

PRELIMINARY BAT ROOST ASSESSMENT AND NESTING BIRD SURVEY

CREETING HILLS FARM, CREETING ST MARY, SUFFOLK, IP6 8PZ



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1.0 Executive Summary and Site Description

A bat and nesting bird survey was undertaken by James Hodson BSc, MSc, (Bat Survey License 2017-30927-CLS-CLS, Great Crested Newt Licence 2018-36283-CLS-CLS) of Eco-Check on 27th July 2022. The survey relates to a planning application due to be submitted to Mid Suffolk District Council for the conversion of stable buildings to residential accommodation.

A preliminary ecological appraisal and protected species scoping survey of the bordering habitats was also undertaken. A detailed search of the exterior of the buildings found no bat droppings, feeding remains or any evidence of bat activity or roosting bats. An internal inspection of the buildings, floors and flat surfaces and roof space (where accessible) found no bat droppings or evidence of bat activity.

Building B1- A timber framed hay store with featheredge boards atop a concrete base. The roof is corrugated tin sheets. The boards are tightly fitted with no gaps. Upon an internal and external inspection no bird nests or signs of bats were observed. The building is to be demolished and the roost potential was assessed as **Negligible**.

Building B2 – A stable of concrete block construction set on a concrete base. The building is rendered on one elevation with a corrugated fibreboard sheet roof. The building is well pointed and generally enclosed when the stable doors are closed. Creeping ivy is growing over the north end of the building. Two bird nests were observed within the structure, both pigeon nests. No evidence of bat activity or roosts was recorded and the roost potential was assessed as **Negligible**.

Building B3 – A second set of stables with the same construction as B2 runs parallel to the west, the only noticeable difference is on the west elevation a set of glazed vented windows are present and the roof has a partial sarking lining beneath the corrugated fibreboard sheeting. No evidence of bat activity or roosts was recorded and the building was assessed as having **Negligible** bat roost potential.

In accordance with Bat Surveys-Good Practice Guidelines, J. Collins, 2016 and 'Bat Workers Manual, 3rd Edition, Mitchell and Jones, 2004 buildings with **Negligible** roost potential require no additional surveying.

One pond is present within 250m of the site boundary but none are within the site itself. The rough pasture grassland, gardens, paddocks and hedgerows across the wider landscape provides suitable habitat for amphibians and reptile species such as common lizard and grass snake although there are few records within 1km. Subject to maintaining the bare ground around the buildings and proposed car parking area this species group is not considered to represent a constraint to development. It is considered unlikely that the proposals would impact upon amphibians because the area of land to be affected by the proposals has poor potential for great crested newt due to the distance from ponds and low value terrestrial habitats.

The hedgerow and tree line along the east boundary are likely used as a commuting/foraging corridor by bats and so a sensitive lighting scheme must be implemented to limit light spillage, this may include LED downlighters and lights with hoods. The buildings and adjacent trees, shrubs and hedging could provide nesting habitat for birds and so care must be taken if works commence during the nesting season. It is recommended that any vegetation around the buildings is kept at a short height to maintain its unsuitability for reptiles and amphibians. If development has not commenced within 2 years of August 2022, it is recommended that an updated survey is undertaken, as the suitability of the site for protected species may have changed.

1.1 Scope of the Report

This report details the methodology, results and conclusions of a daytime preliminary roost assessment undertaken on the 27th July 2022. The purpose of the survey was to confirm the presence or likely absence of bat roosts, within the buildings, the value of the buildings for roosting bats and the presence of any nesting birds. The survey data collected was used primarily to evaluate the likely impact of the proposed demolition and conversion works on roosting bats and also lighting and design layout proposals on roosting, foraging and commuting bats. A general assessment of the wider site was also undertaken to assess if any other protected or priority species, including great crested newt, are likely to be present or impacted by the proposed conversion and construction works.

1.2 Aim of Survey

To examine the buildings to determine the presence or likely absence of nesting barn owls and/or roosting bats, species protected under the Wildlife and Countryside Act 1981 with respect to the proposed development works. If found to be present, the survey aims to determine the use of the building by protected species so that the impacts of the development proposal can be assessed and appropriate advice given to address these impacts.

In the light of the survey this report provides initial recommendations for potential mitigation measures if protected species are likely to be affected by the proposed works. It may be necessary to obtain a European Protected Species (EPS) license in accordance with the above legislation. This report has been prepared in accordance with the recommended format in 'Bat Surveys-Good Practice Guidelines, J. Collins, 2016' and 'Bat Workers Manual, 3rd Edition, Mitchell and Jones, 2004'. The methodology of the survey adopts the recommended best working practice for the inspection of buildings and trees for bats and bat roosts.

1.3 Site Location and Description

The application site is a farm location used as stables and hay storage along with general farm use. The site is located within the village of Creeting Hills within the Needham Market District of Mid Suffolk and located approximately 1km north-east of Needham Market and 1.2km south of Creeting St. Mary. The site is bordered by All Saints Road to the east, dwellings and gardens to the north and the A14 to the west. The site grid reference is TM09695588 (**See Fig 1**).

The building is bordered by hedging, trees and shrubs to the east and hard standings and managed grassland to the north, south and west. Beyond the immediate site the landscape is primarily large open grassland fields and pasture with scattered trees and hedgerows.

There are no ponds within the site but there is one pond within a 250m radius. The site is considered to have limited connectivity to the wider landscape with no hedgerows, tree lines, farm tracks or other linear features connected to the building.

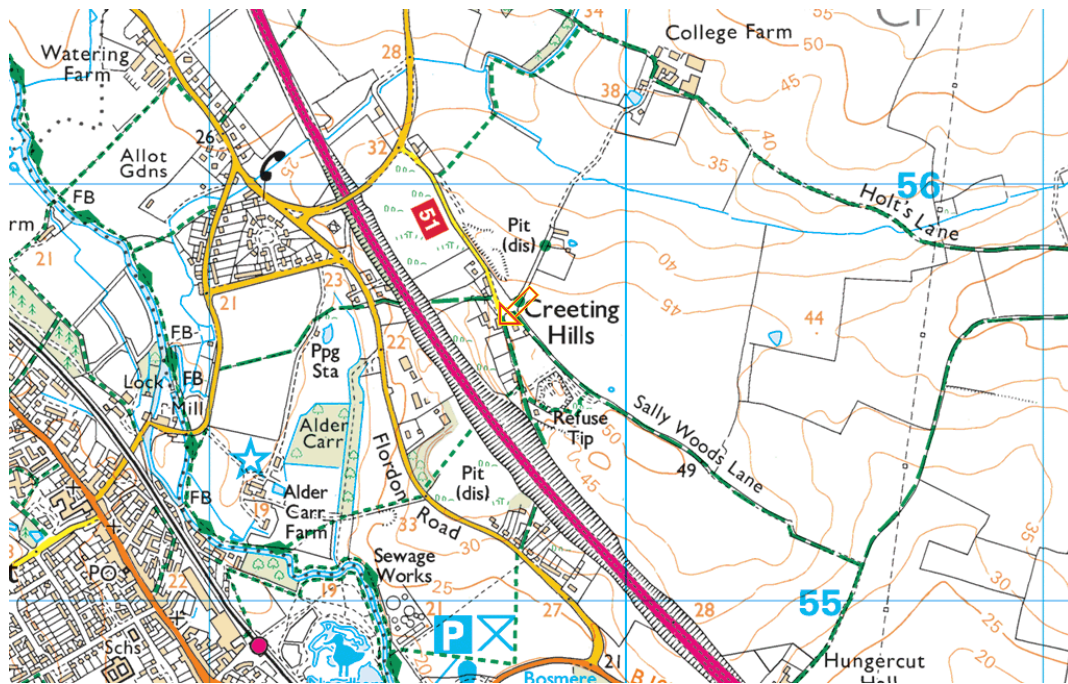


Fig 1. Site Location Map – StreetMap 2022

1.4 Building Description

Building B1- A timber framed hay store with featheredge boards atop a concrete base. The roof is corrugated tin sheets. The boards are tightly fitted with no gaps. Upon an internal and external inspection no bird nests or signs of bats were observed. The building is to be demolished and the roost potential was assessed as **Negligible**.

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Fig 2 & 3. Hay store B1 to be demolished (left) and internal view of B1 (right)



Fig 4 & 5. West elevation of stables B2 (left) and internal view of equine store (right)



Fig 6 & 7. South and east elevations of stables B3 (left) and internal view of stable (right)



Fig 8 & 9. Evidence of swallows nesting within B2

1.5 Proposed Works

The proposed works are for the demolition of the hay store building (B1) and conversion of the stable buildings (B2 & B3) into residential dwellings with associated parking.

1.6 Site Context and Status

Statutory designated sites^{1 2} –

The site is within the impact risk zone of a single SSSI as detailed below;

- SSSI Creting St. Mary Pits – approximately 0.2km south

There are two non-statutory sites within the 2km search:

- LNR Fen Alder Common – Adjacent to site
- LNR Needham Lake – 0.9km south-west

(Please note , all distances are approximate)

Protected/Priority Species^{3 4}-

A search for relevant notable and protected species records within 2km of the site returned a number of priority and protected species records. The biodiversity data search within 1km of the site indicated 123 species records:

- 175 counts Hedgehog *Erinaceus europaeus*
- A range or birds of conservation concern (BoCC) were recorded including yellowhammer, skylark, tree creeper, buzzard, House Sparrow, greenfinch and swift.
- one record of great crested newt *Triturus cristatus* within 1km.
- 12 records of reptile species within 1km.
- 2 Records of brown hare *Lepus europaeus*
- 10 records of badger *Meles meles*

- A search on <http://www.magic.gov.uk/> indicated two great crested newt licenses were found within 2km, all from the same pond, located at grid ref. TM080559

Bat records of note within 5km and relevant to the proposed development works are:

- 9 Bat species included Common pipistrelle *Pipistrellus pipistrellus* Soprano pipistrelle *Pipistrellus pygmaeus*, Brown long-eared *Plecotus auritus*, Natterer's *Myotis nattereri*, common noctule *Nyctalus noctule*, Daubenton's *Myotis daubentoniid*, Whiskered bat *Myotis mystacinus*, Western barbastelle *Barbastella barbastellus*, and Serotine bat *Eptesicus serotinus*.

Pond and waterbodies:

A search for ponds and waterbodies within 250m was conducted using Ordnance Survey Data (OS Explorer Map 237 Scale 1:25,000) and publicly available Environment Agency data: There is one pond within 250m of proposed site development. Pond P1 is located approximately 240m north-east of the site. This can be seen in the map within Fig 10.



Fig 10. Results from the 250m search performed using Magic 2022.

Protected habitats and habitats subject to conservation designations:

There are no priority Habitats, as listed under the NERC Act 2006 Section 41 Habitats of Principal Importance found on site. Other Priority Habitats to occur within 2km (identified using MAGIC – managed by Natural England), include purple moor grass and rush pasture, lowland Fens, deciduous woodland and Traditional Orchard. A MAGIC search map is provided in **Fig.11** and **Appendix 2**.

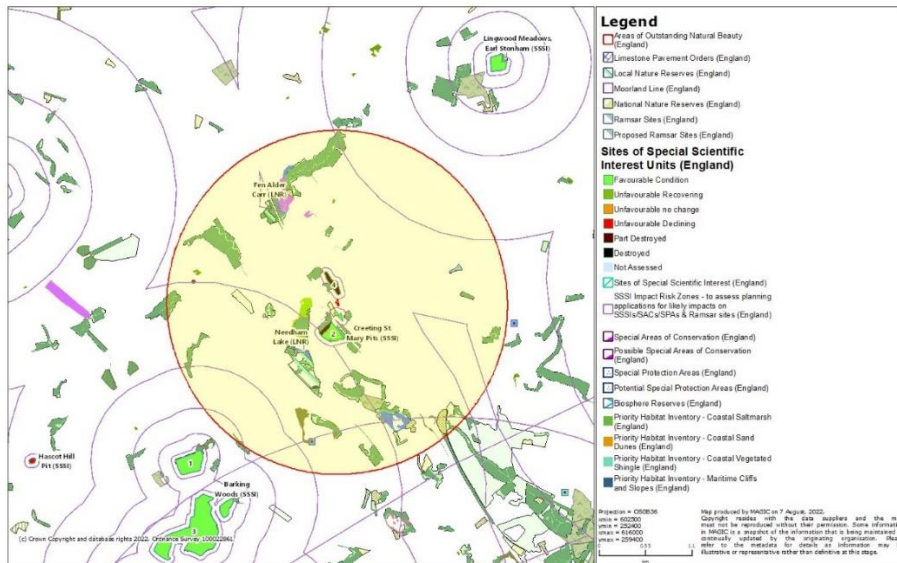


Fig 11. Map of Designated Wildlife Sites and Priority Habitats within 2km – *Magic Map 2022*

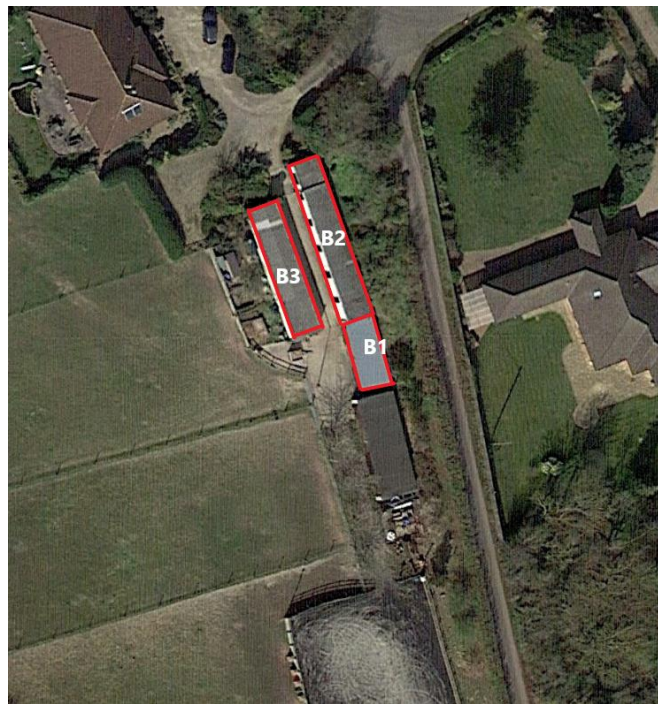


Fig 12. Aerial view of site and bordering habitats, September 2020

1 Statutory designation include Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, National Nature Reserves (NNR), Sites of Special Scientific Interest (SSSI) and Local Nature Reserves (LNR).

2 Non-statutory sites are designated by local authorities and protected through the planning process (e.g. County Wildlife Sites, Sites of Importance for Nature Conservation or Local Wildlife Sites).

3 Legally protected species include those listed in Schedules 1, 5 or 8 of the Wildlife and Countryside Act 1981; Schedule 2 of the Conservation of Habitats and Species Regulations 2017 (as amended); or in the Protection of Badgers Act 1992 (as amended).

4 Notable species include Species of Principal Importance under the Natural Environment and Rural Communities Act 2006; Local Biodiversity Action Plan (LBAP) species; Birds of Conservation Concern (Eaton et al., 2009); and/or Red Data Book/nationally notable species (JNCC, undated).

2.0 Legislation

2.1 All species of bat are fully protected under The Conservation of Habitats and Species (Amendment EU Exit) Regulations 2019, through their inclusion on Schedule 2. Regulation 39 prohibits:

- Deliberate killing, injuring or taking (capture) of Schedule 2 species (e.g. bats);
- Deliberate disturbance of bat species as:
 - a) to impair their ability:
 - (i) to survive, breed, or reproduce, or to rear or nurture young;
 - (ii) to hibernate or migrate
 - b) to affect significantly the local distribution or abundance of the species;
 - Damage or destruction of a breeding site or resting place; and
 - Keeping, transporting, selling, exchanging or offering for sale whether live or dead or of any part thereof.

Bats are also currently protected under the Wildlife and Countryside Act 1981 (as amended) through their inclusion on Schedule 5. Under this Act, they are additionally, protected from:

- Intentional or reckless disturbance (at any level);
- Intentional or reckless obstruction of access to any place of shelter or protection; and
- Selling, offering or exposing for sale, possession or transporting for purpose of sale.

An EPS Licence issued by the relevant countryside agency (e.g. Natural England) will be required for works liable to affect a bat roost or for operations likely to result in a level of disturbance which might impair their ability to undertake those activities mentioned above (e.g. survive, breed, rear young and hibernate). The licence is to allow derogation from the relevant legislation but also to enable appropriate mitigation measures to be put in place and their efficacy to be monitored.

Though there is no case law to date, the legislation may also be interpreted such that, in certain circumstances, important foraging areas and/or commuting routes can be regarded as being afforded *de facto* protection, for example, where it can be proven that the continued usage of such areas is crucial to maintaining the integrity and long-term viability of a bat roost.

The species protection provision of the Habitats Directive, as implemented by The Conservation of Habitats and Species (Amendment EU Exit) Regulations 2019 contain three “derogation tests” which must be applied by the Local Planning Authority when deciding whether to grant planning permission for a development that could harm a European Protected Species. The three tests are that:

- The activity to be licensed must be for imperative reasons of overriding public interest or for public health and safety
- There must be no satisfactory alternative; and
- Favourable conservation status of the species must be maintained.

It is the responsibility of the applicant to submit sufficient information to address these tests when applying for planning permission. NB: For development activities, a Natural England EPS Licence application can only be obtained after planning permission has been granted. However, the granting of planning permission does not guarantee that a licence will be issued by Natural England.

2.2 Natural Environment and Rural Communities Act 2006 (NERC)

The NERC Act 2006 states that ‘every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity’, otherwise known as the Biodiversity Duty. Under Section 41 of the Act, the Secretary of State must publish a list of the living organisms and types of habitat which in the Secretary of State’s opinion are of principal importance for the purpose of conserving biodiversity.

This list is based on those species listed in the UK Biodiversity Framework as priority species (see Section 2.3) in addition to Annex II species listed under The Conservation (Natural Habitats, &c.) Regulations 2017. The S41 list replaces the list published under Section 74 of the Countryside and Rights of Way (CROW) Act 2000.

2.3 UK Biodiversity Framework and Biodiversity 2030

[Biodiversity 2030](#) - The EU Biodiversity Strategy aims to halt the loss of biodiversity and ecosystem services in the EU and help stop global biodiversity loss by 2030. It reflects the commitments taken by the EU in 2010, within the international Convention on Biological Diversity.

Now the UK BAP partnership no longer operates, but many of the outputs originally developed under the UK BAP still remain valid and of use. For example, background information on UK priority habitats and species still informs much of the biodiversity work at country level and remain a point of reference for targeted conservation efforts. Priority habitats and species lists can be seen on the [JNCC website](#).

Current UK Bat Priority Species include:

- soprano pipistrelle
- lesser horseshoe bat
- greater horseshoe bat
- barbastelle
- bechstein's bat
- noctule
- brown long-eared bat

3.0 Methodology

3.1 Building Inspection

Bat surveys usually involve two elements, surveying sites for likely roost and hibernation sites and surveying likely foraging areas. The daytime survey of the site was carried out on the 27th July 2022. The weather conditions were cloudy and dry with a temperature of 18°C. The survey was undertaken in accordance with the Bat Conservation Trust's *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (Collins, 2016).

A thorough methodical inspection of the outside of the buildings was carried out from ground level to eaves level looking for evidence of bats and possible bat access points. An inspection was carried out inside the buildings looking for evidence of bats and bat roosting sites. In examining the buildings for barn owls, a search was made for evidence of barn owls (feathers, pellets and faecal 'splashes' on timbers), their nest sites and the birds themselves. The buildings were also assessed for potential to support nesting or roosting barn owls and other nesting birds.

In examining the buildings for bats, particular attention was given to any gaps in which bats may roost. It is important to remember that bats are difficult to survey and find and it is usually signs of their activity rather than their actual presence that indicates the existence of a bat roosting site. The presence of moth and butterfly wings for example can indicate bat presence. Bat droppings on walls, floors and flat surfaces can be used to identify species. Floors, walls, supports, and exposed surfaces were inspected for bat droppings, bat urine, feeding remains, oil staining from the fur of bats (indication of frequent use of a particular site), clean cob-web free areas on the ridge boards or crevices and wear of substrates caused by the movement of bats in and out of potential roost exit holes over a long period of time. Beneath ledges, the ground was examined for feathers, pellets and birdlime that could indicate occupation by barn owls.

3.3 Limitations

The extensiveness of the ecological assessment was limited by the season in which the site visit was made. To confirm the presence or absence of all protected species usually requires multiple visits at suitable times of the year. Summer surveys between May and September are considered optimal. The site visit focussed on assessing the potential of the site to support species given protection under British or European law.

In view of the above constraints this assessment cannot be considered to provide a comprehensive survey of the ecological interest of the site. It does however provide a "snapshot" of the ecological interest present on the day of the visit and highlights areas where further survey work may be required. It is expected that evidence of bats (particularly in exposed areas or on external faces of the buildings) which may be present at other times of the year may not have been visible during the survey. A difficulty in inspecting buildings for bats is that the presence of smaller roosts is generally harder to detect than more significant colonies, particularly those of crevice dwelling bats such as pipistrelle. In addition, bats are very transient in nature with complex roosting behaviour and often move between several different roosting sites during the year. Therefore, the presence of transient singleton roosts (e.g. single male roost) can be present at any time of year.

4.0 Survey Results

4.1 Barn Owls (*Tyto alba*)

The buildings are considered unsuitable for barn owls nesting due to the lack of suitable nesting ledges and frequent disturbance. No signs of barn owls were recorded in the buildings.

4.1.1 Nesting Birds

An old swallow nest was observed within B2s hay store as well as a nest within the north side in the general store. B1 also had removed swallow nests within it. The buildings all have potential for nesting birds due to their open nature and suitable conditions.

4.2 Bats: (All species)

A detailed search of the exterior of the buildings found no bat droppings, feeding remains or any evidence of bat activity or roosting bats. An internal inspection of the buildings, floors and flat surfaces found no bat droppings or evidence of bat activity. An external search similarly revealed no evidence of roosting bats.

The buildings are in good state of repair with the roof sheets interlocking, wall tops cemented and the pointing is in good condition. The rendered walls similarly have very few cracks that could be utilised by bats. The stables have internal lighting and are in regular use and subject to disturbance. The stable buildings were all assessed as having **Negligible** probability of bat interest. In accordance with Bat Surveys-Good Practice Guidelines, J. Collins, 2016 and 'Bat Workers Manual, 3rd Edition, Mitchell and Jones, 2004 buildings with **Negligible** roost potential require no additional surveying.

I consider that the buildings overall have low enough bat roosting potential such that the visual inspection was sufficient to provide reasonable confidence in a negative roost assessment. There is therefore no reasonable expectation that impacts to bats, such as would be considered an offence under Article 12 (1) of the Habitats Directive of The Conservation of Habitats and Species (Amendment EU Exit) Regulations 2019 will occur as a result of the proposal.

Due to the habitats present within the site and the local landscape it is considered likely that foraging or commuting bats use the adjacent habitats. This is due to the site having connectivity to hedgerows, trees lines, woodland or other linear features connecting to the wider landscape. 9 bat species have been recorded in the area and are known to travel at least 5 km to, so we would assume they will be using the surrounding area for commuting and foraging.

Herpetofauna (*Amphibians and reptiles*)

One pond is present within 250m of the site boundary but none are within the site itself. The rough grassland, gardens, paddocks and hedgerows across the wider landscape provides suitable habitat for amphibians and reptile species such as common lizard and grass snake although the application site lacks core habitat for reptiles. Subject to maintaining the short vegetation around the buildings

and proposed car parking area this species group is not considered to represent a constraint to development.

Great crested newt is listed on Annexes II and IV of the EC Habitats Directive. It is protected under the Wildlife and Countryside Act (1981) (as amended) and is identified as a European Protected Species on the Conservation of Habitats and Species (Amendment EU Exit) Regulations 2019. It is a UK BAP Priority Species and is listed on the local BAP. The data search returned no records for great crested newt within 1km of the site and five great crested newt license returns were found approximately 1.5km to the east. There is no certainty therefore that a local GCN population is present, but there is a local abundance of ponds which could support such a population. Also, adjacent pasture land, hedgerows and woodland are a favorable terrestrial habitat for GCN should they wish to migrate across it.

During their terrestrial phase, great crested newts are typically taken to commute up to 500m between their breeding pond and their terrestrial habitats, though as a general rule it is those suitable habitats within 250 m of a breeding site that are likely to be used most frequently and further recent research has shown that the majority of newts occur within 50 m of ponds, with few individuals being found at greater distances (EN, 2004) ⁵

However, a proportion of the population is also likely to forage for food and shelter in suitable habitats up to 250m from a breeding pond and juvenile GCN have been known to disperse up to 500m from their breeding pond, in a single season. It is considered unlikely that the proposals would impact upon the newt population because the area of land to be affected by the proposals has poor potential for great crested newt due to the limited size of the development, low value terrestrial habitats and the barriers to dispersal.

Additional Protected Species

The site and adjacent habitats are suitable for hedgehog *Erinaceus europaeus*, a S41 Species of Principal Importance. No evidence of or potential habitat for any other protected species was recorded within the immediate vicinity of the proposed building works.

Conclusions

No evidence of any bat roosts or bat activity was recorded within the buildings or site generally. There was minimal evidence of nesting birds using the open stable buildings. The boundary trees, shrubs and hedging provide further suitable nesting areas and so works should be timed to avoid the active nesting season where possible or a pre-works inspection undertaken. The presence of great crested newt and reptiles within the site is unlikely due to the lack of suitable terrestrial habitat and the site being well managed.

Table 1.0 - Guidelines for assessing the potential suitability of proposed development sites for bats, based on the presence of habitat features within the landscape (Adapted from table 4.1 pp. 35 in Collins, 2016)

Suitability.	Description of Roosting habitats.	Description of Commuting and Foraging habitats.
Negligible	Negligible habitat features on-site likely to be used by roosting bats.	Negligible habitat features on-site likely to be used by commuting or foraging bats.
Low	<p>A structure with one or more potential roost sites that could be used by individual bats opportunistically. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats (i.e. unlikely to be suitable for maternity or hibernation.)</p> <p>A tree of sufficient size and age to contain PRFs but with none seen from the ground or features seen with only very limited roosting potential.</p>	<p>Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or un-vegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat.</p> <p>Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub.</p>
Medium	A structure or tree with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only – the assessments in this table are made irrespective of species conservation status, which is established after presence is confirmed).	<p>Continuous habitat connected to the wider landscape that could be used by bats for commuting such as lines of trees and scrub or linked back gardens.</p> <p>Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.</p>
High	A structure or tree with one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat.	<p>Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by commuting bats such as river valleys, streams, hedgerows, lines of trees and woodland edge.</p> <p>High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts.</p>

5.0 Interpretation of Results and Recommendations

5.1. Bat Species

5.1.1. Overview of legislation relating to bat species

British bat species are protected under the Wildlife and Countryside Act (1981) and The Conservation of Habitats and Species (Amendment EU Exit) Regulations 2019. This makes it an offence to kill or injure bats or damage or destroy a place of shelter or protection, amongst other actions (see **Appendix 2 for more details**).

5.1.2. Summary of findings and likely impacts in absence of mitigation

There is a reasonable expectation that impacts to bats, such as would be considered an offence under Article 12 (1) of The Conservation of Habitats and Species (Amendment EU Exit) Regulations 2019, are unlikely to occur as a result of the proposal. The potential for roosting bats, based purely on a daytime visual search, however can rarely be excluded entirely due to the highly mobile nature of bats and seasonal use of roosts.

5.1.3. Recommendations

Bats: The built scheme should take the opportunity to enhance roosting opportunities through the provision of bat boxes. As part of general biodiversity enhancement for the site, it is recommended that new bat roosting and bird nesting resources are introduced. This will include bat roosting boxes erected on the building or incorporated into the built structure itself (**Appendix 3**):

- 2 x Bat Bricks (one in each gable wall elevation, as close to the eaves as possible and at least 5m off ground level).

During the conversion works, any new fascia boards should be proud of the wall by c15/20mm to allow roosting by bats. In order for the resources discussed to be viable bat sensitive lighting should be employed to avoid light pollution. In general, it is recommended that site lighting is kept to a minimum. Security lighting should be operated on short timers.

Any new external lights will be set on a motion detector and positioned in such a way that they do not shine on the boundary habitats, particularly the roadside hedgerow and trees to the east, garden to the north and the paddock to the south where bats are likely to forage. Low intensity lighting should be used where possible in place of high intensity discharge or sodium lamps, this will minimize disturbance to foraging and commuting bats.

In accordance with the Bat Conservation Trust's publication *Bats and artificial lighting* (BCT, 2018) light pollution by artificial lighting will be kept to a minimum and light spillage avoided. The following specific mitigation will be put in place to minimize disturbance to bats caused by the lighting of the site.

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

- Minimise light spill by eliminating any bare bulbs and upward pointing light fixtures. The spread of light should be kept near to or below the horizontal plane, by using as steep a downward angle as possible and/or shield hood. Flat, cut-off lanterns are best;
- Use light sources that emit minimal ultra-violet light (van Langevelde and Feta, 2001) and avoid the white and blue wavelengths of the light spectrum, so as to avoid attracting insects and thus potentially reducing numbers in adjacent areas;
- Limiting the height of lighting columns to eight metres and increase the spacing of lighting columns (Fure, 2006) can reduce the spill of light into unwanted areas;
- Avoid using reflective surfaces under lights or light reflecting off windows (e.g. on to trees);
- Only the minimum amount of light needed for safety and access should be used and or turned off when the site is not in use;
- Artificial lighting proposals should not directly illuminate boundary habitats, which may be of value to foraging or commuting bats and birds (e.g. green corridors);
- Lighting that is required for security reasons should use a lamp of no greater than 2000 lumens (150 Watts) and be PIR sensor activated, to ensure that the lights are not on only when required (Jones, 2000; Collins, 2016);

5.2 Birds- To increase nesting opportunities generally and to compensate for the loss of nesting areas, 5 nest boxes should be installed. Installation of the nest boxes will be supervised by 'Eco-Check Ltd' or an experienced ecologist to ensure the correct positioning for each species. The types of nest boxes will include;

- 2 x long-lasting bird boxes (32mm & 28mm)
- 1 x deep nest box
- 2 x swallow cups underneath the eaves of the retained store building

5.2.1. Assessment of impact and licensing

The value of the site to bats is assessed as **Negligible** at the **Parish/ Neighbourhood** scale due to the probability of minor bat use. The impact of the development upon bats is considered to be **Neutral** subject to the reasonable avoidance and mitigation measures being implemented. The results of the survey would indicate that a European Protected Species Mitigation (EPSM) licence or Low Impact Class Licence (BMCL) is unlikely to be required for the proposed conversion works. This is based on no evidence of bat activity or roosts within the building and low probability of bat interest within the working areas. The active nests of all bird species are protected and so the building and bordering vegetation must be inspected if works are to commence during the period **1st March- 31st August inclusive**, these dates are subject to change with climatic conditions.

5.3 Great Crested Newt-

5.3.1. Overview of legislation relating to Great Crested Newt

The Great crested newt is an internationally important species. It is listed in Annexes II and IV of the EC Habitats Directive and Appendix II of the Bern Convention. It is protected under Schedule 2 of the Conservation of Habitats and Species (Amendment EU Exit) Regulations 2019, and Schedule 5 of the Wildlife and Countryside Act 1981. Under Section 9(4) of the Wildlife and Countryside Act, it is an offence to intentionally kill, injure, damage, destroy, take or obstruct access to any structure or place which these species use for shelter or protection. The Countryside and Rights of Way Act 2000 introduces 'reckless' to offences, in addition to those that are carried out with intent.

5.3.2. Summary of findings and likely impacts in absence of mitigation

- Potential Harm to Individual Great Crested Newts-The works (including laydown areas) will be confined to habitats considered suboptimal for GCN (existing built footprint, hard standing and cleared ground).
- Loss/Damage to Aquatic Habitats- The development of the site will not lead to the loss of, or damage to, any ponds, assuming environmental best practice during the construction period.
- Loss of Foraging Habitat- Terrestrial habitat within the site to be impacted by the proposals is considered to be poor for GCN. Impacts to GCN foraging habitat are therefore considered negligible as works are primarily restricted to the footprint of the existing buildings and bare ground surrounding it.
- Disruption to Dispersal and Migration- No disruption to dispersal/migration is anticipated as the site is bounded by fencing, walls etc. and the proposals do not bisect any habitats likely to be used by great crested newt.

Natural England's Rapid Risk Assessment Tool was used which indicates that the development activities are of such a type, scale and location that it is unlikely any offence would be committed should the development proceed. The development of the site will not lead to the loss or damage to any potential breeding ponds or other waterbodies. There is no hydrological link from the construction area to the potential breeding ponds and as such there should be no indirect impact upon the ponds.

There are no features within the site that are likely to attract GCN specifically to the site and the value of the site to amphibians is assessed as **Negligible** at the **Parish/Neighborhood** scale and the impact of the development subject to mitigation is **Neutral**.

6.0 Habitats Regulations and Derogation Test

With respect to the impact on bats, an offence under Article 12 of the European Directive and Regulation 41 of The Conservation of Habitats and Species (Amendment EU Exit) Regulations 2019 is unlikely to occur as a result of conversion works.

Given the lack of evidence of any roosting bats within the building, the **Negligible** probability of bat interest within the working areas and the potential to incorporate mitigation within the development for bats, it is considered there are reasonable and realistic opportunities to maintain the favourable conservation status of the local bat population despite the proposed construction work.

We recommend that the following condition from BS42020:2013 is attached to any planning consent; “Occasionally European protected species, such as bats, can be found during the course of development even when the site appears unlikely to support them or after an ecological survey has found no previous evidence of them. In the event that this occurs, the developer must stop work immediately and seek the advice of a suitability qualified ecological consultant and/or the relevant statutory nature conservation organisation.”

Reason: In accordance with the requirements of the adopted Joint Core Strategy and paragraph 118 of the National Planning Policy Framework, and for the undertaking of the council’s statutory function under the Natural Environment and Rural Communities Act (2006).

7.0 Recommendations for Further Surveys

We suggest that any habitat loss associated with the proposal can be adequately mitigated through landscaping, planting and other biodiversity enhancement measures. The following advisory recommendations include:

- Destruction of in-use nests or harm to adult birds caused by removal of trees/hedgerows on site during the main breeding bird season (1st March to 31st August). If works commence during this period a nesting bird survey must first be undertaken by an appointed ecological clerk of works (ECoW).
- We advise that before the commencement of construction, it is recommended that in line with the British Standard 42020:2013 Biodiversity – Code of practice for planning and development - that a **Biodiversity Enhancement Plan (BEP)** is submitted and approved. The role of the BEP is to ensure that the identified risks to biodiversity are assessed and that suitable methods are adopted on site to minimise the risks through the production of a method statement. The BEP is also to ensure that biodiversity protection zones are enforced.

The suggested condition below is based on BS42020:2013 and in terms of biodiversity net gain, the enhancements proposed will contribute to this aim. Recommended condition:

PRIOR TO COMMENCEMENT: COMPLIANCE WITH ECOLOGICAL REPORT RECOMMENDATIONS

We recommend that the following condition from BS42020:2013 is attached to any planning consent;

“Occasionally European protected species, such as bats, can be found during the course of development even when the site appears unlikely to support them or after an ecological survey has found no previous evidence of them. In the event that this occurs, the developer must stop work immediately and seek the advice of a suitability qualified ecological consultant and/or the relevant statutory nature conservation organisation.”

Reason: In accordance with the requirements of the adopted Joint Core Strategy and paragraph 118 of the National Planning Policy Framework, and for the undertaking of the council’s statutory function under the Natural Environment and Rural Communities Act (2006).

“All ecological mitigation and enhancement measures and/or works shall be carried out in accordance with the details contained within the report (Eco-Check, August 2022), as submitted with the planning application and agreed with the local planning authority prior to determination.”

Reason: To conserve and enhance Protected and Priority species and allow the LPA to discharge its duties under the UK Habitats Regulations, the Wildlife & Countryside Act 1981 as amended and s40 of the NERC Act 2006 and s17 Crime & Disorder Act 1998.

“A ‘statement of good practice’ shall be signed upon completion by the competent ecologist, and be submitted to the LPA, confirming that the specified enhancement measures have been implemented in accordance with good practice upon which the planning consent was granted’.

Reason: To conserve and enhance Protected and Priority species and allow the LPA to discharge its duties under the UK Habitats Regulations, the Wildlife & Countryside Act 1981 as amended and s40 of the NERC Act 2006 and s17 Crime & Disorder Act 1998.

8.0 References

Barn Owl Trust (2002) Barn Owls on Site –Natural England

Bat Surveys-Good Practice Guidelines, J. Collins, 2016' Corbet and Harris (1991).

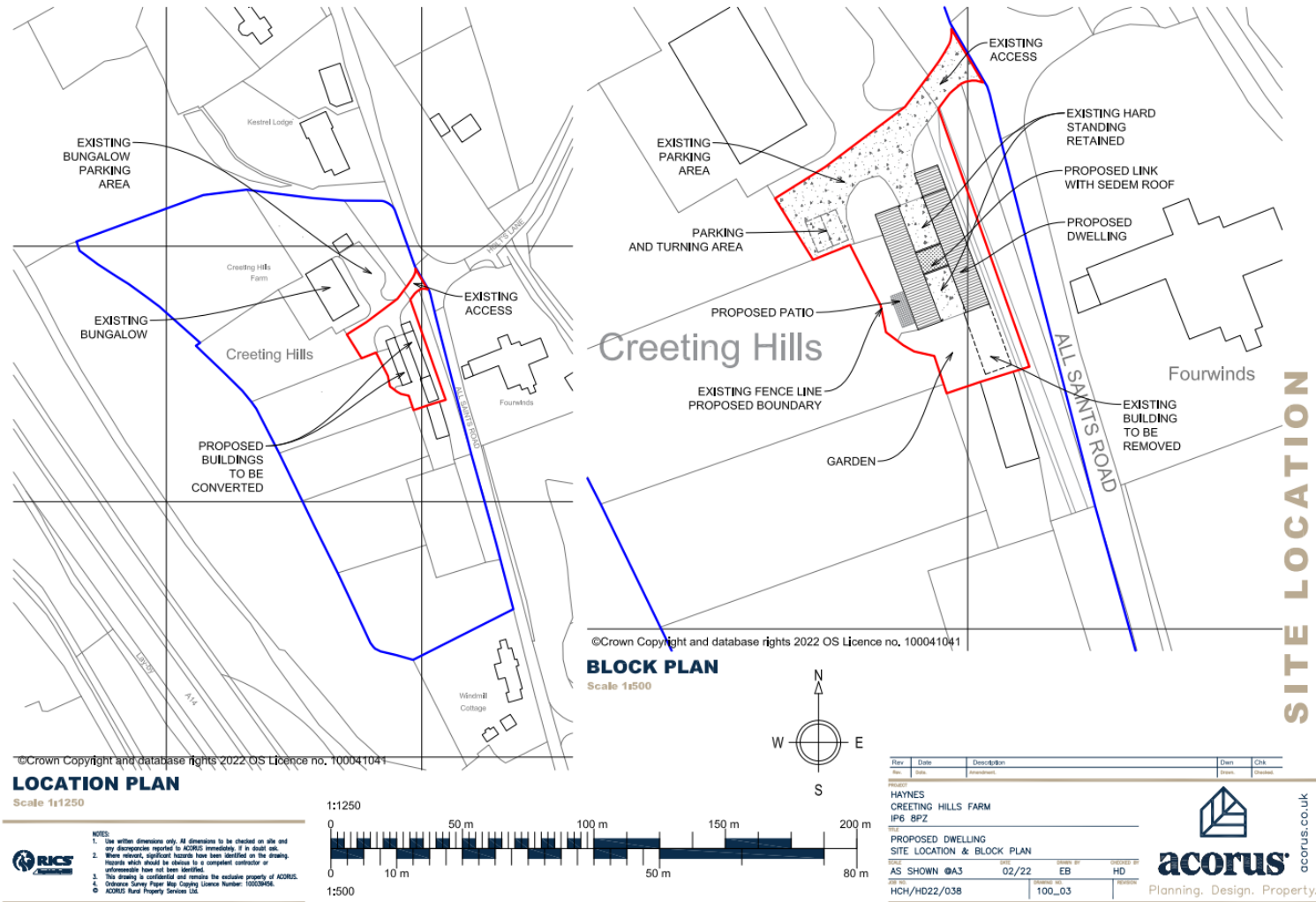
The Handbook of British Mammals – Blackwell

Joint Nature Conservancy Council (2004). The Bat Workers Manual – JNCC

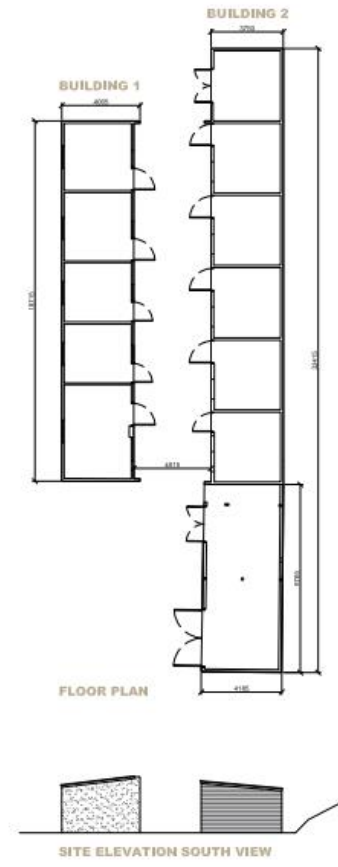
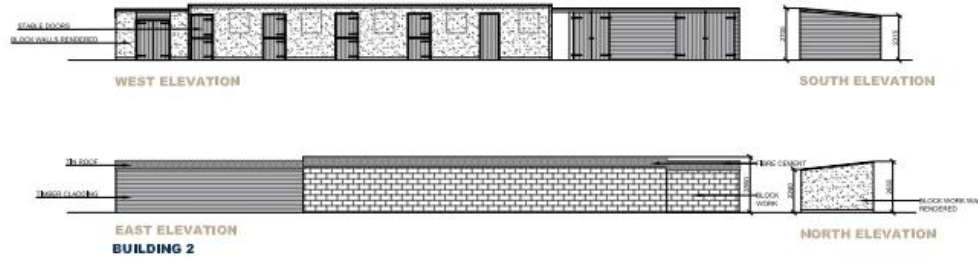
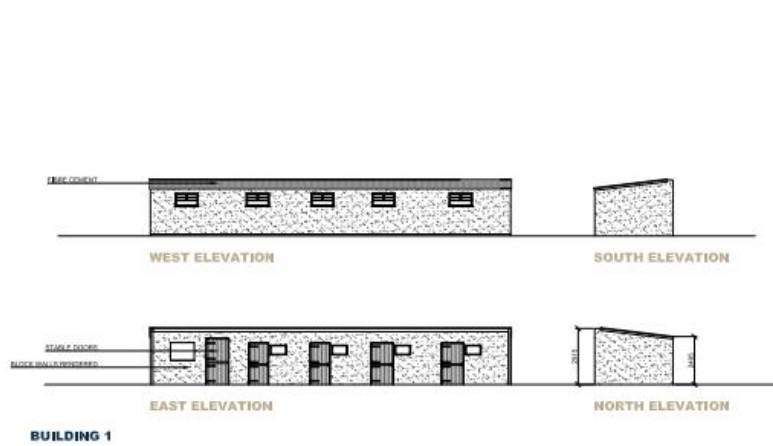
Mitchell-Jones, & McLeish, A.P. Ed. (2004),3rd Edition Bat Workers' Manual, JNCC.

BS 420202: 2013 Biodiversity; Code of Practice for Planning and Development.

APPENDIX 1



Site Location and Proposed Layout Plan



FLOOR PLAN & ELEVATIONS

Scale 1:100



- NOTES:**
1. Use written dimensions only. All dimensions to be checked on site and any discrepancies reported to ACORUS immediately, if in doubt call.
 2. Where relevant, significant hazards have been identified on the drawing. Hazards which should be checked by a competent contractor or professional have not been identified.
 3. This drawing is confidential and remains the exclusive property of ACORUS.
 4. Ordnance Survey Paper Map Copying Licence Number: 10009406.
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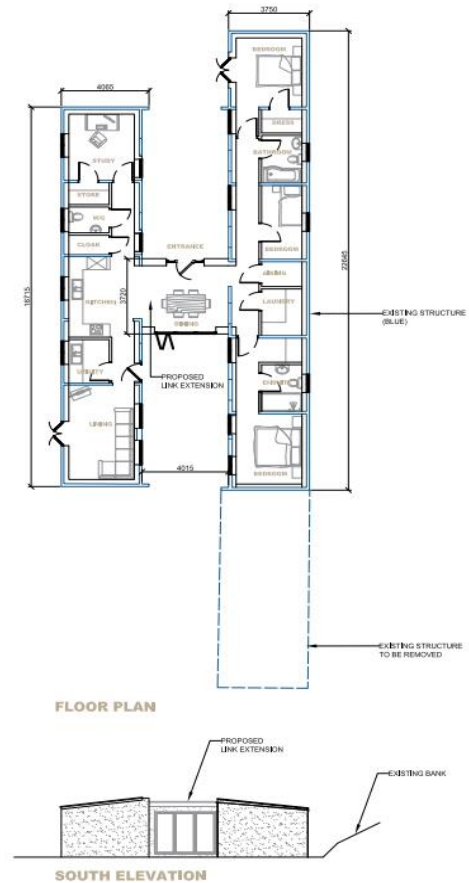


HAYNES CREEPING HILLS FARM		SPE 8PZ	
EXISTING BUILDINGS			
PLAN & ELEVATIONS			
AS SHOWN @A1	02/22	ES	HD
100_01	100_01		
H01/H022/038		100_01	



SURVEY

Existing floorplan and elevations



FLOOR PLAN & ELEVATIONS

Scale 1:1100



- NOTES:
1. Use written dimensions only. All dimensions to be checked on site and any discrepancies reported to ACORUS immediately. If in doubt ask.
 2. Where relevant, significant hazards have been identified on the drawing. Hazards which should be obvious to a competent contractor or unforeseeable have not been identified.
 3. This drawing is confidential and remains the exclusive property of ACORUS.
 4. Ordnance Survey Paper Map Copying Licence Number: 100039456.
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Project	Client	Drawn	Check	Date
HAYNES CREEPING HILLS FARM IP6 8PZ				
PROPOSED DWELLING PLAN & ELEVATIONS				
AS SHOWN 0A1	02/22	EB	HD	
HCH/HD22/038	100_02			

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 Planning. Design. Property.

PLANNING

Proposed floor plan and elevations

APPENDIX 2

COUNTY: SUFFOLK SITE NAME: CREETING ST MARY PITS

DISTRICT: MID SUFFOLK

Status: Site of special Scientific Interest (SSSI) notified under Section 28 of the Wildlife and Countryside Act 1981

Local Planning Authority: MID SUFFOLK DISTRICT COUNCIL

National Grid Reference: TM 097555 Area: 5.2 (ha.) 12.8 (ac.)

Ordnance Survey Sheet 1:50,000: 155 1:10,000: TM 05 NE

Date Notified (Under 1949 Act): – Date of Last Revision: –

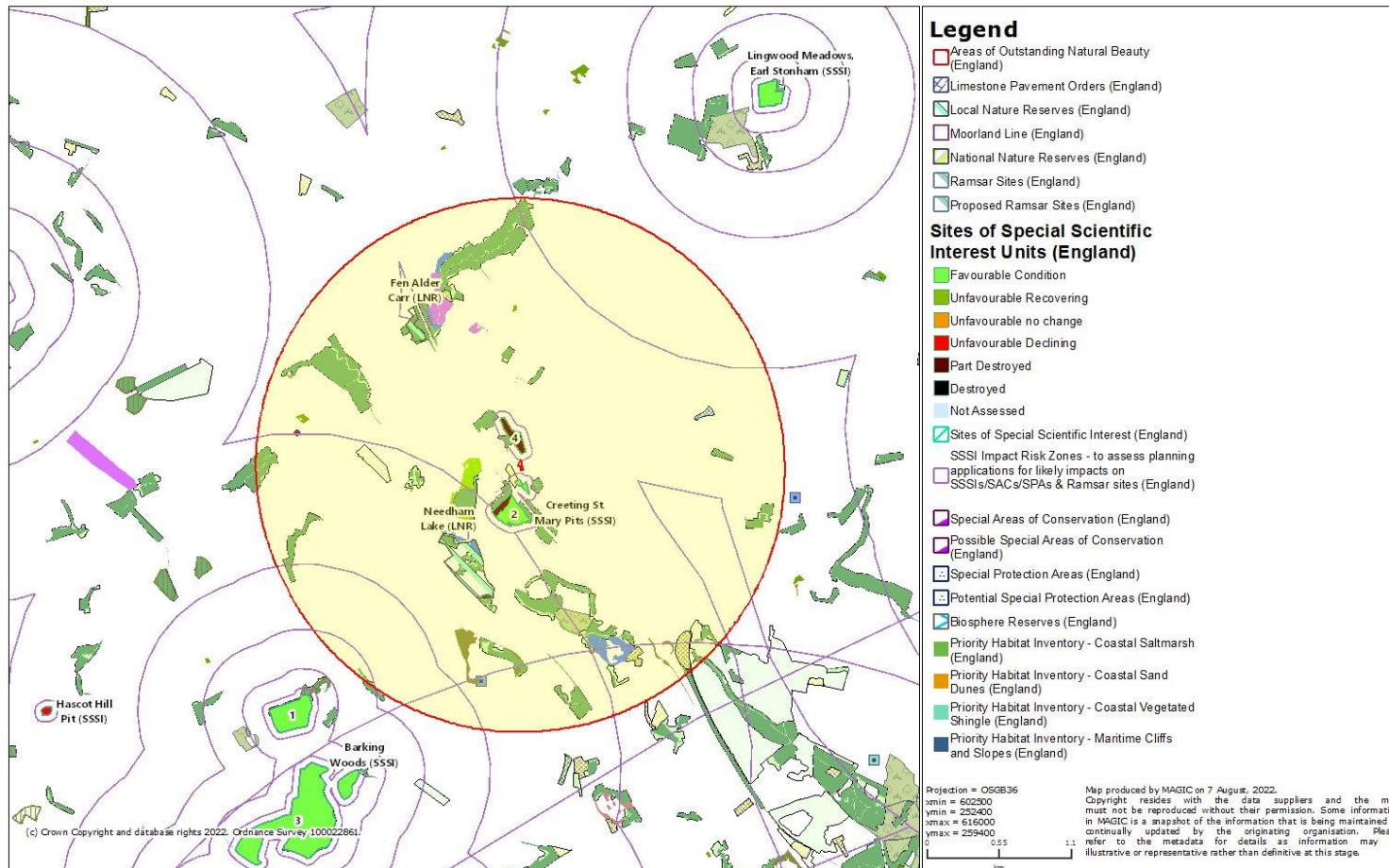
Date Notified (Under 1981 Act): 1987 Date of Last Revision: –

Other Information:

This new site partially overlaps the former Creeting Hill Sand Pits site denotified in October 1986.

Description and Reasons for Notification:

This complex of old quarry sections allows a very important part of the Lower Pleistocene stratigraphy of Suffolk to be demonstrated. The site is of great importance as the type-site of the recently defined Creeting Sands, thought to be shallow marine/intertidal sediments laid down during an early Pleistocene interglacial. These occur at the base of the sequence and are overlain by gravels, either early Thames deposits (Kesgrave Formation) or Anglian outwash, which are in turn overlain by till (Lowestoft Formation). The description of these newly defined marine/intertidal beds and the appraisal of their relationship to better established parts of the East Anglian stratigraphy are at an early stage, but will clearly focus considerable attention on the Creeting St Mary Pits. The latter therefore have considerable research potential as well as great importance as a key stratigraphic site.



Map of Statutory Wildlife Sites and Priority Habitats – Magic Map 2022

APPENDIX 3

Table 6.1 Guidance on the optimal timing for carrying out specialist ecological surveys and mitigation

This is not definitive and is intended to provide an indication only. The timing of surveys and animal activity will be dependent on factors such as weather conditions. Please consult the *species briefing sheets* for more detailed information, including species distribution.

KEY	
	Recommended survey time
	No surveys
	Mitigation conducted at these times
	Mitigation works restricted

- * Where survey techniques involve the capture, handling or disturbance of protected species then only licensed persons can undertake surveys; personal survey and monitoring licences are obtained from English Nature, Countryside Council for Wales, Environment and Heritage Service (NI) or Scottish Natural Heritage
- ** Where mitigation involves the killing, capture, injury and/or disturbance of protected species and/or the damage, destruction or obstruction of their habitats, a development licence must be obtained from the Department for Food and Rural Affairs (England), Scottish Executive's Environment and Rural Affairs Department, Welsh Assembly (Countryside Division) or the Environment and Heritage Service Northern Ireland. Licences will be granted only to persons who have proven competence in dealing with the species concerned. Development licence applications take approximately 30 days to be processed by government departments. Where mitigation works need to be conducted under licence before works begin, licence applications will need to be submitted considerably earlier.

take approximately 30 days to be processed by government departments. Where mitigation works need to be conducted under licence before works begin, licence applications will need to be submitted considerably earlier.

		Licence required?	J	F	M	A	M	J	J	A	S	O	N	D
Habitats / vegetation	Surveys	N	Mosses and lichens. No other detailed plant surveys – Phase 1 surveys only (least suitable time)			Detailed habitat assessment surveys. Surveys for higher plants and ferns. Mosses and lichens in April, May and September only						Mosses and lichens. No other detailed plant surveys – Phase 1 surveys only (least suitable time)		
	Mitigation	N	Planting and translocation		No mitigation for majority of species							Planting and translocation		
Birds	Surveys	N	Winter birds		Breeding birds / migrant species			Breeding birds		Breeding birds / migrant species			Winter birds	
	Mitigation	N	Clearance works may be conducted at this time, but must stop immediately if any nesting birds are found		No clearance or construction works. Bird nesting season						Clearance works may be conducted at this time, but must stop immediately if any nesting birds are found			
Badgers	Surveys	*	All survey methods – best time is in spring and early autumn / winter											
	Mitigation	**	Building of artificial setts. No disturbance of existing setts						Stopping up or destruction of existing setts					
Bats	Surveys	*	Inspection of hibernation, tree and building roosts		No surveys		Activity surveys and inspection of building roosts. Emergence counts.				No surveys		Inspection of hibernation, tree and building roosts	
	Mitigation	**	Works on maternity roosts		Works on maternity roosts until mid-May. Works on hibernation roosts from mid-March		Works on hibernation roosts only			Hibernation works until November. Maternity roosts from mid-September		Works on maternity roosts only		

Table 6.1 Guidance on the optimal timing for carrying out specialist ecological surveys and mitigation (continued)

		Licence required?	J	F	M	A	M	J	J	A	S	O	N	D
Other reptiles	Surveys	N	No surveys – reptiles in hibernation		Activity surveys from March to June and in September / October. Surveys are limited by high temperatures during July and August. Peak survey months are April, May and September.								No surveys – reptiles in hibernation	
	Mitigation	N	Scrub clearance		Capture and translocation programmes can only be conducted whilst reptiles are active (March to June and September / October). Trapping is limited by high temperatures during July / August. Scrub clearance								Scrub clearance	
Great crested newts (n/a in NI)	Surveys	*	No surveys – newts in hibernation		Pond surveys for adults: mid-March to mid-June. Surveys must include visits undertaken between mid-April and mid-May. Egg surveys April to mid-June. Larvae surveys from mid-May. Terrestrial habitat surveys				Larvae surveys to mid-August. Terrestrial habitat surveys		Terrestrial habitat surveys		No surveys – newts in hibernation	
	Mitigation	**	No trapping of newts. Pond management only		Newt trapping programmes in ponds and on land				Newt trapping on land only				No trapping of newts. Pond management only	
Natterjack toads	Surveys	*	No surveys – toads in hibernation		Surveys of breeding ponds for adults. Surveys for tadpoles from May onwards. Surveys for adults on land				Surveys for adults on land		No surveys – toads in hibernation			
	Mitigation	**	Pond management works		Trapping of adults in ponds from April to July. Trapping of adults on land. Trapping of tadpoles from May to early September								Pond management works	
White-clawed crayfish	Surveys	*	Reduced activity		Surveys can be undertaken		Avoid surveys (females are releasing young)		Optimum time for surveys				Reduced activity	
	Mitigation	***	Avoid capture programmes (low activity levels may lead to animals being easily missed)		Exclusion of crayfish from construction areas		Avoid capture programmes		Exclusion of crayfish from construction areas				Avoid capture programmes (low activity levels may lead to animals being easily missed)	
Fish	Surveys	*	For coastal, river and stream-dwelling species, the timing of surveys will depend on the migration pattern of the species concerned. Where surveys require information on breeding, the timing of surveys will need to coincide with the breeding period, which may be summer or winter months, depending on the species.											
	Mitigation	**	Mitigation for the protection of watercourses is required at all times of year. Mitigation for particular fish species will need to be timed so as to avoid the breeding season. This varies from species to species.											

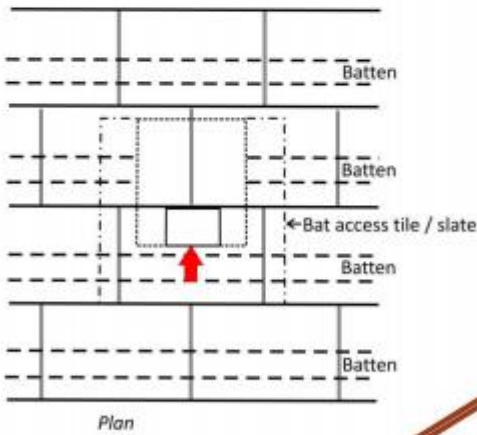
*** Where mitigation involves the capture of white-clawed crayfish, a mitigation licence must be obtained from English Nature, Countryside Council for Wales, Environment and Heritage Service (NI) or Scottish Natural Heritage. Licences will be granted only to persons who have proven competence in dealing with the species concerned.

Bat Ridge Tile Design

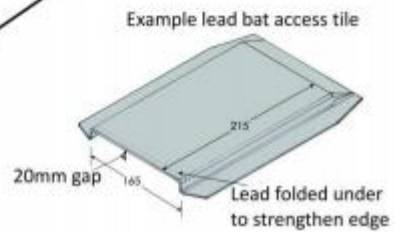
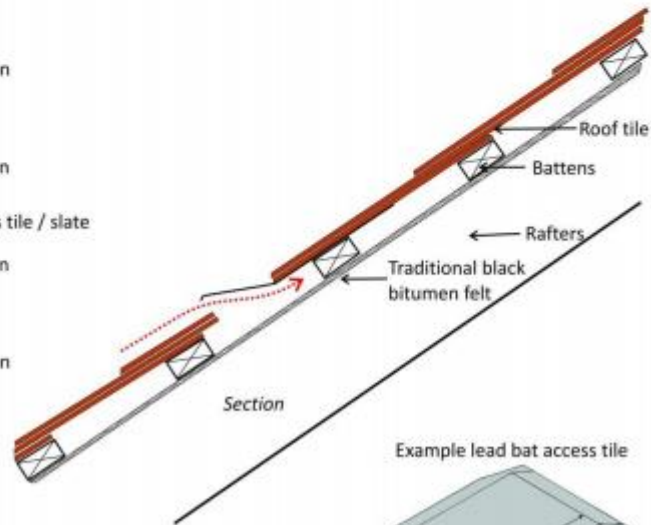
Ridge tiles with section of edge cut away to leave an access hole measuring 15mm-20mm high by 50mm-70 mm long (*shown as 1*); or an access hole of similar dimensions created by leaving an area free of mortar (*shown as 2*), or by straddling two tiles with a third (*not shown*) to leave an appropriate gap. If necessary (i.e. if weather ingress is considered a problem (e.g. where ridges are in very exposed locations)), a lead 'saddle' (*shown as 3*) should be used to increase the distance from the entry hole to the ridge hole.












Bat Access Tile Design



Example of bat access tile available from Tudor Clay Roof Tiles (<http://tudorrooftiles.co.uk/>)



Examples of Bat Boxes		
<p>It is important that the bat boxes are positioned sufficiently high above the ground to dissuade ground predators, a minimum of 4m up; and at a distance from sources of artificial lighting. The boxes should be located on the west, south and east facing sides of the trees / buildings giving bats a range of microclimates through the year and direct access to foraging and commuting habitat along site boundaries.</p>		
Schwegler 1FF Bat Box		The 1FF bat box can be sited in trees or on buildings. Size: 43cm high x 27cm wide x 14cm deep.
Schwegler 2F Bat Box		The 2F bat box can be sited in trees or on buildings. Size: 33cm high x 16cm diameter.
1FQ Schwegler Bat Roost (For External Walls)		Suitable for a variety of crevice-dwelling bats, for larger roosts or maternity groups. Internal layout provides 3 different areas where bats can roost, offering different levels of light and temperature. Gaps ranging from 1.5cm to 3.5cm wide offering various places for bats to roost. Suitable to erect on most types of external brick, timber or concrete structures. Size: 60cm high x 35cm wide x 9cm deep.
Improved Roost-Maternity Bat Box		A large 3 crevice bat box. 3 separate crevices each with different temperature characteristics. Suitable for larger roosts or maternity groups of small crevice-dwelling species such as pipistrelle bats. Suitable to erect on buildings or trees. Size: 49cm high x 26cm wide x 13cm deep.
Timber Double Chamber Bat Box		This bat box is suitable for siting on trees in gardens or woodland and requires no annual maintenance. Should not be painted or treated with any type of preservative, as these can harm the bats. Size: 31.3cm high x 16cm wide x 16cm deep.
The Kent Bat Box		Made from untreated rough-sawn timbers ca.20mm thick. Crevices can be between 15mm and 25mm wide. Suitable to fit to walls, other flat surfaces or trees. Approximate dimensions (boxes vary in size): 24cm wide x 47.5cm high x 17cm deep.

Bird Nesting Habitat	
<p>CedarPlus Nest Box Available with 2 entrance hole sizes: 32mm hole – suitable for great, marsh and coal tits, redstart, nuthatch, pied flycatcher, house sparrow and tree sparrows. 26mm hole – to allow access only to blue, marsh and coal tits (and possibly wrens).</p> <p>Height: 370mm; Width: 156mm; Depth: 175mm</p>	
<p>Schwegler 1B Bird Box The 1B nest box will attract a wide range of species and is available with different entrance hole sizes to prevent birds from competing with each other for the boxes.</p> <p>It is available in 4 colours: brown, green, white and red. The nest box can be attached to the tree or wall using an aluminium nail or by hanging over a branch and is made from Woodcrete to ensure that it is long-lasting.</p> <p>Entrance hole sizes:</p> <p>32mm hole – will attract great, blue, marsh, coal and crested tit, redstart, nuthatch, collared and pied flycatcher, wryneck, tree and house sparrow.</p> <p>26mm hole – suits blue, marsh, coal and crested tit and possibly wren. All other species are prevented from using the nest box due to the smaller entrance hole.</p> <p>Oval hole (29x55mm) – suits redstarts because more light enters the brood chamber. It is also suitable for all other species which nest in the 32mm boxes.</p> <p>Height: 23cm; Diameter: 16cm</p>	
<p>No. 10 Schwegler Swallow Nest The Swallow Nest No. 10 consists of a woodcrete nesting bowl which is attached to a wooden panel of formaldehyde-free chipboard. The nest should be placed inside outbuildings such as sheds, barns or stables leaving a distance of at least 35mm between the top of the nest and wall top. Ensure there is always access for the birds through an open window or skylight, or other high level access (minimum of 50mm (H) x 70mm (W) gap). Multiple nests should not be placed at less than 1m intervals.</p> <p>To avoid problems with droppings accumulating, a droppings board could be placed beneath each nest box to collect the droppings.</p>	



Artificial lighting and wildlife

Interim Guidance: Recommendations to help minimise the impact 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#sthashs7GPA1vL.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

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*.

⁷<http://planningguidance.planningportal.gov.uk/blog/guidance/light-pollution/when-is-light-pollution-relevant-to-planning/>

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