GRAY
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Ecological Impact Assessment

Site: Barn at Pond Farm, Swanton Abbott

Client: Henry Read

Reference: HR05422

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Project	Barn at Pond Farm, Swanton Abbott
Report Type	Ecological Impact Assessment
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The conclusions of this report are valid for a period of 18 months, unless significant habitat changes have occurred on site.

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Contents

1 Executive Summary

1.1 Gray Ecology was commissioned to undertake an Ecological Impact Assessment of a proposed development at Pond Farm in Swanton Abbott, Norfolk. Development plans revolved around the conversion of the barn to a residential dwelling. The site had previously been surveyed by Gray Ecology in November 2020, with bat and great crested newt surveys completed in 2021.

1.2 The development site was adjacent to a large pond which had "Average" Suitability in supporting great crested newts. An eDNA test of the pond in May 2021 confirmed that this feature supported great crested newts. There were no other ponds within 250m of the site. With a risk that individuals may be injured or killed during clearance and construction works, either a European Protected Species Mitigation licence or a District Level Licence for this species will be required prior to work commencing on site.

1.3 Two nocturnal bat surveys of the building were completed in May and June 2021 and no evidence of a bat roost was found. During the site visit in 2023, only one old bat dropping was found inside the barn and it was felt that the potential of the barn to support bat roosts had declined following the collapse of part of the structure and damage in other areas. No further surveys for bats are required. To prevent a minor adverse impact on foraging bats, external lighting should be minimal, low-intensity and directional away from the pond to the east and tree line to the north, following guidance from the Institute of Lighting Professionals, 2018.

1.4 The building supported common nesting birds and conversion should commence outside the bird breeding season to avoid destroying any active nests. An ecologist should be contacted to complete a nesting bird check no more than 48 hours prior to work commencing if this is not possible.

1.5 To avoid minor adverse impacts on hedgehogs and common toads, any pits or trenches left open overnight should contain suitable wildlife escape ladders and must be checked for trapped wildlife before being filled. Materials must be stored on existing hardstanding or in skips/on pallets to prevent wildlife seeking refuge within it.

1.6 To provide a net gain for biodiversity, bat boxes and bird boxes should be installed on the new building, with native bulbs and new native hedgerow/fruit tree planting included within the site landscaping.

2 Introduction

2.1 Background

2.1.1 Gray Ecology was commissioned to undertake an Ecological Impact Assessment (EcIA) of a proposed development involving the conversion of a modern agricultural building to a dwelling at Pond Farm in Swanton Abbott, Norfolk.

2.1.2 Gray Ecology had previously completed a Preliminary Ecological Appraisal in November 2020, with bat and great crested newts surveys completed between May and June 2021. A new site visit was completed in March 2023 to re-evaluate the potential of the site to support Protected and Priority Species and re-assess impacts based on updated development proposals.

2.1.3 This report aims to describe the ecological baseline of the site, as well as evaluate habitats within its boundaries for their value in the wider environment and their potential to support protected species. It assesses potential impacts on these features as a result of the development and advises on the need for further impact assessments, any European Protected Species Mitigation (EPSM) licences or other mitigation strategies.

2.2 Site Description

2.2.1 The proposed development Site comprised a modern agricultural shed located within an area of concrete hardstanding with scattered scrub and trees at the peripheries, centred at OS Grid Reference TG25642676 (see Map 1 below). The site was in a rural location surrounded by large arable fields, with substantial blocks of woodland, heathland and lakes to the north and east, with Swanton Hill Common being the closest of these at 500m to the east.

Map 1: Site location (Google Earth Pro, 2020)

3 Methodology

3.1 Personnel

3.1.1 The walkover surveys, Protected Species surveys and report were completed/led by Abi Gray BSc. (Hons) MSc. ACIEEM, an ecologist with over nine years' experience, who holds Natural England Licences for bats [reference 2016-26862-CLS-CLS], barn owls [reference CL29/00374] and great crested newts [reference 2015-17248-CLS-CLS]).

3.2 Desk Study

3.2.1 The Government's Multi-Agency Geographic Information for the Countryside website (www.magic.gov.uk) was accessed for information on Designated Sites and granted European Protected Species Mitigation Licences within 2km of the proposed development site in March 2023. This platform was also used to assess local green infrastructure in relation to the development site.

3.2.2 A search for records of Designated Sites and Protected Species within 2km of the site from the Local Biological Records Centre was not commissioned due to the small scale of the development.

3.3 Field Study

3.3.1 Environmental conditions during the initial field surveys are shown in Table 1:

Table 1: Environmental variables

Survey Date	06/11/2020	08/03/2023
Temperature	2°C	6°C
Cloud Cover	20%	100%
Precipitation	Dry	Dry
Wind	Beaufort Scale 0 – Calm	Beaufort Scale 2 – Light Breeze

3.3.2 A Phase 1 habitat survey of the site was conducted in accordance with the best practice publication Phase 1 Habitat Survey Methodology (JNCC, 2010), with habitats present within the survey area mapped and described with dominant and notable species identified. Any specific features of ecological interest were also recorded and mapped, as were Habitats of Principle Importance (e.g. wet woodland or lowland meadows).

3.3.3 The habitats within the survey area were assessed for their potential to support protected or priority species and although species-specific surveys for all species were not undertaken, evidence of their presence was noted.

3.3.4 Those species considered as part of this assessment included the following, with key legislation detailed in Appendix 1:

- Badger
- Reptiles
- Water vole
- Otter
- Great crested newt
- Birds
- Bats
- Species of Principal Importance (e.g. brown hare and common toad)

Species-Specific Surveys

Great Crested Newts

3.3.5 The Habitat Suitability Index (HSI) was used to assess accessible ponds and water bodies within 250m of the site for their potential to support great crested newts (Oldham et al 2000). Details of the scoring system are shown in the table below.

Table 2: Habitat Suitability Index values

HSI	Pond suitability
< 0.5	Poor
0.5 – 0.59	Below average
0.6 – 0.69	Average
0.7 – 0.79	Good
> 0.8	Excellent

3.3.6 Habitats on site were assessed for their suitability for this species to use during their terrestrial phase.

3.3.7 One pond was sampled for great crested newt eDNA with analyses undertaken by ADAS on 12 May 2021. The water sample was collected by Abi Gray on 20 April 2021 in accordance with Natural England and ADAS sample collection guidance.

Bats

3.3.8 Structures and trees within the site boundaries were assessed for their potential to support roosting bats. The survey work was completed in accordance with Bat Conservation Trust's "Bat Surveys for Professional Ecologists" (Collins, 2016). The rationale behind the value given to the suitability of a feature to support bats is shown in the Table 3.

Table 3: Assessing the potential suitability of a development site for bats (taken from Collins, 2016)

Suitability	Description of roosting habitats	Description of commuting and foraging habitat
Negligible	Negligible habitat features onsite likely to be used by roosting bats.	Negligible habitat features on-site likely to be used by commuting or foraging bats.
Low	A tree/structure of sufficient size and age to contain potential roost features (PRFs) but with none seen from the ground or features seen with only very limited roosting potential.	Habitat that could be used by small numbers of commuting bats such as a gappy hedgerow or unvegetated stream, but isolated. 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.
Moderate	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).	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.
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.	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. Site is close to and connected to known roosts.

3.3.9 Two nocturnal bat surveys of the building were completed in accordance with the Bat Conservation Trust's Good Practice Guidelines. The visits were completed in May and June 2021, over two weeks apart, in suitable weather conditions and using two surveyors with Echometer Touch 2 Detectors. Details of these visits can be found below:

Table 4: Bat Survey Details

Date	Emergence /Re-entry Survey	Survey Times	Sunset/ Sunrise	Surveyors	Weather Conditions
11/05/21	Emergence	20:20 – 21:50	20:38	Abi Gray Sean Gray	14°C at start, 10°C at end, Dry, Beaufort Scale 3
02/06/21	Emergence	20:55 – 22:25	21:10	Abi Gray Sean Gray	22°C at start, 16°C at end. Dry. Beaufort Scale 2

3.4 Survey Limitations

3.4.1 The PEA walkover was undertaken outside of the optimal time for botanical surveys; however, given the habitats within the site it is considered unlikely rare plants will have been present. Therefore, there were no significant limitations to the surveys undertaken.

3.5 Suitability Assessment

3.5.1 The following criteria was used when assessing the likelihood of a protected species being present within the survey area:

Table 5: Criteria considered when assessing the likelihood of occurrence of protected species

Assessment Category	Criteria for other Species
Confirmed Present	Species are confirmed as present from the current survey or historical confirmed records.
High	Habitat and features of high quality for species/species assemblage. Species known to be present in wider landscape. Good quality surrounding habitat and good connectivity.
Moderate	Habitat and features of moderate quality. The site in combination with surrounding land provides all habitat/ecological conditions required by the species/assemblage. Within known national distribution of species and local records in desk study area. Limiting factors to suitability, including small area of suitable habitat, some severance/poor connectivity with wider landscape, poor to moderate habitat suitability in local area.
Low	Habitats within the survey area poor quality or small in size. Few or no records from data search. Despite above, presence cannot be discounted as within national range, all required features/conditions present on site and in surrounding landscape. Limiting factors could include isolation, poor quality landscape, or disturbance.
Negligible	Very limited poor-quality habitats and features. No local records from desk study; site on edge of, or outside, national range. Surrounding habitats considered unlikely to support species/species assemblage.

3.6 Impact Assessment

3.6.1 The assessment was undertaken in accordance with the Chartered Institute of Ecology and Environmental Management's (CIEEM) Professional Guidance Series 'Guidelines for Ecological Impact Assessment [EcIA] in the UK and Ireland Terrestrial, Freshwater, Coastal and Marine' (2018), and with reference to the Bat Mitigation Guidelines (Mitchell-Jones & McLeish, 2004).

Zone of Influence

3.6.2 The Zone of Influence (ZoI) has been determined based on the location of the development site and the proposed works. In this instance, the ZoI is largely restricted to the development site itself given the small scale of the development and the habitats being directly impacted.

Value of Ecological Features

3.6.3 The value of ecological features uses conservation status (i.e. extent, relative abundance and distribution) to assign geographical levels at which the feature is considered to hold importance, those being:

- International
- National
- Regional
- County
- District
- Local
- Site

Scale of Impact

3.6.4 Impacts on ecological features, whether beneficial or adverse, can occur either directly (e.g. loss of habitats, habitat fragmentation, noise/light disturbance) or indirectly (e.g. changes to local hydrology, nutrient levels, and water/air quality). The overall impact is assessed taking into consideration a range of factors, including conservation status of an ecological feature, magnitude, spatial extent, duration, reversibility, and timing and frequency.

3.6.5 For nature conservation designations, other defined habitats and ecosystems, this assessment considers what effect the potential impacts are likely to have on conservation objectives or interest/qualifying features. For ecosystems, consideration is given to whether a change in ecosystem structure and/or function is likely that would substantively alter its ecological integrity.

3.6.6 For habitats and species, this assessment considers what effect the potential impacts will have on "conservation status", and whether or not the effect is likely to substantively alter the ecological integrity of the habitat or species under consideration.

3.6.7 For the purposes of this report, conservation status is defined as per CIEEM (2016):

- habitats: "conservation status is determined by the sum of the influences acting on the habitat that may affect its extent, structure and

functions as well as its distribution and its typical species within a given geographical area"; and

- species: "conservation status is determined by the sum of influences acting on the species concerned that may affect its abundance and distribution within a given geographical area."

3.6.8 Impacts are categorised as Major, Moderate, Minor, Neutral or Unknown, as detailed in Table 6. Impacts are considered in the absence of any mitigation and then again when specific recommendations for avoidance, mitigation, compensation and enhancements have been made.

3.6.9 Consideration is also given to the potential for the development proposal to give rise to significant impacts in combination with other proposed developments in the local area.

Table 6: Criteria considered when assessing the likelihood of occurrence of protected species

Assessment Category	**Criteria**
Unknown	There is insufficient data available to make an assessment as to any potential impacts on a habitat or species.
Major	Likely to have an effect on the habitat or species at a regional, national or international level
Moderate	Likely to have an effect on the habitat or species at a county level
Minor	Likely to have a small effect on the habitat or species at a local level
Neutral	No predictable effect on habitat or species

4 Results

4.1 Statutory Designated Sites

4.1.1 Two Statutory Designated Sites were found within 2km of the proposed development:

Table 7: Criteria considered when assessing the likelihood of occurrence of protected species

Site Name	Designation	Reason for Designation	Distance from Development Site
Westwick Lakes	Site of Special Scientific Interest (SSSI)	Westwick Lakes form a compact group of five secluded, man-made lakes. The Perch Lake group is of a type rarely found in East Anglia and closely resembles nutrient-poor lakes found in the upland areas. The acidic waters support an unusual aquatic flora and plankton fauna which includes one locally uncommon species. The other lakes are more typical with abundant water weeds and provide an interesting contrast to the Perch Lake group. There is considerable ornithological interest with large flocks of wildfowl overwintering in the lakes.	1.6km north-east
Felmingham Cutting	Local Nature Reserve (LNR)	Felmingham Cutting on the Weavers' Way is a Butterfly Nature Reserve, which has become populated with a wide variety of butterflies since the line closed, sixteen different species having been found here. The whole cutting is managed to keep a series of different breeding areas for different species, and is very scenic	2km north

4.2 Priority Habitats

4.2.1 There were no priority habitats within the development site itself. A Traditional Orchard is listed as being present 50m to the east of the site, across a small road. The nearest woodland is over 550m to the east with a small block of lowland heathland over 650m east. A large pond was present within 15m of the south-eastern corner of the site.

4.2.2 The development site was listed as being within the National Habitat Network as Network Enhancement Zone 1.

4.3 Field Study

4.3.1 Map 2 gives an overview of the habitats on site, with further details of each habitat listed below.

Habitat Description

4.3.2 The site proposed for development consisted mainly of a large area of hardstanding with a modern shed in the north-western corner.

4.3.3 The main section of the building was a large, steel-framed shed with a pitched, corrugated sheet roof, and corrugated sheet walls with capped, block walls (around 2m in height) on the southern and northern aspects. The building was open on the eastern and western aspects. During surveys in 2020 and 2021, a timber-framed, flat-roofed structure adjoined the main barn on the western aspect – this was in a very poor state of repair and had collapsed and been removed prior to the survey in 2023, leaving just an area of bare earth at this end of the site.

4.3.4 A small lean-to unit was present on the northern aspect of the steel-framed shed. With a sloping corrugated sheet roof, this unit had block walls and a concrete floor and was in use for storage at the time of the survey.

Figure 1. Looking north-east across site

Figure 2. Looking north-west across site

Protected Species

Badger

4.3.5 With the majority of the site unsuitable for badger foraging or sett-building, the likelihood of this species being present within the site is low.

Birds

4.3.6 The building was accessible to birds via the open doorways and gaps around the sheet walls. There was evidence of woodpigeon nesting taking place with eggshells found scattered on the floor in 2020 and old nests present in the framework in 2023. There were no obvious potential nest sites for Schedule 1 bird such as barn owl to use, and no evidence of their presence.

4.3.7 Common nesting birds were confirmed as present within the building.

Bats

4.3.8 There were no records of granted European Protected Species Mitigation licences for bats within 2km.

Foraging and Commuting

4.3.9 The site was considered to have high potential to support foraging and commuting bats due to suitable green habitat and infrastructure around the boundaries of the site and the immediate area, including several high value features including lines of trees, a large pond, and large blocks of woodland within 1km.

Potential Roost Sites – Buildings

4.3.10 The building on site was completely accessible to bats via the open doorway to the east and numerous gaps between sheet walls and roofs.

4.3.11 The main shed was considered to be unsuitable for roosting bats with a lack of any obvious Potential Roost Features (PRFs) and an entirely open, airy interior. The block walls were in good condition in this area and capped, preventing bats from roosting within these areas. No bat droppings or other evidence of bats was found in this section, although it is considered that any such evidence would have been masked by the earth floor.

4.3.12 Evidence of bats was found in the lean-to section of the barn in 2020. Within this area, at least 30 droppings were found scattered along the floor and objects stored within it. There was no clustering to indicate PRFs within the section; however, it was found that the block walls of this section were mostly uncapped (see Figure 5). On the eastern and western aspects, small areas of brickwork prevented access down into parts of the walls, but there were still areas on these aspects accessible to bats, and the entirety of the northern wall was completely accessible. It was impossible to fully view inside the walls to determine how far down cavities went, but based on previous experience with these building materials, some cavities are likely to extend at least 1m down into the wall.

Figure 5. Internal of lean-to – red arrows indicate access points to cavities within the block walls

4.3.13 In 2020, the building was assessed as having moderate potential to support bat roosts. However, no bat roosts were identified during the two nocturnal surveys in May and June 2021 and no fresh evidence of bats such as droppings were found during the visits. Common pipistrelle bats were frequently observed foraging around the barn and surrounding pond and tree habitat, as well as inside the barn, and it is likely the droppings found during the PEA were from this activity as opposed to roosting bats.

4.3.14 No other species of bat were recorded during the survey.

4.3.15 During the 2023 site visit, only one bat dropping was found internally, caught on an item stored in the shed. Debris and leaf litter was scattered around the floor and it is not considered likely that evidence had been removed. The potential of the lean-to to support bats was felt to have been reduced, with

damaged areas of corrugated sheeting on both the eastern and western ends and the removal of doors from the southern aspect creating a much lighter, draughtier interior.

Great Crested Newts

4.3.16 OS Maps indicated the presence of one pond within 250m of the development site, which was a large feature immediately adjacent to the access driveway to the site.

4.3.17 This pond, reference as Pond 1 – see Appendix 2, was a large (approximately 900m^2) roadside pond with roads to the south and east, and willow scrub to the north and west (Figure 3). The pond was used by low numbers of geese and formed as a result of drainage from arable fields to the north: as a result of this the pond was known to dry out in dry periods in the summer (*Pers. Comm. adjacent landowner)*. A HSI completed on this feature gave a value of 0.69 indicating it had "average" suitability for great crested newts (see Appendix 2 for the full results).

Figure 3. Pond 1 (taken November 2020)

4.3.18 The majority of the site was considered to contain low quality habitat for terrestrial great crested newts due to the large area of hardstanding and bare ground.

4.3.19 No records of granted great crested newt EPSM licences were identified during the desktop search.

eDNA Test Results

4.3.20 Water samples collected from Pond 1 in April 2021 tested positive for great crested newts (see Appendix 2). This species is confirmed as present within the water body and considered likely to also be present within boundaries of the development site.

Reptiles

4.3.21 Although good-quality reptile habitat exists locally around the proposed development site, habitat within the red line of development was considered unsuitable for common reptile species. Overall, it is considered that the likelihood of reptiles being present within the site was low.

Otter

4.3.22 Otters may visit Pond 1 adjacent to the eastern site boundary; however, there were no other ponds within the 250m of this feature and no drains or streams connecting other such water bodies to the site. Overall, it is considered that the likelihood of this species being present within the site was low.

Water Vole

4.3.23 The pond was considered to be sub-optimal for water voles. The fact that the pond dries out regularly, combined with very low, shallow banks, reduced its suitability to support this species and it is considered that the likelihood of water vole being present was low.

Priority Species

4.3.24 Based on the habitats present within the site and the immediate surrounding area, it is considered possible that hedgehog and common toad may occasionally be present within the site.

5 Impact Assessment

5.1 Project Description

5.1.1 The development proposal is shown in Appendix 3 and includes the conversion of the building to residential. A small extension will be built on the western end, where the original timber portion of the agricultural shed had collapsed.

5.2 Potential Impacts

Designated Sites

5.2.1 The Site falls within the SSSI Impact Risk Zone for Westwick Lakes SSSI and is within a Nutrient Impact Area. The Local Planning Authority should consult Natural England's Nutrient Neutrality Advice.

5.2.2 Neutral impacts on Felmingham Cutting LNR are envisaged as there will be no direct uptake of land from the LNR, which is 2km north with no obvious ecological connectivity to the development Site.

Ecological Features

5.2.3 Table 8 discusses the value of ecological features at the site and provides an assessment of expected impacts upon those features in the absence of mitigation. All assessments are based upon the site layouts provided in Appendix 3.

Table 8: Risk assessment for Ecological Features

Ecological Features	Scale of Value	Scale of Impact	Rationale
Habitats	Site	Neutral	Habitats being lost were of low ecological value and their loss is not of significance.
Badger	Site	Neutral	Unlikely present within the ZoI
Birds	Site	Minor adverse	Nesting habitat within the shed will be lost during conversion works, with any active nests destroyed or disturbed by the works.
Bats	Local	Minor adverse	No impacts on roosting bats envisaged.

Ecological Features	Scale of Value	Scale of Impact	Rationale
			High quality foraging habitat may be detrimentally impacted by any increase in post-development lighting.
Great Crested Newts	Local	Moderate adverse	A Natural England Rapid Risk Assessment (2010) indicates that the development is of such a size that great crested newts present in Pond 1 could be impacted by the proposals by giving a result of "Amber – Offence Likely" A site-specific assessment concurs with this. There is a risk of individuals being injured or killed during clearance and construction works. No fragmentation of habitat will occur.
Reptiles	Site	Neutral	Unlikely present within the ZoI
Otter	Site	Neutral	Unlikely present within the ZoI
Water Vole	Site	Neutral	Unlikely present within the ZoI
Priority Species	Local	Minor adverse	Hedgehog and common toad may occasionally be present in the site and may be injured or killed during clearance and construction works.

6 Recommendations

6.1 Further Surveys to Inform Planning

6.2 Licencing

6.2.1 Licencing for great crested newts will be required prior to any development work being undertaken. This could either be in the form of a European Protected Species Mitigation (EPSM) licence, which would require additional survey work of Pond 1, or a District Level Licence. Details of the proposed licensing route and any necessary on-site mitigation and compensation will need to be provided to the Local Planning Authority to enable them to reach a decision on the planning application.

6.3 Further Surveys

6.3.1 No further surveys for any other Protected or Priority Species are recommended (other than potentially for great crested newts should a EPSM licence be sought, as detailed above).

6.3.2 Updated nocturnal bat surveys are not felt to be required at this stage due to the lack of new evidence of activity inside the structure, the degradation of the potential of the barn to support roosting bats, and that previous surveys are less than 2 years old.

6.4 Avoidance, Mitigation and Compensation Recommendations

6.4.1 For those ecological features where a negative impact was identified during the Impact Risk Assessment, detailed recommendations have been made within this section and the Residual Risk Assessment calculated in Table 9.

Table 9: Recommendations

Ecological Features	**Scale of Unmitigated Impact**	**Recommendations**	**Scale of Residual Impact**
Birds	Minor adverse	Conversion works must commence outside of the bird breeding season, which runs between 1 March and 31 August. If this is not possible, the building should be checked by an ecologist for nesting birds no more than 48 hours prior to work commencing.	Neutral
Bats	Minor adverse	External lighting should be kept to a minimum, be low-intensity and directional to the ground, particularly avoiding illumination of boundary habitats. Lighting guidance from the Institute of Lighting Professionals (2018) should be followed (see Appendix 4).	Neutral
Great Crested Newts	Moderate adverse	An EPSM or District Level Licence will be required in order for the development to legally proceed.	Neutral
Priority Species	Minor adverse	Any trenches or pits left open overnight will contain a suitable wildlife escape ladder at an angle of approximately 60^0 and will be checked for wildlife prior to being filled. Materials and equipment will be stored on existing areas of hardstanding, in skips or raised on pallets, to prevent wildlife seeking refuge within it. Any close-board fencing must contain hedgehog tunnels at a rate of 1 per 6m of fencing.	Neutral

6.5 Cumulative Impacts

6.5.1 With impacts from the development on ecological features reduced to Neutral, cumulative impacts resulting from other nearby developments are thereby avoided.

7 Enhancements

7.1.1 The Local Planning Authority has a legal duty to consider enhancements on proposed development sites. Furthermore, the National Planning Policy Framework (NPPF) requires planning decisions to aim to promote net gains in biodiversity on development sites.

7.1.2 The majority of the site consisted of hardstanding, bare earth and built structures: this will be enhanced with approximately 250m^2 replaced with garden habitat including flower beds and lawns.

7.1.3 To provide a reasonable net gain for biodiversity, the following items should be incorporated into the site design and soft landscaping, and indicative locations are shown in Appendix 5:

- Two integrated bat boxes should be installed on the property – 1 x cavity box on the south-eastern aspect and 1 x crevice box on the south-western side, high up as close to the eaves/verge as possible. The Integrated Eco Bat Boxes would be a suitable design.
- Two swift Nest Boxes should be installed under the eaves of the new property on the south-western aspect and high up on the apex of the northern-western gable end. The Cambridge Swift Nest Box System would be suitable, as would other integrated boxes.
- Honeysuckle or jasmine should be planted on trellises growing up existing fences on the southern and western boundaries, providing a food source for insects.
- Bulbs including crocus, snowdrop and daffodil should be planted underneath any newly turfed areas, with lawns seeded with a flowering lawn mix such as Emorsgate Seeds Mix EL1.

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Mitchell-Jones, A.J. (2004) Bat mitigation guidelines. English Nature, Peterborough, UK

Appendix 1 – Relevant Legislation

Badgers

Badgers and their setts are protected. Under the Protection of Badgers Act 1992, in England it is an offence to wilfully kill, injure or take a badger (or attempt to do so), cruelly ill-treat a badger, dig for a badger, intentionally or recklessly damage or destroy a badger sett or obstruct access to it, cause a dog to enter a badger sett, or disturb a badger when it is occupying a sett.

Reptiles

All reptiles are protected under the Wildlife and Countryside Act 1981 (as amended), making it illegal to intentionally kill or injure a common reptile.

Water Voles

The water vole is fully protected under Schedule 5 of the Wildlife and Countryside Act 1981 and is a priority conservation species. It is illegal to intentionally capture, kill or injure water voles.

Otters

Otters are fully protected as a European protected species (EPS) and are also protected under sections 9 and 11 of the Wildlife and Countryside Act 1981.It is illegal to capture, kill, disturb or injure otters (on purpose or by not taking enough care), damage or destroy a breeding or resting place (deliberately or by not taking enough care), obstruct access to their resting or sheltering places (deliberately or by not taking enough care), or possess, sell, control or transport live or dead otters, or parts of otters.

Great Crested Newts

Great crested newts are protected under The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 and the Wildlife and Countryside Act 1981 (as amended). This legislation fully protects great crested newts in all life stage from intentional or reckless activities, as well as protecting their breeding and resting places from damage or destruction.

Birds

Wild birds, their young, eggs, and their nests whilst in use or being built, are protected under the Wildlife and Countryside Act 1981 (as amended).

Bats

All UK bat species are protected under The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 and the Wildlife and Countryside Act 1981 (as amended). This legislation fully protects bats and their breeding sites or resting places, making it an offence to deliberately capture, injure or kill bats, deliberately disturb bats, damage or destroy a bat breeding or resting place.

Hazel Dormouse

Dormouse are fully protected under The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019 through their inclusion on Schedule 2. Under Section 41 of these regulations dormice are protected from:

- Deliberate killing, injury or capture
- Deliberate disturbance of dormice 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
- Keeping, transporting, selling, exchanging or offering for sale whether live or dead or of any part thereof.

In England and Wales, dormouse is also protected under the Wildlife and Countryside Act 1981 (as amended) through their inclusion on Schedule 5 in respect to sub-sections 9 (4) (b) and (c) and 9 (5). Under this Act, they are additionally protected from:

- Intentional or reckless disturbance while in their place of shelter (at any level)
- Intentional or reckless damage, destruction or obstruction of access to any place of shelter or protection
- Selling, offering or exposing for sale, possession or transporting for purpose of sale, any live or dead wild animal, or any part of, or anything derived from, such animal.

Appendix 2 – HSI Assessment, Rapid Risk Assessment and eDNA Results

Date HSI assessment undertaken	06/11/2020
Pond ref	Pond 1
SI1 - Location	1
SI2 - Pond area	0.98
SI3 - Pond drying	0.5
SI4 - Water quality	0.33
SI4 - Shade	1
SI6 - Fowl	0.67
SI7 - Fish	1
SI8 - Ponds	0.65
SI9 - Terr'l habitat	0.67
SI10 - Macrophytes	0.5
HSI	0.69

Component	**Likely effect** (select one for each component; select the most harmful option if more than one is likely; lists are in order of harm, top to bottom)	**Notional offence probability score**
Great crested newt breeding pond(s)	No effect	0
Land within 100m of any breeding pond(s)	0.1 - 0.5 ha lost or damaged	0.5
Land 100-250m from any breeding pond(s)	No effect	0
Land >250m from any breeding pond(s)	No effect	0
Individual great crested newts	No effect	0
	Maximum:	0.5
Rapid risk assessment result:	**AMBER: OFFENCE LIKELY**	

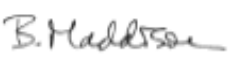
Client: Abi Gray,
Gray Ecology

ADAS
Spring Lodge
172 Chester Road
Helsby
WA6 0AR

Tel: 01159 516747
Email: Helen.Rees@adas.co.uk

www.adas.uk

Sample ID: ADAS-1268	Condition on Receipt: Low Sediment	Volume: Passed
Client Identifier: ND06920	Description: pond water samples in preservative	
Date of Receipt: 30/03/2021	Material Tested: eDNA from pond water samples	

Determinant	Result	Method	Date of Analysis
Inhibition Control†	2 of 2	Real Time PCR	12/05/2021
Degradation Control§	Within Limits	Real Time PCR	12/05/2021
Great Crested Newt*	10 of 12 (GCN positive)	Real Time PCR	12/05/2021
Negative PCR Control (Nuclease Free Water)	0 of 4	Real Time PCR	As above for GCN
Positive PCR Control (GCN DNA 10^{-4} ng/µL)#	4 of 4	Real Time PCR	As above for GCN
Report Prepared by:	Dr Helen Rees	Report Issued by:	Dr Ben Maddison
Signed:		Signed:	
Position:	Director: Biotechnology	Position:	MD: Biotechnology
Date of preparation:	12/05/2021	Date of issue:	12/05/2021

eDNA analysis was carried out in accordance with the stipulated methodology found in the Technical Advice Note (WC1067 Appendix 5 Technical Advice Note) published by DEFRA and adopted by Natural England.

** If all PCR controls and extraction blanks give the expected results a sample is considered: negative for great crested newt if all of the replicates are negative; positive for great crested newt if one or more of the replicates are positive.*

† Recorded as the number of positive replicate reactions at expected C_t value. If the expected C_t value is not achieved, the sample is considered inhibited and is diluted as per the technical advice note prior to amplification with great crested newt primer and probes.

§ No degradation is expected within time frame of kit preparation, sample collection and analysis.

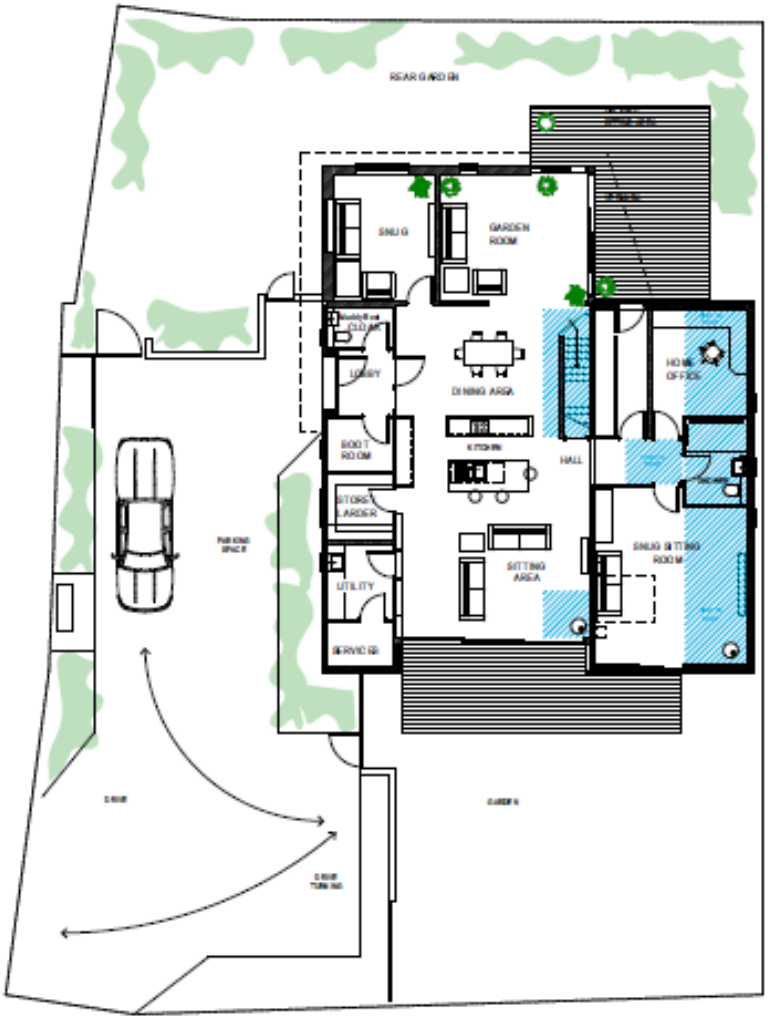
#Additional positive controls (10^{-1}, 10^{-2}, 10^{-3} ng/µL) are also routinely run, results not shown here.

Appendix 3 – Development Proposals

This drawing is not to be scaled, any discrepancies are to be reported to Julian Hood : Architectural Technologist

0m 5 10

scale



SITE PLAN

N

Revisions:

POND FARM BARN - THE HILL, SWANTON ABBOTT, NR10 5AT

SITE LAYOUT

Scale: 1:200 @ A4 | Date: January 2023 | Drawing: 310.11

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Appendix 4 – Lighting Guidance

External lighting on the site must be minimal, directional to the ground and low intensity. The following recommendations by the Institute of Lighting Professionals (2018) must be incorporated into the detailed site design:

- All luminaires should lack UV elements when manufactured. Metal halide, fluorescent sources should not be used.
- LED luminaires should be used where possible due to their sharp cut-off, lower intensity, good colour rendition and dimming capability.
- A warm white spectrum (ideally <2700Kelvin) should be adopted to reduce blue light component.
- Luminaires should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats (Stone, 2012).
- Luminaires should always be mounted on the horizontal, i.e. no upward tilt.
- Any external security lighting should be set on motion-sensors and short (1min) timers.
- Accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.

Appendix 5 – Enhancement Recommendations