



ENVIRONMENTAL CONSULTANTS

Unit 4, Langham Stables, Langham Lane, Lodsworth, Petworth, West Sussex, GU28 9BU

www.ecologyco-op.co.uk

Preliminary Ecological Appraisal

Land East of 93 Bersted Street, Bognor Regis

Author: Briony Hill BSc, Grad CIEEM

Reviewed by: Paul Whitby BSc, MCIEEM, CEcol

24th August 2016

Project No: 1571

The Ecology Co-operation Ltd
Registered Office: Greens Court, West Street, Midhurst, West Sussex, GU29 9NQ
Company number: 8905527



Report Summary

1. This report gives details of a Preliminary Ecological Appraisal (PEA) carried out at for land east of 93 North Bersted Street, Bognor Regis by Briony Hill a Graduate member of the Chartered Institute for Ecology and Environmental Management (CIEEM).
2. The PEA was carried out on the 22nd August 2016 to evaluate the site for habitats potentially suitable to support EU and UK protected species as it is proposed to build a single residential property.
3. The plot of land is located on the outskirts of a North Bersted residential area with properties immediately south of the site and their gardens meeting the west and eastern boundaries. The North Bersted Bypass – A259 is located less than 380m to the north with a few pastoral fields and a small area of woodland is situated between. This site has been managed as a vegetable plot for a number of years with two large vegetable plots located in the centre surrounded by mown lawn. The site also supports a shed, a small greenhouse, an area of scrub and hedgerows.
4. No further surveys are recommended for badgers, bats, dormice, great crested newts or water voles. Precautionary mitigation is required for reptiles with the lawn to be kept bellow 5cm in height and the compost heaps hand searched and relocated to a suitable area within the large plot located north and under the same ownership. Hand searches may be required by a suitably qualified ecologist if any scrub, hedgerow or trees are to felled during the nesting bird season (1st March to 31st August). In addition, if any protected species are found during the proposed work, an ecologist must be contacted immediately for advice.
5. The proposal at this site is very small in scale, with only a single residential dwelling proposed to be built. This is not anticipated to affect The Brook LNR, located 0.5km to the north east.

This report has been prepared by The Ecology Co-operation Ltd, with all reasonable skill, care and diligence within the terms of the Contract with the client. This report only becomes the property of the client once payment for it has been received in full.

We disclaim responsibility to the client and others in respect of any matters outside the scope of the above.

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



CONTENTS PAGE

1	INTRODUCTION	4
1.1	Purpose of the Report	4
1.2	Background	4
2	METHODOLOGY	10
2.1	Badger	10
2.2	Bats	10
2.3	Breeding Bird Habitat	11
2.4	Dormice	11
2.5	Great Crested Newt	11
2.6	Reptiles.....	11
3	LEGAL PROTECTION.....	11
4	RESULTS.....	12
4.1	Badgers	12
4.2	Bats	12
4.3	Breeding Birds	13
4.4	Dormice	13
4.5	Great Crested Newts	14
4.6	Reptiles.....	14
4.7	Water Voles	15
4.8	Designated sites and wider Ecological Impact Significance	15
4.9	Constraints/Limitations	16
5	DISCUSSION AND RECOMMENDATIONS	16
5.1	Badgers	16
5.2	Bats	16
5.3	Breeding Birds	17
5.4	Dormice	17
5.5	Great Crested Newts	17
5.6	Reptiles.....	18
5.7	Water voles.....	18
5.8	Development Impact Assessment	18
6	Appendix 1 – Legislation and Policy	19
7	Appendix 2 - Artificial lighting and wildlife	21



1 INTRODUCTION

1.1 Purpose of the Report

This report gives details of a preliminary ecological appraisal for the potential of protected species and or valuable habitats to be present at Land east of 93 North Bersted Street, Bognor Regis. It is proposed to construct a single residential dwelling on this plot of land. The grid reference for the site centre is SU 92495 01356.

This survey assessment was carried out by Briony Hill, a Graduate member of the Chartered Institute for Ecology and Environmental Management (CIEEM).

This survey and report was carried out and produced at the request of Christopher Tomkins.

This survey has been carried out to assess what impact (if any) a residential development at this land might have upon protected or notable wildlife and habitats. This report describes the results of a preliminary ecological appraisal for the potential presence or likely absence of protected species. Where necessary mitigation measures considered necessary to protect wildlife as well as compensate for any potential harm to habitats of value that could take place are outlined.

1.2 Background

This report is intended to assess the current ecological value of Land East of 93 North Bersted Street, Bognor Regis, which is situated north of North Bersted (See Figure 1). The plot of land surveyed is the single plot, with a large plot of land under the same ownership located to the north (See figure 2). The plot of land is located on the outskirts of a residential area with properties immediately south and their associated gardens meeting the west and eastern boundaries. To the north a few pastoral fields and a small area of woodland located within the large plot are present. In the wider landscape new build properties are being constructed further west and north and the North Bersted Bypass – A259 is located less than 380m to the north with agricultural and pastoral fields along with solar farms beyond.

This site has been managed as a vegetable garden for a number of years with two large vegetable plots located in the centre (See figure 3). These are surrounded by mown lawn composed of grass which could not be identified due to its short length, although some cock's-foot (*Dactylis glomerata*) was scattered in the area and a small amount of *Poa* sp. Other grassland plants identified were common dandelion (*Taraxacum officinale*), white clover (*Trifolium repens*), ground ivy (*Glechoma hederacea*), field bindweed (*Convolvulus arvensis*), common sorrel (*Rumex acetosa*) and broadleaved dock (*Rumex obtusifolius*). This lawn extends beyond the northern boundary leading to a small orchard (See figure 4). Additional plants identified along the edges of the vegetable patches are; precumbent yellow-sorrel (*Oxalis corniculata*), wood spurge sp. (*Euphorbia amygdaloides*), Russian comfrey (*Symphytum x uplandicum*), common nettle (*Urtica dioica*) and bindweed sp.

The western boundary is marked by a wooden trellis and wire metal fence with hawthorn (*Crataegus monogyna*), elder (*Sambucus nigra*), holly (*Ilex aquifolium*) and bramble (*Rubus fruticosus*) present with an understory of ivy (*Hedera helix*), nettle, hedge woundwort (*Stachys sylvatica*), broadleaved dock and

Land at 93 North Bersted Street, Bognor Regis

hogweed (*Heracleum sphondylium*). Two compost heaps are located just a few meters away from the western boundary. Behind these is a large *Cotoneaster* sp. hedgerow as well as a semi mature hazel (*Corylus avellana*), pedunculate oak (*Quercus robur*), elder (*Sambucus nigra*) and hawthorn with bramble intertwined (See figure 5).

The southern boundary is marked by a hedgerow with a section of hornbeam (*Carpinus betulus*) and a section of cypress sp. a small amount of elder and holly was also present with an understory dominated by nettle. A large bay bush (*Laurus nobilis*) was located just in front of this hedgerow. The eastern boundary is a hedgerow of beech (*Fagus sylvatica*), hazel, hawthorn with dandelion, herb Robert (*Geranium robertianum*), ivy and nettle along this margin.

At the northern boundary an area of scrub is present as well the mown lawn which extends further to the north. The scrub is dominated by bramble with a semi-mature unidentified ornamental tree, semi-mature and sapling cherry trees (*Prunus* sp.), semi-mature plum (*Prunus* sp.) and sapling pedunculate oak, with nettle, hogweed, raspberry (*Rubus* sp.), ground ivy, ivy and cook's-foot in the understory (See figure 6).

A gravel and short mown grass access lane runs between properties 97 and 101 and meets the south east corner of the site (See figure 7).

A small wooden framed greenhouse is located on the site (See figure 8). In addition, a wooden shed is located in the south west corner situated on concrete hardstanding (See figure 9). This has single skinned wooden panelled walls which are tight fitting and a corrugated chrysotile roof with the absence of any lining or roof void. It has not yet been confirmed if this shed will remain or be demolished. Bramble scrub has grown over the top of the roof and along the northern and part of the eastern face.



Figure 1. An aerial image showing the location of land east of 93 North Bergsted Street. The approximate site boundary is outlined in red.



Figure 2. Site plan showing the location and site boundaries of 'single plot', located east of 93 North Bergsted, which was surveyed.



Figure 3. The vegetable plots located in the center of the site.



Figure 4. The mown lawn extends to the north leading to a small orchard located off site.



Figure 5. Cotoneaster hedgerow with a semi mature hazel and pedunculate oak, elder, hawthorn and bramble interspersed.



Figure 6. Area of scrub located to the north of the site.



Figure 7. View from the north of the access grassy lane to the east of the site adjacent to the eastern hedgerow seen on the left.



Figure 8. Green house located on site. The southern hedgerow of cypress and hornbeam is located behind along with the large bay shrub.



Figure 9. The wooden shed with corrugated chrysotile roof located in the south west corner of the site with bramble growing over the roof and down the north and part of the eastern face.



2 METHODOLOGY

A preliminary ecological appraisal was carried out on 22nd August 2016 to evaluate the site for its potential to support EU and UK protected species. The populations of the following species or taxonomic groups are often recorded within rural settings; badgers (*Meles meles*), bats, nesting birds, great crested newt (*Triturus cristatus*), dormice (*Muscardinus avellanarius*) and the more widespread species of reptiles such as common lizard (*Zootoca vivipara*), slow worm (*Anguis fragilis*) and grass snake (*Natrix natrix*).

The methods developed by CIEEM and the following authors were used in the assessment of either suitable habitat to support the above species or taxonomic groups or in some cases direct evidence that the species were present¹²³⁴⁵⁶

In addition, observations of any important plant communities or other valuable ecological features will have been recorded and detailed. Details of initial survey method for each species are given below.

Following the appraisal of this site the decision was taken that a biodiversity records search was not necessary due to the small nature of this particular development and the low potential for protected species to be present.

2.1 Badger

An initial assessment was carried out to identify areas that might be used by Badgers (*Meles meles*). Signs of Badgers including setts, incidental foraging signs, runs and latrines, are recorded if encountered during the survey.

2.2 Bats

Trees, buildings, and other structures were assessed for the potential to support roosting bats. Bats can use a variety of roost areas including trees with holes, splits, cracks, cavities, Ivy and loose bark as well as a variety of roosting areas within buildings.

A detailed survey was carried out looking for any evidence indicating the presence of bats using buildings or trees, such as rub marks, staining or droppings inside or outside any potential roost sites.

¹ Bright, B., Morris, P., Mitchell-Jones, A.J. and Mitchell-Jones, T (1997) *The Dormouse Conservation Handbook*. English Nature.

² English Nature (2001) *Great Crested Newt Mitigation Guidelines*. English Nature, Peterborough.

³ Harris, S, Cresswell, P. and Jefferies, D. (1989) *Surveying Badgers*. Mammal Society.

⁴ Oldham, R.S., Keeble, J., Swan, M.J.S. and Jeffcote, M. (2000) Evaluating the suitability of habitat for the great crested newt (*Triturus cristatus*). *Herpetological Journal* 10, 143-155.

⁵ Collins, J.(ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd edn). The Bat Conservation Trust, London..

⁶ CIEEM (2013) *Guidelines for Preliminary Ecological Appraisal*



If any definite signs of bats or other evidence had been found (such as actual sightings, droppings, urine stains, odour, scratch marks, grease stains and feeding remains), they would have been recorded.

2.3 Breeding Bird Habitat

Habitats were assessed for their suitability for nesting birds. This could include ground nesting species, such as Skylark (*Alauda arvensis*) and Lapwing (*Vanellus vanellus*) or birds that favour urban environments. Where buildings were present, possible use by Starlings (*Sturnus vulgaris*) House Sparrow (*Passer domesticus*), or Barn Owls (*Tyto alba*).

2.4 Dormice

The site was assessed for its value for dormice, including woodland and suitable hedgerows, which form either a continuous or connected area of habitat at least 2 hectares in area. Particular note was made of the presence of trees which are valuable for foraging dormice, particularly hazel. If possible a nut search to look for evidence of nuts that have been chewed by dormice would also be made.

2.5 Great Crested Newt

Initial surveys centre on identifying suitable habitat. If there are ponds or wet ditches that are considered to be suitable breeding habitats for Great Crested Newt within 500 m that are not isolated from the site by unsuitable habitat or physical barriers, then this species could be using terrestrial habitat on the site.

2.6 Reptiles

The site was assessed for reptiles, with particular attention paid to those features that provide suitable basking areas (e.g. south-facing slopes), hibernation sites (e.g. banks, walls, piles of rotting vegetation) and opportunities for foraging (rough grassland and scrub).

3 LEGAL PROTECTION

Legal protection applying to relevant bird, mammal, herpetofauna and invertebrate species is detailed in Appendix 1 of this report.



4 RESULTS

4.1 Badgers

No signs of any badger activity were seen during the survey assessment. It is likely that if any setts were situated within 30 metres of the site boundary, then some evidence of badger activity would have been observed.

4.2 Bats

The only buildings on site are a small wooden frame greenhouse and a wooden shed located in the south west corner of the site which at the time of writing this report has not been decided to remain or be demolished. The green house has no suitable features to support roosting bats.

The wooden shed has no suitable roosting features for bats. The corrugated chrysotile roof is not a suitable material for roosting bats, which require an area with a stable temperature. Due to its thermoregulatory properties, chrysotile is rarely observed to support bats. The walls are single skinned wooden panels walls which are tight fitting. In addition, there is no void internally. Bramble scrub has grown over the top of the roof and along the northern and part of the eastern face which could provide roosting area for bats however it is not incredibly dense (See figure 10).

Internally the building was cobwebbed indicating that bats do not use this area. The floor area was searched for any bat droppings or feeding remains that might remain if any bats had used this building, however no evidence of use by bats was identified. This building was therefore identified to have a negligible potential to support roosting bats.

None of the semi-mature or sapling trees are large enough to support suitable features for crevice dwelling bats such as splits, root holes or peeling bark.



Figure 10. Bramble growing over the corrugated chrysotile roof of the wooden shed located on the south west of the plot of land.

4.3 Breeding Birds

All of the scrub, hedgerows, saplings and semi-mature trees have the potential to support a variety of common nesting birds.

Skylark are known to be nesting at The Brooks Local Nature Reserve located 0.5km to the north east. This ground nesting bird is associated with open farmland, moorland, marshland and heathland. This plot of land does not support any of these habitat types and it is unlikely that any skylarks would be found on site at any time.

4.4 Dormice

The east and south boundary hedgerows composed of of hornbeam, cypress sp, elder, holly, beech, hazel hawthorn represent potential low value habitat for dormice. This arboreal species favours mixed broadleaved woodland, where there are clear sources of food for as long of their active season as possible (March to October). The scrub dominated by bramble with an unidentified ornamental tree, cherry, plum and sapling pedunculate oak also has low value. These habitats have limited connectivity to an area of woodland to the north, located within the large plot, which is less than 0.7 hectares in size. Some hedgerows extend from this however these do not connect to any further woodland area due to the North Bersted bypass acting as a barrier to the north and east and residential areas acting as barriers to the wider landscape to the south and west.



4.5 Great Crested Newts

No ponds are located within the sites boundaries. A large pond was identified on the aerial imagery located approximately 350m to the west of the site (See figure 11). This is a relatively new pond managed as part of a wetland scheme for the new residential development to the north of North Bersted. It is unlikely that this pond supports great crested newts as a result of it being established fairly recently and being surrounded by residential properties on three of its boundaries resulting in the surrounding terrestrial value being poor.

The terrestrial value of the site for amphibians is moderate, with the patches of scrub and occasional ground cover offering suitable foraging habitat and cover for this group of species.



Figure 11. The location of the pond in relation to the site with its approximate boundaries show in red.

4.6 Reptiles

About half of the site is composed of mown lawn and vegetable patch which has a weed suppressing top sheet unsuitable for reptiles which require suitable ground cover from predators. Very limited suitable foraging habitat is present in the form of a vegetable patch and minimal longer grass along vegetable patch boundary and around the area of scrub. In addition, the two compost heaps are considered suitable reptile hibernacula (See figure 12).

The large plot, under the same ownership, located north and meeting the northern boundary is likely to support reptiles.



Figure 12. Compost heaps located to the west of the site, these are considered suitable reptile hibernacula.

4.7 Water Voles

Water voles are confirmed in the wider landscape with sightings made at The Brooks Local Nature Reserve which is located north east on the other side of North Bersted Bypass – A259.

However, there are no waterbodies or watercourses on or adjacent to the site that might support water voles.

4.8 Designated sites and wider Ecological Impact Significance

A search was undertaken on the MAgiC website resource (www.magic.gov.uk) and The Brooks Local Nature Reserve (LNR) was identified 0.5km to the north east the other side of North Bersted Bypass – A259 (See figure 13).

This site is 19 hectares in size with large areas of meadow. It supports ditches lined by narrow reedbeds and a number of temporary and permanent ponds. In addition, an extensive floodplain woodland has been recently planted as the site floods yearly in winter. Water voles have been confirmed at the site in 2009. This LNR also supports several hundred black poplar trees, rare picture-winged flies and nesting skylarks.

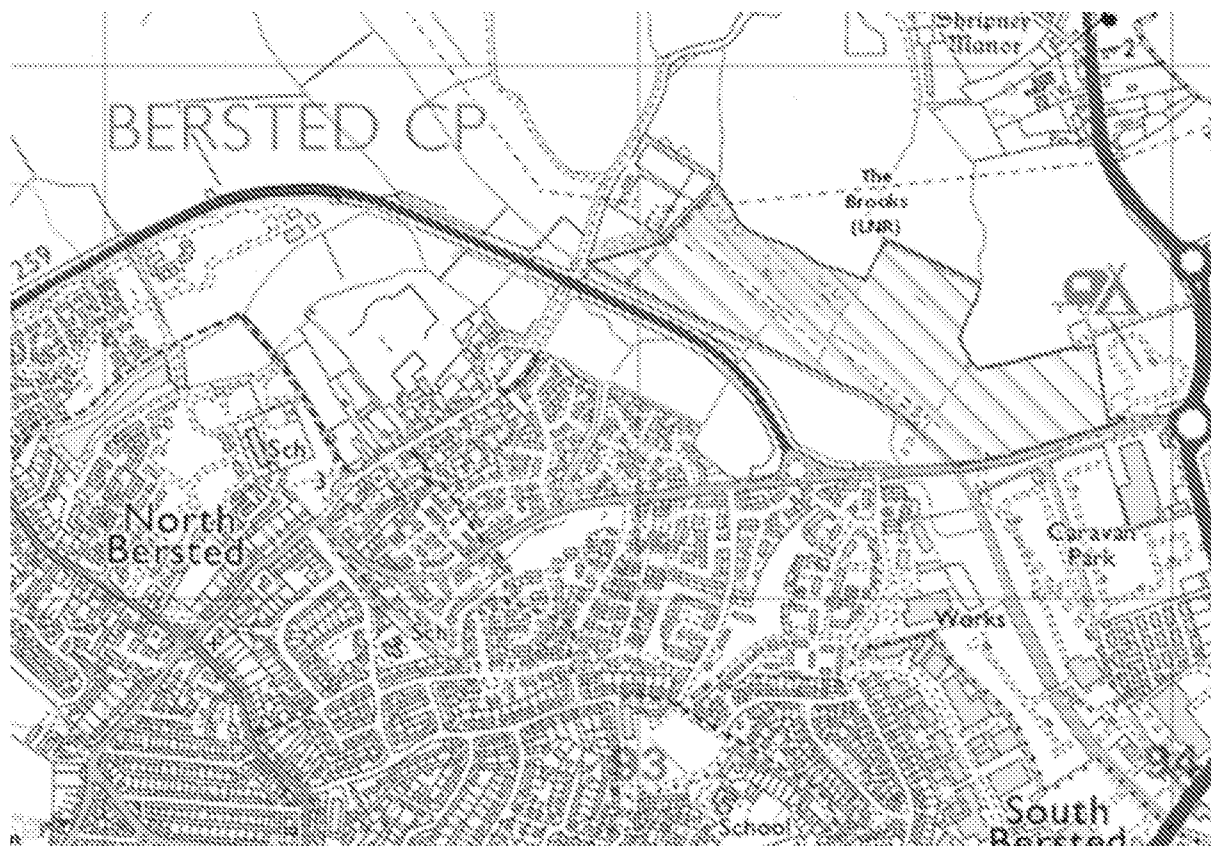


Figure 13. MAgiC map showing the location of The Brooks LNR in relation to land east of 93 North Bergsted Street with the sites boundaries shown in red.

4.9 Constraints/Limitations

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

5 DISSCUSSION AND RECOMMENDATIONS

5.1 Badgers

No signs of Badger activity were identified during the assessment and no badger setts are situated on or near of the proposed construction zone. No further mitigation for badgers is advised, however if any signs of digging by large animals is identified on or near to the course prior to construction, then an ecologist should be contacted for advice.

5.2 Bats

The wooden shed was considered to have negligible potential to support roosting bats due to it having tightly fitting single skinned wooden walls, no void, a roof composed of corrugated chrysotile sheets an



Land at 93 North Bersted Street, Bognor Regis

unsuitable material to support roosting bats and no evidence of past or present use by bats internally. Bramble scrub has grown over the top of the roof and along the northern and part of the eastern face but this is not particularly dense and is therefore unlikely to support roosting bats. Due to this no further bat surveys and mitigation is recommended.

The semi-mature or sapling trees within the construction zone are not large enough to support suitable features for crevice dwelling bats, such as peeling bark, splits or rot holes. No further surveys are recommended on these trees.

As the site could have value for foraging bats, it is very important that the impacts of artificial lights are minimised where possible. In Appendix 2 guideline produced by the Bat Conservation Trust are included and it is important that the development would have to strictly follow these guidelines.

5.3 Breeding Birds

All of the scrub, hedgerows, saplings and semi-mature trees have a high potential to support a variety of nesting birds. It will be essential for any future development to consider the nesting bird season and any vegetation removal should be timed outside of the nesting bird season (1st March to 31st August) unless features are first hand search by a suitably qualified ecologist.

This plot of land does not support any open farmland, moorland, marshland and heathland with which skylark are associated and therefore it is unlikely they would be found on site at any time.

5.4 Dormice

The east and south boundary hedgerows along with the scrub represent potential low value habitat for dormice. These have connectivity to woodland located to the north within the large plot which in turn has connectivity to limited hedgerows. However, this habitat is isolated due to the North Bersted bypass acting as a barrier to the north and east and residential areas acting as a boundary to the wider landscape to the south and west. Due to this and the area of woodland being less than 2 hectares, (indeed it is approximately 0.7 hectares in area), it is unlikely to support a population of dormice and it is unlikely dormice would be found on the site at any time. In addition, the hedgerows are not expected to be affected by the development with only the scrub to be partially cleared with bramble and semi mature trees expected to be removed. As such no further surveys are recommended.

5.5 Great Crested Newts

No ponds were identified on the site whilst a large pond was identified on mapping located approximately 350m to the east. This pond is considered unlikely to support great crested newts as it is relatively new, large in size, managed as a wetland area and has poor surrounding terrestrial habitat due to being surrounded by new residential properties on three of its boundaries.

Due to this no further surveys are recommended with respect to great crested newts, as it is unlikely that this species would be found on the site at any time.



5.6 Reptiles

There is very limited suitable foraging habitat in the form of a vegetable patch and minimal longer grass along vegetable patch boundary and around the area of scrub to the north. In addition, the two compost heaps are considered suitable reptile hibernacula.

Due to the limited amount of foraging habitat a reptile survey is not suggested in this instance but instead precautionary mitigation is recommended. The lawn area must be continually mown before and during construction and not left to grow above 5cm in height. It must be mown as tightly as possible to the scrub, hedgerows and vegetable patches. This will prevent any suitable habitat establishing and potential reptiles from colonising the area from the northern large plot which has potential to support reptiles.

A hand search and removal of the two compost heaps located to the west of the site is also recommended. The compost heap along with any reptiles that might be found would be relocated to a suitable area with the large plot located to the north.

5.7 Water voles

The site is located approximately 0.5km from The Brooks LNR which is known to support water voles. The site itself however does not support any suitable habitat for water voles. Therefore, no further surveys are recommended for this species.

If any protected species are encountered at any time during construction an ecologist must be contacted immediately for advice.

5.8 Development Impact Assessment

This development is small in scale with a proposal to construct a single residential property which would result in the loss of two vegetable patches, some mown lawn, an area of scrub and a few semi mature trees, a cotoneaster hedgerow and potentially a wooden shed.

Due to the small scale of this development it is not anticipated to affect The Brook LNR, located 0.5km to the north east of the site.

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



6 Appendix 1 – Legislation and Policy

General

This section briefly describes the legal protection afforded to protected species. It is for information only and is not intended to be comprehensive or to replace specialised legal advice. It is not intended to replace the text of the legislation, but summarises the salient points.

Badger

Badger is protected in Britain under the Protection of Badgers Act 1992 and Schedule 6 of the Wildlife and Countryside Act 1981 (as amended).

The legislation affords protection to Badger and Badger setts, and makes it a criminal offence to:

- wilfully kill, injure, take, possess or cruelly ill-treat a Badger, or to attempt to do so;
- interfere with a sett by damaging or destroying it;
- to obstruct access to, or any entrance of, a Badger sett; or
- to disturb a Badger when it is occupying a sett.

Bats, Dormouse and Great Crested Newt

Dormouse (*Muscardinus avellanarius*), Great Crested Newt (*Triturus cristatus*), and all species of British bat (*Vespertilionidae* and *Rhinolophidae*) are listed on *Schedule 5* of the *Wildlife and Countryside Act 1981* (as amended), and receive full protection under *Section 9*. These species are also all listed as European Protected Species on *Schedule 2* of the *Conservation (Natural Habitats, etc.) Regulations 1994* which gives them full protection under *Regulation 39*. Protection was extended by the *Countryside and Rights of Way Act 2000* (the CROW Act). Under the above legislation it is an offence to:

- kill, injure or take an individual;
- possess any part of an individual either alive or dead;
- intentionally or recklessly damage, destroy or obstruct access to any place or structure used by these species for shelter, rest, protection or breeding;
- intentionally or recklessly disturb these species whilst using any place of shelter or protection; or
- sell or attempt to sell any individual.

It is also an offence to set and use articles capable of catching, injuring or killing bats (for example a trap or poison), or knowingly cause or permit such an action. In the case of Dormouse and all species of British bat there is also protection under *Schedule 6* of *The Wildlife and Countryside Act 1981* (as amended) relating specifically to trapping and direct pursuit of these species.

Dormouse, Great Crested Newt and all species of British bat are included as priority species in the *UK Biodiversity Action Plan* and as species of principal importance for the conservation of biological diversity in England under *Section 74* of the *Countryside and Rights of Way (CROW) Act 2000*.

Reptiles

Common Lizard (*Lacerta vivipara*), Grass Snake (*Natrix natrix*), Slow-worm (*Anguis fragilis*), and Adder (*Vipera berus*) are listed under *Schedule 5* of the *Wildlife and Countryside Act 1981* (as amended), in respect of *Section 9(5)* and part of *Section 9(1)*. This protection was extended by the *Countryside and Rights of Way (CROW) Act 2000*. Under the legislation it is an offence to:

- intentionally or deliberately kill or injure any individual of these species; or
- sell or attempt to sell any part of these species either alive or dead.



Nesting Birds

All species of bird are protected under *Section 1* of the *Wildlife and Countryside Act 1981* (as amended). Protection was extended by the *Countryside and Rights of Way (CROW) Act 2000*. Under the above legislation it is an offence to intentionally:

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

Certain species are listed on *Schedule 1* of the *Wildlife and Countryside Act 1981* (as amended) and receive protection under *Sections 1(4)* and *1(5)*. The protection was extended by the *Countryside and Rights of Way (CROW) Act 2000*. There are special penalties where the offences listed above are committed for any *Schedule 1* species and it is also an offence to intentionally or recklessly:

- disturb any such bird when it is building its nest or while it is in or near a nest containing dependant young; or
- disturb the dependant young of any such bird.

Roman Snails

In 2008, the Roman snail (*Helix pomatia*) was added to *Schedule 5* of the *Wildlife and Countryside Act 1981* (as amended), and it became an offence to intentionally kill, injure or take individuals of this species.



7 Appendix 2 - Artificial lighting and wildlife

Interim Guidance: Recommendations to help minimise the impact of artificial lighting

Wherever human habitation spreads, so does artificial lighting. This increase in lighting has been shown to have an adverse effect on our native wildlife, particularly on those species that have evolved to be active during the hours of darkness. Consequently, development needs to carefully consider what lighting is necessary and reduce any unnecessary lighting, both temporally and spatially. When the impacts on different species groups are reviewed, the solutions proposed have commonalities that form the basis of good practice. These are outlined in the following document.

Overview of impacts

Invertebrates

Artificial light significantly disrupts natural patterns of light and dark, disturbing invertebrate feeding, breeding and movement, which may reduce and fragment populations. Some invertebrates, such as moths, are attracted to artificial lights at night. It is estimated that as many as a third of flying insects that are attracted to external lights will die as a result of their encounter.¹ Insects can become disoriented and exhausted making them more susceptible to predation. In addition, the polarisation of light by shiny surfaces attracts insects, particularly egg laying females away from water. Reflected light has the potential to attract pollinators and impact on their populations, predators and pollination rates. Many invertebrates natural rhythms depend upon day-night and seasonal and lunar changes which can be adversely affected by artificial lighting levels.

It is not always easy to disentangle the effects of lighting on moths from other impacts of urbanisation. However, it is known that UV and green and blue light, which have short wavelengths and high frequencies, are seen by most insects and are highly attractive to them. Where a light source has a UV component, male moths in particular will be drawn to it. Most light-induced changes in physiology and behaviour are likely to be detrimental. They discern it to be 'light', so they do not fly to feed or mate.²

Birds

There are several aspects of changes to bird behaviour to take into account. The phenomenon of robins and other birds singing by the light of a street light or other external lighting installations is well known, and research has shown that singing did not have a significant effect on the bird's body mass regulation. However, it was felt that the continual lack of sleep was likely to be detrimental to the birds' survival and could disrupt the long-term circadian rhythm that dictates the onset of the breeding season³. Many species of bird migrate at night and there are well-documented cases of the mass mortality of nocturnal migrating birds as they strike tall lit buildings. Other UK bird species that are particularly sensitive to artificial lighting are long-eared owls, black-tailed godwit and stone curlew.⁴

¹ Bruce-White C and Shardlow M (2011) A Review of the Impact of Artificial Light on Invertebrates - See more at: <http://www.buglife.org.uk/advice-and-publications/publications/campaigns-and-reports/review-impact-artificial-light/#sthash.s7GPA1vL.dpuf>

² As above

³ Pollard A. (2009) Visual constraints on bird behaviour. University of Cardiff

⁴ Rodriguez A., Garcia A.M., Cervera F. and Palacios V. (2006) Landscape and anti-predation determinants of nest site selection, nest distribution and productivity in Mediterranean population of Long-eared Owls, *Asio otus*. *Ibis*, 148(1), pp.133-145



Land at 93 North Bersted Street, Bognor Regis

Mammals

A number of our British mammals are nocturnal and have adapted their lifestyle so that they are active in the dark in order to avoid predators. Artificial illumination of the areas in which these mammals are active and foraging is likely to be disturbing to their normal activities and their foraging areas could be lost in this way. It is thought that the most pronounced effect is likely to be on small mammals due to their need to avoid predators. However, this in itself has a knock-on effect on those predators.

The detrimental effect of artificial lighting is most clearly seen in bats. Our resident bat species have all suffered dramatic reductions in their numbers in the past century. Light falling on a bat roost exit point, regardless of species, will at least delay bats from emerging, which shortens the amount of time available to them for foraging. As the main peak of nocturnal insect abundance occurs at and soon after dusk, a delay in emergence means this vital time for feeding is missed. At worst, the bats may feel compelled to abandon the roost. Bats are faithful to their roosts over many years and disturbance of this sort can have a significant effect on the future of the colony. It is likely to be deemed a breach of the national and European legislation that protects British bats and their roosts.

In addition to causing disturbance to bats at the roost, artificial lighting can also affect the feeding behaviour of bats and their use of commuting routes. There are two aspects to this: one is the attraction that short wave length light (UV and blue light) has to a range of insects; the other is the presence of lit conditions.

As mentioned, many night-flying species of insect are attracted to lamps that emit short wavelength component. Studies have shown that, although noctules, serotines, pipistrelle and Leisler's bats, take advantage of the concentration of insects around white street lights as a source of prey, this behaviour is not true for all bat species. The slower flying, broad-winged species, such as long-eared bats, barbastelle, greater and lesser horseshoe bats and the *Myotis* species (which include Brandt's, whiskered, Daubenton's, Natterer's and Bechstein's bats) generally avoid external lights.

Lighting can be particularly harmful if it illuminates important foraging habitats such as river corridors, woodland edges and hedgerows used by bats. Studies have shown that continuous lighting along roads creates barriers which some bat species cannot cross⁵. It is also known that insects are attracted to lit areas from further afield. This could result in adjacent habitats supporting reduced numbers of insects, causing a further impact on the ability of light-avoiding bats to feed.

These are just a few examples of the effects of artificial lighting on British wildlife, with migratory fish, amphibians, some flowering plants, a number of bird species, glow worms and a range of other invertebrates all exhibiting changes in their behaviour as a result of this unnatural lighting.

Recommendations

Survey and Planning

The potential impacts of obtrusive light on wildlife should be a routine consideration in the Environmental Impact Assessment (EIA) process⁶. Risks should be eliminated or minimised wherever possible. Some locations are particularly sensitive to obtrusive light and lighting schemes in these areas should be carefully planned.

In August 2013, Planning Minister Nick Boles launched the new National Online Planning Guidance Resource aimed at providing clearer protection for our natural and historic environment. The guidance looks at when lighting pollution concerns should be considered and is covered within one of the on line planning practice

⁵ Stone E. L., Jones G and Harriss (2009) Street lighting disturbs commuting bats. *Current Biology*, 19, pp 1-5

⁶ See also: Institution of Lighting Professionals – Professional Lighting Guide (PLG 04) Guidance on undertaking lighting environmental impact assessments)

guides⁷. The guide provides an overview for planners with links to documents that aim to give planners an overview of the subject through the following discussion points:

1. When is obtrusive light / light pollution relevant to planning?
2. What factors should be considered when assessing whether a development proposal might have implications for obtrusive lighting / light pollution?
3. What factors are relevant when considering where light shines?
4. What factors are relevant when considering how much the light shines?
5. What factors are relevant when considering possible ecological impact?

This can help planners reach the right design through the setting of appropriate conditions relating to performance and mitigation measures at the planning stage.

The Institution of Lighting Professionals (ILP) recommends that Local Planning Authorities specify internationally recognised environmental zones for exterior lighting control within their Development Plans⁸. In instances lacking classification, it may be necessary to request a Baseline Lighting Assessment/Survey conducted by a Lighting Professional in order to inform the classification of areas, particularly for large-scale schemes and major infrastructure projects.

When assessing or commissioning projects that include the installation of lighting schemes, particularly those subject to the EIA process, the following should be considered and relayed to applicants:

- **Ecological consultants should confirm the presence of any sensitive fauna and flora**, advising the lighting designers of bat routes and roosts and other areas of importance in order to ensure that reports correspond with each other.
- **Ecological consultants should consider the need for quantitative lighting measurements**. In some instances it may be necessary for further lighting measurements to be taken. For example, outside an important bat roost. These should follow best practice guidance from the ILP and would ideally be conducted by a Lighting Professional.
- **Where appropriate, professional lighting designers should be consulted** to design and model appropriate installations that achieve the task but mitigate the impacts. This should be done at the earliest opportunity. Early decisions can play a key role in mitigating the impact from lighting.
- **Reports submitted should outline the impacts of lighting in relation to ecology**, making clear reference to the ecological findings, highlighting any sensitive areas and detail proposed mitigation. Consideration should also be given to internal lighting where appropriate.
- **Post –installation checks and sign off upon commissioning should be carried out** by the lighting designer to ensure that the lighting installation has been installed in accordance with the design, that predictions were accurate and mitigation methods have been successful.

Principles and design considerations

Do not

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

Avoid

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

Do

- **consider employing a competent lighting designer** who will apply the principals of providing the right light, in the right place, at the right time and controlled by the right system.
- **minimise the spread of light** to at, or near horizontal and ensure that only the task area is lit. Flat cut-off

lanterns or accessories should be used to shield or direct light to where it is required.

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

Technological specifications

Research from the Netherlands has shown that spectral composition does impact biodiversity.

- **Use narrow spectrum light sources** to lower the range of species affected by lighting.
- **Use light sources that emit minimal ultra-violet light**
- **Lights should peak higher than 550 nm**
- **Avoid white and blue wavelengths of the light spectrum** to reduce insect attraction and where white light sources are required in order to manage the blue short wave length content they should be of a warm / neutral colour temperature <4,200 kelvin.

Further guidance on the spectral composition of artificial lighting will be made available following the publication of research from the Netherlands.

Further reading:

- A review of the impact of artificial light on invertebrates. Buglife. 2011
- Royal Commission on Environmental Pollution. 2009. Artificial light in the environment. London, HMSO
- "The Ecological Consequences of Artificial Night Lighting" edited by Longcore and Rich
- Shedding Light: A survey of local authority approaches to lighting in England. CPRE 2014

<http://planningguidance.planningportal.gov.uk/blog/guidance/light-pollution/when-is-light-pollution-relevant-to-planning/> <http://planningguidance.planningportal.gov.uk/blog/guidance/light-pollution/when-is-light-pollution-relevant-to-planning/>

⁸ Institution of Lighting Professionals (2011) Guidance Notes for the Reduction of Obtrusive Light GN01:2011.