	1.2	0.1
		<i>Myotis</i> spp.	10	2.0	0.2
		Barbastelle	4	0.8	0.1
D	14 th – 19 th October 2020	C.pip	214	35.7	2.7
		S.pip	12	2.0	0.2
		<i>Plecotus</i> spp.	11	1.8	0.1
		<i>Myotis</i> spp.	19	3.2	0.2
		Barbastelle	2	0.4	0.0

As with the walked activity transects, the majority of the registrations on the Anabat statics were from Common Pipistrelles, which dominated all deployments in terms of the total number of calls recorded, particularly at locations A, C and D. Other species included occasional Soprano Pipistrelle, Serotine, Noctule (*Nyctalus noctula*), *Plecotus* spp, *Myotis* Spp. and Barbastelle.

Similarly to the walked transects, the southern boundary hedgerow had the highest diversity of bats with at least 6 different species recorded, however species diversity was fairly even across all areas of the site. In contrast to the walked transect, the western boundary tree line had the highest total bat activity levels although overall activity levels were generally low across the site as a whole. It is worth noting that Barbastelle were only recorded commuting along the western boundary. The higher activity levels along the western boundary reflects the higher quality of hedgerows found within this area.

4.4 Evaluation

Following the PRA undertaken as part of the PEA and the subsequent emergence survey, it is concluded that there is a likely absence of roosting bats within the Stables on site with relatively low activity levels during the survey.

During the activity surveys, Common Pipistrelles activity levels were considered be low overall. Additionally occasional Soprano Pipistrelles, *Plecotus* spp, *Myotis* spp, Noctule, Serotine and Barbastelle were recorded on site (with these species considered common and rarer in England (Wray *et al* 2010)). Commuting and foraging activity was however largely restricted to low numbers of Common Pipistrelle and individual bats of other species. Guidance on valuing bat foraging and commuting habitat is provided by Wray *et al* (2010), which uses a points-based system. Using this system, the site scores **32 points** for commuting bats and **19 points** for foraging bats (see **Table 5**) and is correspondingly considered to be of **regional value** for commuting bats and **Local value** for foraging bats.

Table 5. Valuation of habitat for (a) commuting and (b) foraging bats after Wray et al. (2010). The points scored by the site are indicated in bold type.

Species	Number of bats	Roosts nearby	Habitat features
(a) Commuting habitat			
Common (2)	Individual bats (5)	None (1)	Absence of (other) linear features (1)
		Small number (3)	Un-vegetated fences and large field sizes (2)
Rarer (5)	Small numbers (10)	Moderate number/not known (4)	Walls, gappy or flailed hedges, isolated well grown hedges, moderate field sizes (3)
		Large number of roosts or close to a SSSI for the species (5)	Well grown and well connected hedges, small field sizes (4)
Rarest (20)	Large numbers (20)	Close or within a SAC for the species (20)	A complex network of well- established hedges, small fields and rivers/ streams (5)
(b) foraging habitat			
Common (2)	Individual bats (5)	None (1)	Industrial or other site without established legislation (1)
		Small number (3)	Suburban areas or intensive arable land (2)
Rarer (5)	Small numbers (10)	Moderate number/not known (4)	Isolated woodland patches, less intensive arable and/or small towns/villages (3)
		Large number of roosts or close to a SSSI for the species (5)	Larger or connected woodland blocks, mixed agriculture and small villages/hamlets (4)
Rarest (20)	Large numbers (20)	Close or within a SAC for the species (20)	Mosaic of pasture, woodlands and wetland areas (5)

5.0 MITIGATION & RECOMMENDATIONS

5.1 Introduction

In order to fully comply with applicable legislation and planning policy, it is necessary to mitigate or compensate for any significant ecological impacts.

The chapter is divided into three sections, dealing with mitigation and enhancement. Please note, the following recommended mitigation and enhancement measures are general based upon the data collected up to this point and may be subject to alteration on completion of the additional surveys.

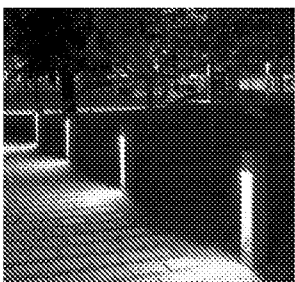
5.2 Mitigation

5.2.1 Site Layout

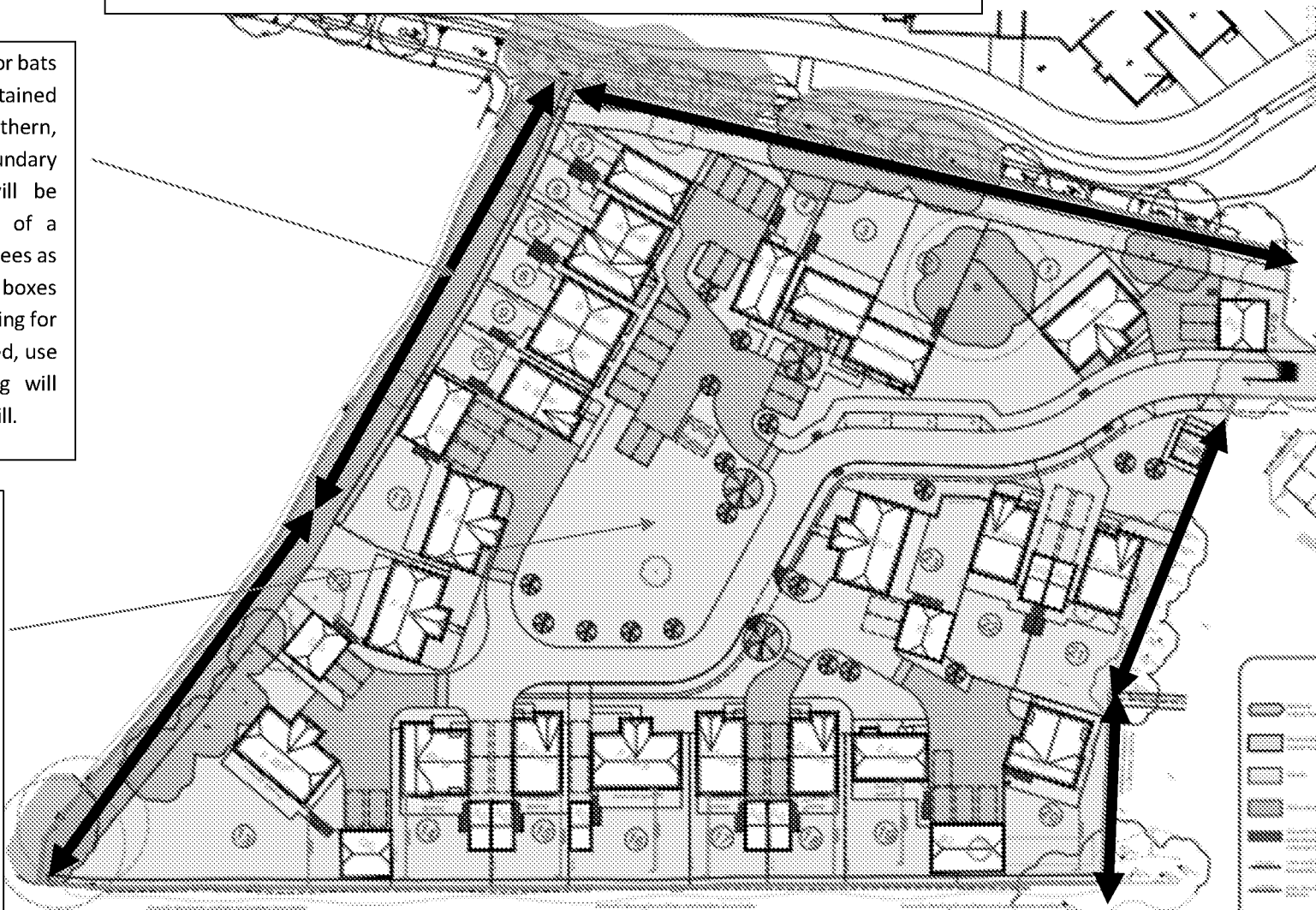
Fig 5 below provides an overview of the areas on site that will be retained for the benefit of foraging and commuting bats. As can be seen all hedgerows around the boundary of the site will be retained for foraging and commuting bats. Due to the presence of the Barbastelles along the western boundary and the overall higher activity levels, both hedges that are present along this boundary (which run parallel to each other) are to be retained. This will ensure the ongoing suitability of the commuting corridor between the two hedgerows along the ditch. Additionally, the width of the hedgerow / treeline to the north will also provide sufficient cover for light sensitive bat species, with the layout designed to ensure that lighting is kept away from the boundaries of the site.

Figure 5. Features to enhance / mitigate for impacts to bats designed into the scheme.

'Dark corridors' maintained for bats (black arrows) adjacent to retained mature tree lines on northern, western and southern boundary tree lines. These areas will be enhanced through planting of a number of new shrubs and trees as well as the erection of bat boxes within trees. Should any lighting for amenity pathways be required, use of low-level bollard lighting will be required to minimise light spill.



Low level bollard lighting keeping undesirable light spill to a minimum but maintaining usability of POS area for residents.



5.2.2 Sensitive Lighting

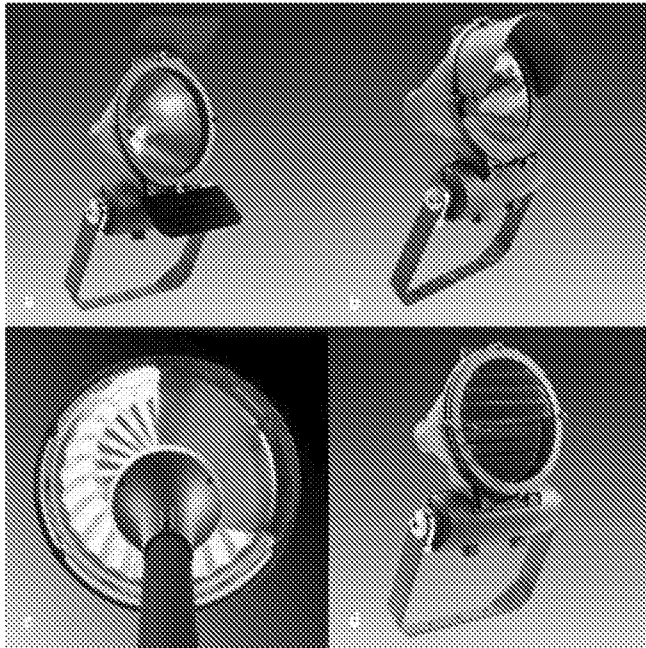
A document (Guidance Note 08/18 Bats and Artificial Lighting in the UK) has recently been produced via a collaboration between the Institute of Lighting Professionals (ILP) and the Bat Conservation Trust (BCT), which outlines the latest recommendations to minimise the impacts of increased artificial lighting on bats. Mitigation measures may include making use of accessories such as baffles, hoods or louvres to reduce light spill and direct it only to where it is needed (**Fig 5**) with the aim of seeking to keep light spill onto boundary features at or below 1 Lux (it is considered a lighting strategy with a light spill contours plan can be secured via an appropriately worded condition with this strategy prepared in conjunction with an ecologist).

Further details on how the lighting strategy may be implemented are outlined below (re-produced from ILP / BCT 2018):

'Luminaires come in a myriad of different styles, applications and specifications which a lighting professional can help to select. The following should be considered when choosing luminaires:

- *All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources should not be used. LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.*
- *A warm white spectrum (ideally <2700Kelvin) should be adopted to reduce blue light component.*
- *Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats (Stone, 2012).*
- *Internal luminaires can be recessed where installed in proximity to windows to reduce glare and light spill.*
- *The use of specialist bollard or low-level downward directional luminaires to retain darkness above can be considered. However, this often comes at a cost of unacceptable glare, poor illumination efficiency, a high upward light component and poor facial recognition, and their use should only be as directed by the lighting professional.*
- *Column heights should be carefully considered to minimise light spill.*
- *Only luminaires with an upward light ratio of 0% and with good optical control should be used – See ILP Guidance for the Reduction of Obtrusive Light.*
- *Luminaires should always be mounted on the horizontal, i.e. no upward tilt.*
- *Any external security lighting should be set on motion-sensors and short (1min) timers.*
- *As a last resort, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed (**Fig 5**).*

Figure 5. (a) Shield ‘barn doors’ (b) cowl hood; (c) shield and; (d) external louvre Images from ILP (2011).



5.3 Enhancements

5.3.1 Planting

It is recommended that the following species should be given priority for any planting on site in order to provide the greatest benefit to bats and other native local wildlife). These are as per recommendations within the BCTs Landscape and Urban Design for Bats and Biodiversity (Gunnell et al., 2012) (**Fig 7**).

Figure 7. Screenshot from appendix within Gunnell et al., (2012) indicating plant species of known benefit to bats that will form the basis of on-site planting.

Plant species	Common name	Natvie Type (N)	Type	Benefit	Soil	Light	Extensive Green Roofs	Living walls	Rain gardens	Hedges /Trees	Beds /Borders
<i>Acer campestre</i>	Field maple	N	T/S	G	Any	Sun/shade				Y	
<i>Acer platanoides</i>	Norway maple		T	G	Well drained /alkaline	Sun/shade				Y	
<i>Acer saccharum</i>	Sugar maple		T	S	Any	Sun/shade				Y	
<i>Achilles millefolium</i>	Yarrow	N	HP	G/F	Well drained	Sun	Y				
<i>Asperula reptans</i>	Bugle	N	HP	G/F	Any	Sun/shade	Y		Y		
<i>Anthylla vulneraria</i>	Kidney vetch	N	HP	F	Well drained	Sun	Y				
<i>Aubrieta deltoidea</i>	Aubrieta		H	F	Well drained	Sun/shade		Y			
<i>Betula pendula</i>	Silver birch	N	T	G	Sandy/Acid	Sun				Y	
<i>Centaurea pratensis</i>	Cuckoo flower	N	HP	F	Moist	Sun/shade			Y		Y
<i>Carpinus betulus</i>	Hornbeam	N	T	G	Clay	Sun				Y	
<i>Centaurea nigra</i>	Common knapweed	N	HP	G/F	Dry, not acid	Sun	Y				Y
<i>Centranthus ruber</i>	Red valerian		HP	F	Well drained /alkaline	Sun	Y				Y
<i>Gemata vitalba</i>	Old man's beard	N	G	F	Well drained /alkaline	Sun				Y	
<i>Corylus avellana</i>	Hazel	N	S	G	Any dry	Sun/shade		Y		Y	
<i>Crataegus monogyna</i>	Hawthorn	N	S	S,G	Any	Sun/shade				Y	
<i>Deunus carota</i>	Wild carrot	N	B	S,G,F	Any	Sun	Y				Y
<i>Dianthus spp.</i>	Pinks	N	A-B	F	Well drained	Sun	Y	Y			Y
<i>Digitalis purpurea</i>	Foxglove	N	B	G	Well drained	Shade / partial shade				Y	Y
<i>Erica cinerea</i>	Bell heather	N	S	F	Sandy	Full sun					Y
<i>Erysimum cheiri</i>	Wallflower		S-P	F	Well drained	Sun		Y			
<i>Eupatorium cannabinum</i>	Hemp agrimony	N	H	F	Moist	Sun/shade			Y		Y
<i>Fagus sylvatica</i>	Beech	N	T	G,R	Well drained /alkaline	Sun/shade				Y	
<i>Foeniculum vulgare</i>	Fennel		H	F	Well drained	Sun					Y
<i>Fraxinus excelsior</i>	Common ash	N	T	G,R	Any	Sun/shade				Y	
<i>Hebe spp.</i>	Hebe species		S	F	Well drained	Sun/shade				Y	Y
<i>Hedera helix</i>	Ivy	N	G	FG	Any	Sun/shade		Y	Y	Y	Y
<i>Heperia matronalis</i>	Sweet rocket		H	F	Well drained / dry	Sun/shade					Y
<i>Hyacinthoides non-scripta</i>	Bluebell	N	B	F	Loam	Shade/ partial shade		Y		Y	Y
<i>Ilex aquifolium</i>	Holly	N	T	G	Any	Sun/shade				Y	
<i>Jasminum officinale</i>	Common jasmine		G	F	Well drained	Sun		Y			Y
<i>Lavandula spp.</i>	Lavender species		S	F	Well drained / sandy	Sun		Y			Y
<i>Lilium vulgare</i>	Toadflax	N	HP	G	Well drained /alkaline	Sun	Y				Y
<i>Lonicera periclymenum</i>	Honeysuckle	N	G	F	Well drained	Sun		Y		Y	
<i>Lotus corniculatus</i>	Bird's foot trefoil	N	HP	F	Well drained /dry	Sun	Y				Y

Plant species	Common name	Native (N)	Type	Benefit	Soil	Light	Extensive Green Roofs	Living walls	Rain gardens	Hedges / Trees	Beds / Borders
<i>Lunaria annua</i>	Honesty		BI	F	Any	Sun partial shade	Y				Y
<i>Malus</i> spp.	Apple		T	C	Any	Sun				Y	Y
<i>Matthiola longipetala</i>	High scented stock		A	F	Well drained moist	Sun			Y		Y
<i>Myosotis</i> spp.	Forget-me-not species	N	A	F	Any	Sun	Y	Y			Y
<i>Nicotiana glauca</i>	Chamberlayne tobacco		A	F	Well drained moist	Sun partial shade			Y		Y
<i>Oenothera</i> spp.	Evening primrose species		BI	F	Well drained dry	Sun	Y				Y
<i>Origanum vulgare</i>	Marjoram	N	HP	F	Well drained dry	Sun	Y	Y			Y
<i>Populus alba</i>	White poplar	N	T	C	Clay loam	Sun				Y	
<i>Potamogeton</i>	Crucible	N	HP	F	Well drained moist	Sun partial shade	Y				Y
<i>Potentilla vulgaris</i>	Princess	N	HP	F	Moist	Partial shade	Y	Y		Y	Y
<i>Prunus avium</i>	Wild cherry	N	T	C	Any	Sun				Y	Y
<i>Prunus domestica</i>	Plum		T	C	Well drained moist	Sun				Y	Y
<i>Prunus spinosa</i>	Blackthorn	N	S	C	Any	Sun partial shade				Y	
<i>Quercus petraea</i>	Seal oak	N	T	C, R	Sandy loam	Sun/shade				Y	
<i>Quercus robur</i>	Common oak	N	T	C, R	Clay loam	Sun/shade				Y	
<i>Rosa canina</i>	Dog rose	N	S	C	Any	Sun			Y	Y	Y
<i>Salix</i> spp.	Willow species	N	S	S, C	Moist	Sun/shade			Y	Y	
<i>Sambucus nigra</i>	Elder	N	T	C	Clay loam	Sun				Y	
<i>Saponaria officinalis</i>	Soapwort	N	HP	F	Any	Sun					Y
<i>Sedum oppositifolium</i>	Sedum	N	HP	C	Well drained	Sun	Y	Y			Y
<i>Sedum album</i>	Ornamental	N	HP	F	Well drained alkaline	Sun	Y				Y
<i>Sedum spectabile</i>	Ice plant		HP	F	Well drained dry	Sun	Y				Y
<i>Gladiolus</i>	Red campan	N	HP	F	Any	Shade partial shade		Y	Y	Y	Y
<i>Sorbus aucuparia</i>	Rosier	N	T	C	Well drained	Sun				Y	
<i>Stachys lanata</i>	Lamb's ears		HP	F	Well drained dry	Sun	Y				Y
<i>Synedrella nodiflora</i>	Michauxia nodiflora		HP	F	Any	Sun					Y
<i>Tagetes patula</i>	French marigold		A	F	Well drained moist	Sun					Y
<i>Thymus serpyllum</i>	Creeping thyme	N	HP, S	F	Well drained dry	Sun	Y	Y			Y
<i>Thalictrum flavum</i>	Common thalictrum		T	C	Any	Sun/shade				Y	
<i>Trifolium</i> spp.	Clover species	N	H	F	Any	Sun	Y				Y
<i>Valeriana</i> spp.	Valerian species	N	HP	F	Moist	Sun partial shade			Y		Y
<i>Verbascum</i> spp.	Mulberry	N	BI, HP	C	Well drained	Sun	Y				Y
<i>Verbena bonariensis</i>	Verbena		HP	F	Well drained moist	Sun					Y
<i>Viburnum lantana</i>	Wayfaring tree	N	S	C	Any	Sun/shade				Y	Y
<i>Viburnum opulus</i>	Guelder rose	N	S	C	Moist	Sun/shade			Y	Y	
<i>Viole</i> spp.	Pansy	N	A	F	Well drained moist		Y	Y			Y

Type

HP - Herbaceous perennial

BI - Biennial

BIP - Biennial perennial

T - Tree

S - Shrub

H - Herb

A - Annual

B - Bulb

C - Creeper/ climber

Benefit

C - Moth caterpillar food plant

S - Sap sucking insects (eg whiteflies)

F - Flowers attract adult moths

R - Good root perennial

5.3.2 Bat Boxes (integrated into houses and mounted on trees)

To act as biodiversity enhancement and in the interests of promoting net gain principles (in line with National and Local planning policy), approximately 50% of the newly built dwellings will have Istock bat bricks (**Fig 8**) integrated within the external brick work. These features are entirely self-contained and available in a variety of different colours to match different construction materials. They should ideally be placed on an elevation which will benefit from some degree of sunlight exposure and be located away from windows as close to the eaves as possible.

Figure 8. Istock bat brick 'B' which will be integrated into the gable walls of 1 of each of the new dwellings on site.



In addition to the integrated bat boxes, the following woodcrete models (or equivalent) will also be erected on suitable retained trees around the site's boundary:

- 2 Schwegler 2 F with double front panel
- 2 Schwegler 2 FN
- 1 Schwegler 1 FS large colony

The front panel of the 2F has a second inner wooden panel fitted to it to create a cavity wall. This provides an ideal roost for bats that inhabit crevices, such as Common Pipistrelles (the most recorded bat on-site) and it has been designed as a summer roosting space for bats. The 2FN Bat Box is larger and more suited to larger species of bat and has two entrances - one at the front and one at the rear against the tree with a domed roof to allow the bats to form roosting clusters for warmth, and an increased internal height. The 1 FS box provides bats with a large internal space within which high numbers of bats can congregate (making it popular for accommodating maternity colonies over summer).

All are manufactured from long-lasting Woodcrete, which is a blend of wood, concrete and clay which will not rot, leak, crack or warp, and will last for at least 20 - 25 years, making it

suitable for long-term mitigation projects. Woodcrete is breathable and maintains a stable temperature inside the box. They are painted black to absorb warmth.

6.0 REFERENCES

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