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Preliminary Ecological Appraisal Report

Land at the former McIntyre Nursery
Littlehampton Road
Ferring
West Sussex
BN12 6PG

December 2020

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QUALITY CONTROL		
The information which we have prepared and provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct.		
Prepared by	Assistant Ecologist - Lewis Hooper	November 2020
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This report remains valid for 12 months from date of issue. Survey data are valid for 12-24 months from the date the survey was undertaken.		

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Whilst every effort has been made to guarantee the accuracy of this report, it should be noted that living creatures are capable of migration and whilst protected species may not have been located during the survey duration, their presence may be found on site at a later date.

The views and opinions contained within the document are based on a reasonable timeframe between the completion of the survey and the commencement of any works. If there is any delay between the commencement of works that may conflict with timeframes laid out within this document, or have the potential to allow the ingress of protected species, a suitably qualified ecologist should be consulted.

It is the duty of care of the landowner/developer to act responsibly and comply with current environmental legislation if protected species are suspected or found prior to works.

1. EXECUTIVE SUMMARY

- 1.1. This report documents the results of a preliminary ecological appraisal (PEA) at land at the former McIntyre Nursery, West Sussex, BN12 6PG.
- 1.2. The proposed development site contained five small buildings/shelters along with areas of bare ground and refuse soil, ruderal vegetation, hardstanding, and a tree line. It is proposed to clear the site and use the land to hold further storage units.
- 1.3. The areas of habitat to be affected by the proposals have been assessed as being of low ecological value. As a precaution, several features within the site will need to be disassembled by hand. No further survey work is considered necessary.
- 1.4. Outline mitigation and enhancement recommendations have been made in order to ensure that opportunities are available for protected species following the completion of the development, and that the ecological value of the site is enhanced in the long-term.

2. INTRODUCTION & BACKGROUND

- 2.1. This report documents the results of a preliminary ecological appraisal (PEA) at land at the former McIntyre Nursery, West Sussex, BN12 6PG.
- 2.2. The survey and report undertaken followed the standard JNCC Phase 1 Survey Methodology, extended to assess the potential for the site to support protected species.

Site Overview

- 2.3. The proposed development site contains five small building/shelters along with areas of bare ground and refuse soil, ruderal vegetation, hardstanding, and tree lines. A small area of the site containing one of the buildings, a polytunnel, could not be surveyed due to access constraints. The site is within a semi rural area, and is immediately surrounded by further storage facilities within a yard. (Map 1, below).
- 2.4. The wider landscape comprises areas of agricultural land and grassland in most directions, tree lines to the north, west, and east with a small area of woodland to the east. To the south lies the A259 followed by an area of residential properties (Map 2, below).
- 2.5. It is proposed to clear the site and use the land to hold further storage units.



Map 1: An aerial view of the buildings on site at the former McIntyre Nursery
(Copyright Google Maps 2019)



Map 2: An aerial view of the site within the wider landscape (Copyright Google Maps 2019)

3. LEGISLATION & POLICY

National Planning Policy Framework (NPPF) 2019

- 3.1. The NPPF aims to minimise impacts on biodiversity and provide net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity. Chapter 15 'Conserving and enhancing the natural environment' details what local planning policies should seek to consider with regard to planning applications:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

170 a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);

170 d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;

174 b) 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.

175 a) if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;

175 d) development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity."

UK Biodiversity Action Plan & Habitats and Species of Principal Importance

- 3.2. The UK Biodiversity Plan (BAP) was a programme designed to help conserve the UK's biodiversity. It led to the production of 436 action plans between 1995 and 1999 to help many of the UK's most threatened species and habitats to recover. A review of the UK BAP

priority list in 2007 led to the identification of 1,150 species and 65 habitats that met the BAP criteria at UK level. Currently 56 Habitats of Principal Importance and 943 Species of Principal Importance are included within Schedule 41 of the NERC Act and these include species and habitats which were identified in the UK BAP and which continue to be considered to represent the conservation priorities of England in the UK Post-2010 Biodiversity Framework.

- 3.3. Species of Principal Importance and Habitats of Principal Importance are those identified as the most threatened and requiring conservation action under Schedule 41 of the Natural Environment and Rural Communities Act 2006 (NERC). Species include West European hedgehog *Erinaceus europaeus*, great crested newt (GCN) *Triturus cristatus*, hazel dormouse *Muscardinus avellanarius*, and common toad *Bufo bufo*.

4. METHODOLOGY

Desk Study

- 4.1. A web-based desk study was undertaken for designated sites and protected species and habitat records within 2km of the site. The following online resources were consulted:
- The MAGIC website, to obtain information on any designated sites of nature conservation interest within 2km of the site and details of any European Protected Species licences issued within 2km (<http://www.magic.gov.uk/MagicMap.aspx>); and
 - Google Maps, to view aerial photographs, maps and to assess the ecological context of the site

Site Visit

- 4.2. Ecologist Genevieve Labram MSc Bsc (Hons) and Assistant Ecologist Joe Denny MSc BSc (Hons) & GradCIEEM undertook a PEA on 6th November 2020.

Preliminary Ecological Appraisal

- 4.3. The PEA identified the habitats present and their potential for protected species, particularly bats, birds, hedgehogs, badgers *Meles meles*, dormice, amphibians and reptiles, following the standard guidelines set out by the Chartered Institute of Ecology and Environmental Management (CIEEM).
- 4.4. The trees and other habitats immediately adjacent to the area to be affected within the red line boundary were assessed for their potential to support roosting and foraging bats, birds and other protected species.

Mammals

- 4.5. Small crevices found in buildings or trees on site and adjacent to the site were assessed for their likely use for roosting bats. Open areas and connectivity of the habitat was also assessed for its potential use for foraging and commuting bats.
- 4.6. Areas of dense vegetated cover on site and adjacent to the site were assessed for their likely use by badgers, and attention was paid to the presence of any signs of current or historic badger activity such as setts and latrines.
- 4.7. Open areas of habitat were visually assessed for signs of mammal tracks, push throughs and latrines.

- 4.8. Areas of tree lines, hedgerows and other boundary vegetation were assessed for their likely use by hazel dormice, or increased likelihood of use due to presence of hazel *Corylus avellana* and other suitable food species.

Amphibians

- 4.9. Any waterbodies within the site were assessed for their potential for use by amphibians and for features which increase likelihood of use as breeding sites for GCN, such as suitable marginal and aquatic vegetation, low water turbidity, absence of fish and low levels of use by water fowl.
- 4.10. Other habitats on site were assessed for their likely use outside of the breeding season for both foraging and shelter purposes.

Reptiles

- 4.11. Open areas of habitat were visually assessed for suitability for reptiles and features which increase likelihood of use by reptiles, including the presence of tussocky vegetation, log and rock piles, basking spots and compost heaps.

Birds

- 4.12. Areas of tree lines, hedgerows, grassland and buildings were assessed for their likely use by breeding or foraging birds.

5. SURVEY RESULTS, IMPACTS AND PROPOSED MITIGATION

Desk Study

Designated Sites

- 5.1. The site is located within the South Downs National Park. This is the only statutory site within 2km of the proposed development.

Priority Habitats and Ancient Woodland

- 5.2. There are multiple areas of protected habitat within the 2km buffer, mostly made up of wood pasture and parkland and priority deciduous woodland as well as good quality semi-improved grassland and lowland calcareous grassland.
- 5.3. The closest area of ancient woodland is an un-named block of ancient and semi-natural woodland located 450m north of the site.

Anticipated Impacts and Mitigation

- 5.4. Given the small scale of the works, and the fact it is already in a developed area no constraints should be implemented in regards to the site being within the South Downs National Park. Also given the nature of the works and distance from the site, areas of priority habitat will not be directly affected through land take or other direct effects of the development.
- 5.5. Following the implementation of the mitigation and enhancement measures set out below it is anticipated that any indirect effects of the development on these features will be effectively minimised.

Preliminary Ecological Appraisal

- 5.6. During the PEA, five small building/shelters along with areas of hard standing, bare ground and refuse soil, ruderal herbs and tree lines were identified within the site boundary.
- 5.7. An area, in the south-eastern corner of the site was not accessible, however, the habitats could be both from within the site and through aerial photographs. It contained one of the buildings: a poly tunnel; and hard standing used for storage of materials.

- 5.8. Figure 1 shows the location and extent of the habitats recorded. It should be noted that only dominant botanical species were identified to classify habitat type. Indicator species were noted where present. The habitat descriptions provided below do not encompass full floral species lists and only dominant native species within each habitat type were recorded at the time of survey.

Bare ground and refuse soil

- 5.9. Large areas of the site were made up of bare ground which was used as access to the facilities. Little to no vegetation was growing through the ground (see Images 1 and 2)

Tree line

- 5.10. A line of trees ran along the north boundary made up of mature cypress *Cupressaceae sp.* (see Image 3)

Hardstanding

- 5.11. Areas of concrete made up approximately half of the site consisting of the driveway and the foundations of some of the buildings.

Buildings

- 5.12. Five building/shelters were present on site of varying sizes. Four of the five structures were storage sheds made of corrugated materials and/or a timber structure with single ply boarding and no insulating material (see Image 4). An addition building in the form of a poly tunnel was present in the un-surveyed area of the site.

Other Notable Habitats

- 5.13. Several log piles, earth piles and stacks of roof tiles were noted around the site which look to have been present for some time. (see Image 5)
- 5.14. Some small areas of ruderal herbs dominated by sorrel *Rumex acetosa* were observed where areas of bare ground had been left undisturbed.

Habitat Summary and Impacts

- 5.15. No precise plans have been finalised, but it is understood all habitats within the site will be affected.
- 5.16. The plants recorded within the habitats on-site likely to be affected by development are common and widespread in the UK and the habitats anticipated to be affected are considered to be of negligible ecological value.

Photos of the Site



Image 1: The area of bare ground



Image 2: Areas of refuse soil within the site



Image 3: The line of trees on the northern boundary as well as an example of one of the buildings



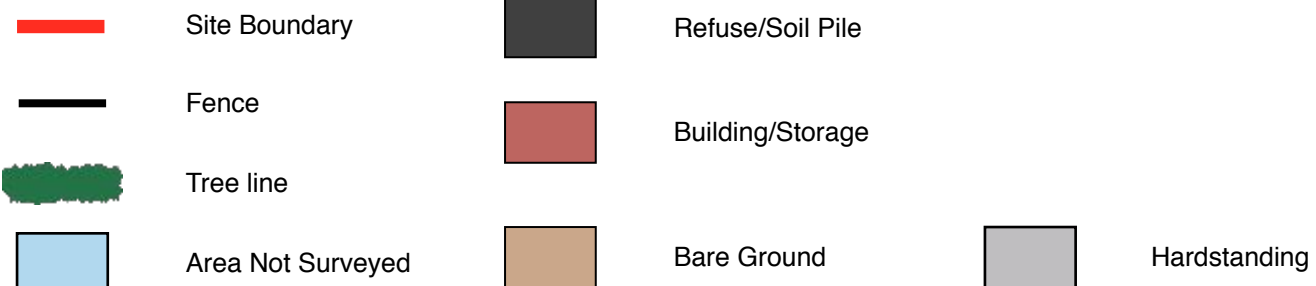
Image 4: Another example of one of the buildings constructed with corrugated material



Image 5: One of the log piles which could provide hibernation habitat



***NOTE** Areas are indicative and are not shown to exact scale.



Project: Land at the former McIntyre Nursery

Figure 1: Habitat Plan

Date: November 2020

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Protected species

Amphibians

Habitat Assessment

- 5.17. No waterbodies suitable to support breeding amphibians are present within 500m of the site. The terrestrial habitat was deemed to be limited in suitability to support amphibians due to the lack of vegetation cover.

Impact of Proposals and Recommendations

- 5.18. The habitats present are unsuitable for amphibians and further survey work is considered unnecessary.
- 5.19. In the extremely unlikely event that GCN are found on site during works all works must **stop** immediately and a suitably qualified ecologist contacted for advice.

Badgers

Habitat Assessment

- 5.20. The habitat within the site provides no foraging and burrowing opportunities for badgers due to the lack of vegetation and the constant use of the site.
- 5.21. No evidence of badgers was found on site during the PEA.

Impact of Proposals and Recommendations

- 5.22. The area due to be lost contains no valuable habitat for badgers. No further survey work is considered necessary.

Bats

Habitat Assessment

- 5.23. Habitats within the site boundary, including the tree lines and open spaces provide potential foraging and commuting opportunities for bats.

Roost assessment

- 5.24. Due to the lack of insulating material providing thermoregulation within the buildings, along with no suitable external or internal features and no evidence being found, these buildings were deemed to be of negligible potential for roosting bats.
- 5.25. The trees within the site are deemed to hold negligible potential for roosting bats

Impact of Proposals and Recommendations

- 5.26. The area due to be lost is small and contains no valuable habitat for bats. No further survey work is considered necessary.

Birds*Habitat Assessment*

- 5.27. The trees within the site provide suitable nesting and foraging opportunities for a variety of bird species which may be found in the local area, and a nest was observed in one of the trees. On this basis, recommendations with respect to this species group are set out below to ensure that they are safeguarded throughout the development works.

Impacts of Proposals and Recommendations

- 5.28. All occupied birds nests have legal protection from damage and destruction under the Wildlife & Countryside Act (1981). All clearance of suitable vegetation and trees should therefore be undertaken outside of the nesting bird season (March to September inclusive for most species in the UK). If vegetation clearance during the nesting season cannot be avoided, all vegetation should be checked for nesting birds by a suitably qualified ecologist immediately prior to clearance taking place. If any active bird nests are found in the areas that need to be cleared they must be buffered from disturbance and works will not be allowed to commence until the chicks have fledged.
- 5.29. Further enhancements in regards to this group are provided below.

Dormice*Habitat Assessment*

- 5.30. Habitats present within the site are considered unsuitable for dormice due to the lack of hedgerows and connectivity to any close woodland or scrub. The *cypress sp* tree line present within the site also does not provide a suitable food source.
- 5.31. No evidence of dormice, including nests and feeding remains, was found during the preliminary ecological appraisal of the site.

Impacts and Mitigation

- 5.32. The area due to be lost is very small and contains no valuable habitat for dormice. No further survey work is considered necessary.

Hedgehog

Habitat Assessment

- 5.33. The tree line within the site and habitats in the surrounding area are considered to be suitable for hedgehogs and it is considered possible they pass through the site on occasion. The base of trees and vegetation/material piles within the site also provide suitable hibernation habitat for this species.

Impact of Proposals

- 5.34. It is considered possible that this species may be present within the site during the development works. While it is considered unlikely that the proposed works will directly affect hedgehogs, it will impact suitable habitats. Safeguarding recommendations with respect to this species are set out below.

Mitigation and Compensation

- 5.35. All dense vegetative areas, brash piles, log piles and rubble piles should be cleared by hand in a sensitive manner to ensure the welfare of any hedgehogs that may be utilising these habitats.
- 5.36. Any trenches and holes created within the site should be covered or contain a mammal ladder overnight to avoid trapping hedgehogs or other fauna that may have fallen in.
- 5.37. If any new fence-lines are proposed, these should include wildlife access holes so that they can freely access / exit the site. 13cm by 13cm is sufficient for any hedgehog to pass through and will be too small for most pets.

Reptiles

Habitat assessment

- 5.38. Habitats present within the site are considered to offer low potential for reptiles due to the lack of suitable vegetation, but, a number of potential hibernacula such as log piles are on site and the near by off-site grassland has potential to support reptiles.

Impact of Proposals and Recommendations

- 5.39. All areas of wood, specifically log piles, and roof tile and material piles should be disassembled cautiously by hand.

6. ENHANCEMENT RECOMMENDATIONS

- 6.1. The proposals consist of clearing the site and constructing further storage units.
- 6.2. All habitats present on site are due to be affected. Impacts to the surrounding landscaping will be negligible.
- 6.3. National planning policy states that all developments should seek to enhance onsite biodiversity whether impacts on protected species are recorded or not. Please see below for specific recommendations.

Landscaping

Wildlife Beneficial Landscaping Scheme

- 6.4. Due to the sites connectivity to habitats in the wider landscape any future landscaping planting should seek to complement the surrounding habitats and provide food and shelter for a wide range of faunal species.
- 6.5. Care should be taken to manage habitats in a suitable way to encourage a wide variety of insects and other wildlife to use the site. This is best achieved with reduced management, and can include leaving some grassland areas to be cut only once or twice a year to encourage flowers. All amenity planting and formal landscaped areas should be created from a palette of wildlife beneficial plants (ideally, but not necessarily native) chosen for their nectar or fruit.
- 6.6. No invasive species should be planted. If any invasive species are found on-site these should be removed with care during vegetation clearance and disposed of appropriately and where possible should be replaced with native flowering plants.
- 6.7. As the habitats around the site have been identified as suitable to support bats, any new external lighting should be directed to avoid light spillage onto vegetation. Bats are sensitive to light and could potentially avoid the area if access points or the surrounding areas become illuminated. Appropriate lighting options will prevent a negative impact on bats potentially using the habitats on site and should be approved by a suitably qualified licensed bat ecologist.
- 6.8. Impacts on bats can be reduced through the use of “warmer” lights as these are less penetrating than bright or cool white lights. Brightness and duration of light should be maintained at as low a level as possible. Motion sensors are strongly recommended, and it is important to direct the light only where it is needed to avoid light spillage onto vegetated margins, this can be achieved by using fixtures that shield the bulb and direct the

light downward. Incidental upward lighting can be minimised by fitting lights with downward facing baffles. Further details regarding lighting and wildlife are provided in the appendix.

Deadwood Habitat Pile

- 6.9. To enhance the site for reptiles, invertebrates and hedgehogs it is recommended that a log or brash pile is created on site in a secluded location adjacent to areas of suitable off and onsite site habitat, preferably constructed from materials from the site.

Bat and Bird Boxes

- 6.10. In order to help achieve a biodiversity net gain on site it is recommended that a number of roost/nest boxes are incorporated into the site area and within the building structures if feasible, in order to improve the availability of roosting and nesting opportunities for these species group.
- 6.11. Roost features for bats can be incorporated into new projects in a number of ways such as bat boxes hung on trees within or adjacent to the site. Examples of enhancement features are included within the appendix.
- 6.12. It is recommended that two bird boxes such as Schwegler 1B Nest Boxes, or similar (with a 32mm entrance hole) are installed within the site. This will provide opportunities for birds such as house sparrow *Passer domesticus*, blue tit *Cyanistes caeruleus* great tit *Parus major*, and blackbird *Turdus merula* and should be installed on retained trees within the completed development.

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APPENDIX 1 - PROTECTED SPECIES LEGISLATION

Bats

In England and Wales, all bat species and their roosts are legally protected under the Wildlife and Countryside Act (1981) (as amended); the Countryside and Rights of Way Act, 2000; the Natural Environment and Rural Communities Act (NERC, 2006); and by the Conservation of Habitats and Species Regulations (2010). You will be committing a criminal offence if you:

- Deliberately capture, injure or kill a bat
- Intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats
- Damage or destroy a bat roosting place (even if bats are not occupying the roost at the time)
- Possess or advertise/sell/exchange a bat (dead or alive) or any part of a bat
- Intentionally or recklessly obstruct access to a bat roost

Barbastelle, Bechstein's, greater horseshoe, lesser horseshoe, brown long-eared, soprano pipistrelle, and noctule bats are all priority species under the UK Biodiversity Action Plan (UK BAP) and have also been adopted as species of principal importance in England under Section 41 of the NERC Act 2006.

Badgers

Badgers and their setts are afforded strict protection under the Protection of Badgers Act 1992. This Act consolidates past badger legislation and, in addition to protecting the badger itself, makes it an offence to damage, destroy or obstruct badger setts. Badgers are also protected under Schedule 6 of the Wildlife and Countryside Act 1981 (as amended), and listed under Appendix III of the Bern Convention, as a species that is in need of protection but may be hunted in exceptional instances. Only badger setts that are currently in use are covered by wildlife legislation.

Birds

All wild birds in the UK are protected under Section 1 of the Wildlife and Countryside Act 1981 (as amended) which makes it an offence to intentionally kill, injure or take any wild bird or to take, damage or destroy the nest or its eggs.

Some bird species, such as the barn owl *Tyto alba*, are listed in Schedule 1 of the 1981 Act and receive further protection, making it an offence to intentionally or recklessly disturb these birds whilst building a nest or in, on or near a nest containing eggs or young; or to disturb dependent young of such a bird.

The NERC Act (2006) inserts a new schedule into the Wildlife and Countryside Act (1981) to protect the nests of some bird species that regularly re-use their nests, even when the nests are not in use. This protection currently applies to golden eagle, white-tailed eagle and osprey.

Reptiles

All British reptiles are listed under schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and are therefore protected from intentional killing or injury. This is largely as a consequence of a national decline in numbers associated with habitat loss.

Two scarcer native British reptiles (smooth snake *Coronella austriaca* and sand lizard *Lacerta agilis*), are afforded 'full' protection. This legislation makes it an offence to intentionally or recklessly kill, injure, disturb, take, possess or sell these species (in all life stages). It is also illegal to damage, destroy or obstruct access to places they use for breeding, resting, shelter and protection.

All species of reptile are priority species in the UKBAP and have been adopted as Species of Principal Importance under Section 41 of the NERC Act (2006) in England (Section 42 in Wales).

Amphibians

Great crested newts (GCN's) *Triturus cristatus* and their habitats are fully protected by the Conservation of Habitats and Species Regulations (2010) and partially protected under the Wildlife and Countryside Act 1981 (as amended). This legislation makes it an offence to kill, injure or capture GCN's, their young or eggs, or destroy / damage their ponds or places of shelter used for breeding or protection. The great crested newt is also a Priority species in the UK Biodiversity Action Plan (UKBAP), and had been adopted as a Species of Principle Importance in England under Section 41 of the NERC Act 2006.

The natterjack toad *Epidalea calamita* is fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended) and Schedule 2 of The Conservation of Habitats and Species Regulations 2010 making it a European Protected Species. The natterjack toad is also a priority species under the UK Biodiversity Action Plan.

The pool frog *Rana lessonae* is protected under the Conservation (Natural Habitats &C.) Regulations 1994 (as amended). As a European protected species the deliberate capturing, disturbing, injuring or killing of this species is prohibited, as is damage or destruction of its breeding sites or resting places. The pool frog is also a priority species under the UK Biodiversity Action Plan due to a 100% decline over 25 years (1980-2005).

Common toads *Bufo bufo* are also designated UKBAP species due to a serious decline of populations across large areas of southern, eastern and central England, thought to be mainly due to changes in habitat management, mortalities on the roads, and climate change.

Dormice

Common dormice *Muscardinus avellanarius* and their habitats are fully protected by both the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations (2010). This legislation makes it an offence to kill, injure, disturb or capture dormice, or destroy or obstruct their resting or breeding places.

The dormouse is also a priority species under the UK Biodiversity Action Plan and has been adopted as a species of Principal Importance in England under Section 41 of the NERC Act 2006 (section 42 in Wales) and so is protected from any adverse effects as a result of development.

Otters

Otters *Lutra lutra* are protected by both the Wildlife and Countryside Act 1981 (as amended) and The Conservation of Habitats and Species Regulations 2010. This legislation makes it is illegal to; deliberately or recklessly kill, injure or capture an otter, deliberately or recklessly disturb or harass an otter, damage, destroy or obstruct access to a breeding site or resting place of an otter.

The otter is also a UK BAP Priority Species and has been adopted as a Species of Principal Importance in England under Section 41 of the NERC Act 2006 (Section 42 in Wales) and the Conservation (Scotland) Act in Scotland.

Water Voles

Water voles *Arvicola terrestris* are fully protected under the Wildlife and Countryside Act 1981 (as amended). This legislation makes it an offence to kill or injure water voles, and to damage, destroy or obstruct access to places used for protection or shelter, and to disturb water voles whilst they occupy such a place.

The water vole is also a Priority species in the UK Biodiversity Action Plan, and had been adopted as a Species of Principle Importance in England under Section 41 of the NERC Act 2006.

White-clawed Crayfish

The white-clawed crayfish *Austropotamobius pallipes* is protected under the Wildlife and Countryside Act 1981 (as amended), making it a criminal offence to; intentionally or recklessly kill or injure a white-clawed crayfish, or sell or

attempt to sell any part of this species. The Habitats Regulations (2010) provide further protection through the declaration of Special Areas of Conservation (SAC). This protection aims to prevent commercial harvesting of white-clawed crayfish and prohibits their capture without a licence.

The white-clawed crayfish is also a Priority species in the UK Biodiversity Action Plan (BAP), and has been adopted as a Species of Principal Importance in England under Section 41 of the NERC Act 2006.

Hedgehogs

Hedgehogs are UK Biodiversity Action Plan (BAP) species, and therefore must be taken into consideration as part of development planning. A recent report (Wembridge, 2011) shows that hedgehog numbers have declined by 25% in the last ten years.

APPENDIX 2 - SURVEY AND REPORTING LIMITATIONS AND EXCEPTIONS

This report and its survey results should be considered in conjunction with the terms and conditions proposed and scope of works agreed between Darwin Ecology Ltd and the client.

This report has been produced in the context of the proposals stated in the Introduction & Background section of this report (Section 2) and should not be used in any other context.

Darwin Ecology Ltd have endeavoured to identify the likely presence / absence of protected species wherever possible on site, where this falls within the agreed scope of works. Current standard methodologies have been used, which are accepted by Natural England and other statutory conservation bodies. No responsibility can be accepted where these methodologies fail to identify all species or significant species on site.

Extended Phase 1 and Preliminary Ecological survey techniques provide a preliminary assessment of the likelihood of protected species occurring on the development site, based on the suitability of the habitats and any field signs found during the site visit. A Phase 1 survey should not be taken as providing a full and definitive survey of any protected species group.

Extended Phase 1 and Preliminary Ecological Appraisals represent a snapshot of conditions at the time of survey and are limited by factors which affect the presence of plants and animals such as the time of year, migration patterns and behaviour. Surveys should therefore not be considered a comprehensive list of all plant species or as conclusive proof that certain protected species are not present or will not be present in the future.

Where the presence/absence of a certain species is in question our ecologists must apply a precautionary approach until further survey data can be sought to better inform the decision.

Darwin Ecology Ltd will advise on the optimum survey season for a particular habitat or protected species prior to undertaking the survey work. Darwin Ecology Ltd cannot accept responsibility for the accuracy of surveys undertaken outside this period.

The potential impacts, mitigation and enhancement sections of the report provide an overview and is for guidance only. This section should not be solely relied upon, but should be considered in the context of the whole report.

Interpretations of survey results and recommendations outlined in the report represent our professional opinions, expressed in accordance with recognised industry practices and current legislation at the time of reporting. The results of survey work undertaken by Darwin Ecology Ltd are representative at the time of surveying.

Where the client had supplied us with data from previous reports, it has been assumed that this information is valid. No responsibility can be accepted by Darwin Ecology Ltd for inaccuracies within any previous data supplied.

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Amendments to this report after its submission may be necessary in light of new, relevant information and / or legislation. This report should be referred to us for re-assessment if any such amendments are necessary or after the expiry of one year from the date of the report.



THE IMPACT OF LIGHTING ON BATS

Bats favour a dark environment for both roosting and foraging as they are adapted to low-light conditions. Artificial lighting will disturb bats if the lighting covers roost access points, flight paths or foraging habitats.

The main peak of nocturnal insect abundance occurs at dusk and a delay in emergence results in a lower foraging rate for bats.

Artificial lighting creates a 'vacuum effect' for nocturnal insects. During the night nocturnal insects use the light of the moon* to navigate. However, artificial lighting and even sky glow above cities obscures the natural moonlight as it is closer

and radiates light in multiple directions.

Some species of bats have been recorded foraging around street lights such as *Pipistrellus* species and *Nyctalus* species. However, species that are less tolerant of artificial light are at a disadvantage when foraging as insects are drawn away from these species usual foraging grounds into the zones of artificial light.

Lighting must be considered in context to any development as increased lighting may cause roost abandonment, reduced reproductive success, and reduced foraging. Mitigation to reduce the impacts of lighting for bats is therefore of great importance in bat conservation.

Table 1: Summary of predicted impact of lighting for each species/genus

Impact	High	Medium	Low
Behaviour			
Maternity roost	All species	-	-
Night roost	<i>Rhinolophus hipposideros</i> <i>Rhinolophus ferrumequinum</i> <i>Myotis</i> spp. <i>Plecotus</i> spp.	<i>Pipistrellus</i> spp. <i>Nyctalus</i> spp. <i>Eptesicus serotinus</i> <i>Barbastella barbastellus</i>	-
Emergence	All species	-	-
Foraging	<i>Rhinolophus hipposideros</i> <i>Rhinolophus ferrumequinum</i> <i>Myotis</i> spp. <i>Plecotus</i> spp.	-	<i>Pipistrellus</i> spp. <i>Nyctalus</i> spp. <i>Eptesicus serotinus</i> <i>Barbastella barbastellus</i>
Commuting	<i>Rhinolophus hipposideros</i> <i>Rhinolophus ferrumequinum</i> <i>Myotis</i> spp. <i>Plecotus</i> spp.	-	<i>Pipistrellus</i> spp. <i>Nyctalus</i> spp. <i>Eptesicus serotinus</i> <i>Barbastella barbastellus</i>
Swarming	All species	-	-
Hibernation	All species	-	-

*For more information see Warrant, E., and Dacke, M. (2016) Visual Navigation in Nocturnal insects. *Physiology*, 31, 182-196.

Sources of light that can disturb bats include; light spill via windows, sport floodlighting, car headlights, roadside lighting, security lighting, aesthetic lighting of waterways, and aesthetic illumination of buildings. Glare will affect bats over greater distance than the target area directly illuminated.

Avoidance is the most effective method, but if this is not possible the following measures should be considered.

What lighting should I use?

- Low pressure sodium lights or 'warm' LEDs
- Wavelength above 540nm
- Colour temperature below 2700K
- Shielded lights that prevent light spill above a 70 degree angle
- Passive infrared (PIR) motion sensors



What to avoid:

- Lighting roost entrances, flightpaths, and foraging or commuting routes
- Reflective surfaces beneath lighting
- High level lights
- Non-directional lighting

Lighting should be considered at an early stage allowing impacts to be minimised through the design of the site.

Key Points

- Keep lighting intensity to the minimum level required
- Limit the times that lights are on to provide some dark periods (e.g. switching installations off between midnight and 5am)
- Dim lighting according to demand
- As an alternative to lighting pathways use paving materials that reflect moonlight
- Low level lighting allows darkness to be retained within higher vegetation
- Set dark habitat buffers - lighting should always be a minimum of 25m from vegetated margins and 40m from waterbodies
- Incorporate dark corridors within the site
- Compensate for the loss of dark areas by enhancing other dark areas
- Consider building design - install internal lighting away from windows

Appendix 3: Bat Boxes

Installation of bat boxes on trees

- These need to be installed at a height of at least 4m.
- In a un-cluttered location on the tree, no branches obstructing the flight path of bats to the box entrance
- Preferably on a southern aspect with good connectivity to linear features such as other mature trees and hedgerows.
- Please note that once bats have inhabited a roost site they may only be disturbed by licensed bat workers.



2F Schwegler Bat Box with Double Front Panel

This box has a front panel with a second inner wooden panel fitted to it to create a cavity wall. This provides ideal quarters for bats that inhabit crevices, such as Nathusius' Pipistrelle (*Pipistrellus nathusii*), Daubenton's Bat (*Myotis daubetonii*) and the Common Pipistrelle (*Pipistrellus pipistrellus*).

It has been designed as a summer roosting space for bats and has a simple entrance hole at the front. The 2F Double Front Panel is 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.



The 2F Double Front Panel bat box can be sited in trees or on buildings and is best positioned at a height of between 3 to 6 metres.



3FN Schwegler Bat Box

The 3FN bat box is manufacture from long lasting Woodcrete, making it ideal for long term mitigation projects.

The 3FN has two entrances, one at the back of the box next to the tree trunk and the other at the front of the box. The small front entrance provides protection against natural predators. The entrance area is stepped providing protection against small predators, draughts and bright lights.

The 3FN bat box is provided with a hanger and aluminium nail and should be sited in trees and is best positioned at a height of between 3 to 6 metres.

Bat boxes should ideally be sited in open sunny positions.





TYPES OF BIRD BOXES



Vivar Pro Seville 32mm WoodStone Nest Box

- Manufactured from woodstone - increases longevity and provides a consistent internal temperature
- The nest box compensates for the lack of natural cavities that are found in trees
- Suitable for blue tits, tree sparrows, house sparrows, great tits, crested tits, nuthatches, coal tits and pied flycatchers
- Should be installed between 1.5m and 3m high



House Martin Nest Cups



Swallow Nest Bowl

- Suitable nest building mud is difficult for house martins and swallows to find
- Alterations to house construction and roof design have resulted in a decrease of suitable nesting sites
- Install swallow nest bowls within an outbuilding or garage that has flight access - 6cm below the ceiling
- Install house martin nest cups under the eaves of a house - minimum of 2m high



Swift Nest Box

- Swift numbers are declining partly due to a loss of nesting sites
- The entrance hole discourages other birds such as starlings and sparrows
- Install a minimum of 5m high with unobstructed airspace in front of the nest
- Integrated models of swift nest boxes are also available



5KL Schwegler Nuthatch Nest Box

- Manufactured from woodcrete
- Nuthatches prefer nest boxes with larger cavities. They will often occupy owl nest boxes and fill the entrance hole with mud reducing the size to approximately 32mm
- Nuthatches plaster mud on the internal walls of the cavity and line the floor with wood chipping and leaves to nest
- To discourage nuthatches from using owl nest boxes try installing the 5KL immediately adjacent



Open-fronted Nest Box

- Manufactured from woodstone - lifetime of 20-25 years
- Suitable for robin, wren, spotted flycatchers, and black redstart
- Best installed hidden from view on the wall of a building or hidden within ivy/honeysuckle as the boxes open-front may attract predators
- Install at a height of 1-3m



Sparrow Terrace Nest Box

- Sparrow populations are decreasing due to a lack of nesting sites
- Sparrows are a sociable species and prefer to nest in a colony
- Likelihood of uptake is increased if more nesting chambers are available (the example nest box shown contains three nesting chambers)
- Various other nest box designs are available
- Install at a minimum of 2m high



Tawny Owl Nest Box

- Install on a mature tree within a woodland (not on the outskirts)
- Install a minimum of 3m high
- Face the box entrance away from prevailing wind (generally avoiding west/south-west)



Little Owl Nest Box

- Prefer areas of mixed farmland and orchards
- Essential features; small entrance hole (70mm), narrow tunnel, and a dark nesting chamber
- Install on a horizontal tree branch/wall top or beam so that owlets can walk in/out prior to fledging
- Can be installed on any tree species apart from cherry - the cherry harvest coincides with the little owl breeding season
- Entrance hole should face the tree trunk
- Install at a minimum height of 3m