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integrating nature conservation

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Ecological Impact Assessment

22 Castle Avenue,
Havant,
PO9 2RY

October 2023

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QUALITY CONTROL		
The information which we have prepared and provided is true, and has been prepared and provided in accordance with the Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct.		
Prepared by	Ecologist Abigail Harrington BSc (Hons)	01/11/23
Approved by	Principal Ecologist Olatz Gartzia BSc MSc ACIEEM	02/11/23
This report remains valid for 12 months from date of issue. Survey data are valid for 12-18 months from the date the survey was undertaken.		

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

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

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

1. EXECUTIVE SUMMARY

- 1.1. Darwin Ecology Ltd was commissioned by WAT Design to undertake an Ecological Impact Assessment (EclA) of proposals for the buildings and habitats at 22 Castle Avenue, Havant, PO9 2RY¹. The assessment was required to support a planning application for a loft conversion with the addition of dormer windows; a single storey extension at the rear of the dwelling; a two storey extension at the side and rear; and the erection of a detached garage. These plans will be completed in phases.
- 1.2. The assessment was informed by a desk study, internal / external building inspection and habitat walkover survey.
- 1.3. During the habitat walkover survey, habitats recorded within the site boundary comprised modified grassland, introduced shrub, individual trees, hedgerow, bramble scrub, bare ground, hardstanding and manmade structures. These habitats provide opportunities for commuting and foraging bats, amphibians, reptiles. hedgehog (*Erinaceus europaeus*), badger (*Meles meles*) and birds within the wider area. Recommendations for mitigation have been made to ensure that these groups are safeguarded throughout the development process.
- 1.4. During the internal /external building inspection the building was assessed as providing **negligible** potential to support roosting bats.
- 1.5. Therefore, the proposed plans will not directly impact any bat roosts and works can proceed without precautionary measures or the need for further surveys.
- 1.6. **In the unlikely event that a bat is discovered during the works, all works must cease and a bat-licence ecologist contacted for advice.**
- 1.7. Outline enhancement recommendations have been made in order to ensure that opportunities are available for protected species following the completion of the development and that the ecological value of the site is enhanced in the long term.

¹ Ordnance Survey (OS) grid reference SU 72997 06310.

2. INTRODUCTION AND BACKGROUND

Background

- 2.1. Darwin Ecology Ltd was commissioned by WAT Design to undertake an Ecological Impact Assessment (EclA) of proposals for the buildings and habitats at 22 Castle Avenue, Havant, PO9 2RY². The assessment was required to support a planning application for a loft conversion with the addition of dormer windows; a single storey extension at the rear of the dwelling; a two storey extension at the side and rear; and the erection of a detached garage. These plans will be completed in phases.
- 2.2. The assessment was informed by a desk study, internal / external building inspection and habitat walkover survey.
- 2.3. The proposed drawings on which this assessment is based are provided at **Appendix 1, Proposed Plans**.
- 2.4. The internal / external building inspection followed the Bat Conservation Trust (BCT) Good Practice Guidelines (2016) and the habitat walkover survey followed the Chartered Institute for Ecological and Environmental Management (CIEEM) Guidelines for Preliminary Ecological Appraisal (2017).
- 2.5. The subsequent EclA follows the CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (2018).

Site Overview

- 2.6. The site is located within the residential area of Warblington, approximately 1.5km east of Havant and 2km west of Emsworth. The site is surrounded on all sides by residential properties.
- 2.7. The site comprises a detached residential dwelling with an associated amenity garden (see **Figure 1**).
- 2.8. The wider landscape comprises further residential properties as well as industrial properties, open green spaces and arable land. The A27 is located approximately 350m southeast (see **Figure 2**).

Scope of Assessment

- 2.9. The process of EclA aims to identify, quantify and evaluate the potential effects of development-related or other proposed actions on habitats, species and ecosystems.
- 2.10. Potential effects on the following ecologically sensitive receptors have been considered during the EclA of 22 Castle Avenue:
 - Statutory and non-statutory designated sites;

² Ordnance Survey (OS) grid reference SU 72997 06310.

- On-site habitats of intrinsic importance (such as priority habitats); and
- Habitats with the potential to support protected species, including bats, dormice *Muscardinus avellanarius*, great crested newts *Triturus cristatus* and other common amphibians, common reptiles, birds, badger *Meles meles*, otter *Lutra lutra*, water vole *Arvicola amphibius* and invertebrates.

2.11. The aim of this report is to:

- Identify and describe ecologically sensitive receptors within the site;
- Carry out an impact assessment of the proposed works and how they will directly / indirectly affect the ecological receptors identified;
- Outline the relevant legislation and protection afforded to protected species present at the site; and
- Provide avoidance, compensation, mitigation and enhancement measures recommended to avoid harm / injury to protected species.



Figure 1: Site location within the local landscape (Copyright Google Earth Pro, 2023). The building subject to survey is outlined in orange.



Figure 2: Site location within the wider landscape (Copyright Google Earth Pro, 2023).

3. LEGISLATION & POLICY

General Wildlife Legislation

- 3.1. Wildlife in the United Kingdom (UK) is protected through European and national legislation, supported by national and local policy and guidance. Development can contribute to conservation and enhancement goals outlined by these various legislation and policy by retaining and protecting the most valuable ecological features within a site and incorporating enhancements to provide biodiversity net gain.
- 3.2. This section provides a brief summary of the principle legalisation and policy that triggers the requirement for preliminary and further ecological assessments in the UK. The presence of protected species within a site are a material consideration during the planning process. Preliminary and any necessary further ecological assessments provide an ecological baseline for a site and evaluation of the potential impact of proposals.
- 3.3. It is the responsibility of those involved with development works to ensure that the relevant legislation is complied with at every stage of a project. Such legislation applies even in the absence of related planning conditions or projects outside the scope of the usual planning process (i.e. permitted development projects or projects requiring Listed Building Consent only).

Bat Legislation

- 3.4. In England and Wales, all bat species and their roosts are legally protected under the European *Habitats Directive (1992)*; the *Conservation of Habitats and Species Regulations (2017)*; the *Wildlife and Countryside Act (1981) (as amended)*; the *Countryside and Rights of Way Act, 2000*; and the *Natural Environment and Rural Communities Act (NERC, 2006)*.
- 3.5. Barbastelle *Barbastella barbastellus*, Bechstein's *Myotis bechsteinii*, greater horseshoe *Rhinolophus ferrumequinum*, lesser horseshoe *Rhinolophus hipposideros*, brown long-eared *Plecotus auritus*, soprano pipistrelle *Pipistrellus pygmaeus*, and noctule *Nyctalus noctula* bats are all species of principal importance in England under *Section 41* of the *Natural Environment and Rural Communities Act 2006*.
- 3.6. You will be committing a criminal offence if you:
 - Deliberately capture, injure or kill a bat;
 - Intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats;
 - Damage or destroy a bat roosting place (even if bats are not occupying the roost at the time);
 - Possess or advertise/sell/exchange a bat (dead or alive) or any part of a bat; or
 - Intentionally or recklessly obstruct access to a bat roost.

- 3.7. The government's statutory conservation advisory organisation, Natural England, is responsible for administering EPS licenses that permit activities that would otherwise lead to an offence.
- 3.8. A licence can be obtained if the following three tests have been met:
- Regulation 53(9)(a) - there is "no satisfactory alternative" to the derogation, and;
 - Regulation 53(9)(b) - the derogation "will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range" and;
 - Regulation 53(2)(e) - the derogation is for the purposes of "preserving public health or public safety or other imperative reasons of overriding public interest, including those of a social or economic nature and beneficial consequences of primary importance for the environment".

National Planning Policy

- 3.9. The *National Planning Policy Framework (2023)* aims to minimise impacts on biodiversity and provide net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity. Chapter 15 'Conserving and enhancing the natural environment' details what local planning policies should seek to consider with regard to planning applications.
- 3.10. Planning policies and decisions should contribute to and enhance the natural and local environment by:
- 174 a) Protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);
 - 174 b) Recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland;
 - 174 d) Minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures;
 - 175) Plans should: distinguish between the hierarchy of international, national and local designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure; and plan for the enhancement

of natural capital at a catchment or landscape scale across local authority boundaries;

176) Great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural beauty which have the highest status of protection in relation to these issues. The conservation and enhancement of wildlife and cultural heritage are also important considerations in these areas, and should be given great weight in National Parks and Broads. The scale and extent of development within all these designated areas should be limited, while development within their settings should be sensitively located and designed to avoid or minimise adverse impacts on the designated area.

3.11. Specific policies regarding habitats and biodiversity comprise:

179) To protect and enhance biodiversity and geodiversity, plans should:

- a) Identify, map and safeguard components of local wildlife-rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity, wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation and
- b) Promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species and identify and pursue opportunities for securing measurable net gains for biodiversity.

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

- a) If significant harm to biodiversity resulting from a development cannot be avoid (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
- b) Development on land within or outside of Sites of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the feature of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest;

c) Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists; and

d) Development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around development should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate.

181) The following should be given the same protection as habitats sites:

a) Potential Special Protection Areas and possible Special Areas of Conservation;

b) Listed or proposed Ramsar sites; and

c) sites identified, or required, as compensatory measures for adverse effects on habitats sites, potential Special Protection Areas, possible Special Areas of Conservation, and listed or proposed Ramsar sites.

Local Planning Policy

3.12. The local planning policy for the site is the Havant Borough Council Adopted Local Plan comprising the Local Plan Core Strategy (adopted March 2011) and the Local Plan Allocations (adopted July 2024). This local plan is currently under review. Relevant policies comprising:

Policy CS11 Protecting and Enhancing the Special Environment and Heritage of Havant Borough

Planning permission will be granted for development that:

1. Ensures the key landscape and built form principles set out in the Havant Borough Townscape, Landscape and Seascape Character Assessment are protected and where possible enhanced by partnership working with developers, groups and the wider community.
2. Protects and where possible enhances the borough's statutory and non-statutory designated landscape, habitats and features of biological, hydrological or geological interest. Protection and enhancement will be achieved by appropriate adaptation and mitigation measures including wardening, education and information and the creation of new habitats, water bodies/courses planting of new trees and woodland.

3. Has particular regard to the following hierarchy of nature conservation designations within the borough (as identified on the Proposals Map): (i) Special Protection Areas (SPA), Special Areas of Conservation (SAC) and Ramsar [International]. (ii) Sites of Special Scientific Interest (SSSI) and National Nature Reserves [National]. (iii) Sites of Importance for Nature Conservation (SINC), Local Nature Reserves (LNR), other Ancient Woodland not identified in (ii) above [Local].
4. Protects and where appropriate enhances the borough's statutory and non statutory heritage designations by appropriately managing development in or adjacent to conservation areas, listed buildings, scheduled ancient monuments, historic parks and gardens, archaeological sites, buildings of local historic or architectural interest.
5. Supports an ongoing programme of survey of habitats and species and designation of Sites of Importance for Nature Conservation.
6. Incorporates partnership working with conservation organisations to improve public understanding of biodiversity and to manage public access to designated sites, particularly on the coast, to reduce harm to nature conservation interests.
7. Incorporates partnership working with landowners and developers to ensure land management practices restore, enhance and where appropriate create new valued landscapes, habitats and their soil structure, particularly the ancient woodland remnants of the Forest of Bere and coastal salt marsh.
8. Protects wildlife habitats and wildlife corridors to prevent the fragmentation of existing habitats and to allow species, for example Brent Geese, to respond to the impacts of climate change by making provision for habitat adaptation e.g. coastal managed realignment and species migration.
9. Maintains undeveloped gaps between the settlements of Emsworth/Havant; Havant/Waterlooville; Havant/Portsmouth; Emsworth/Westbourne and Leigh Park/Rowlands Castle as shown on the Proposals Map.
10. Protects the best and most versatile agricultural land that has the greatest potential for local food security.
11. Responds to the emerging evidence from the Solent Disturbance and Mitigation Project, the published recommendations, and future related research.

Policy CS12 Chichester Harbour Area of Outstanding Natural Beauty (AONB)

Development will be permitted where it:

1. Carefully assesses the impact of individual proposals, and their cumulative effect, on the Chichester Harbour AONB, and its setting.

2. Is appropriate to the economic, social and environmental wellbeing of the area or is desirable for the understanding and enjoyment of the area.
3. Conserves and enhances the special qualities of the Chichester Harbour AONB (as defined in the Chichester Harbour AONB Management Plan).
4. Meets the policy aims of the Chichester Harbour AONB Management Plan and Havant Borough Core Strategy March 2011 70
5. Provides mitigation of any detrimental effects including where appropriate the improvement of existing damaged landscapes relating to the proposal.

Hampshire Biodiversity Action Plan

- 3.13. The local biodiversity action plan relevant to the site is the Hampshire Biodiversity Action Plan. It aims to set out a long-term strategy for biodiversity conservation within Hampshire and provide a series of objectives and actions for achieving successful conservation of habitats and species across the county.
- 3.14. To advance biodiversity conservation in Hampshire, the following objectives have been identified:
 - to audit the nature conservation resource of Hampshire;
 - to identify from the audit habitats and species of priority nature conservation concern, including those which are locally distinct;
 - to prepare action plans for habitats and species of priority concern and follow through with programmes of implementation and monitoring;
 - to ensure that data on habitats and species is sufficient to enable effective implementation and monitoring of biodiversity objectives;
 - to review general issues affecting biodiversity, such as agriculture and development, and chart a course of appropriate action;
 - to raise awareness and involvement in biodiversity conservation across all sectors;
 - to encourage individuals and organisations to review their role in biodiversity conservation and the resources required, and develop their own action in response to the Biodiversity Action Plan for Hampshire;
 - to maintain an ongoing partnership which will co-ordinate, develop and support action for biodiversity;
 - to monitor and review progress towards meeting the above objectives and the targets set out in the habitat and species action plans; and
 - to periodically update the Biodiversity Action Plan for Hampshire and its component habitat and species action plans to take account of changing circumstances.

4. METHODOLOGY

Desk Study

- 4.1. A desk study was undertaken for designated sites and bat species and habitat records within 2 km of the site:
- The MagicMap website was reviewed, to obtain information on any designated sites of nature conservation interest within 2 km of the site and details of any EPS licences issued within 2 km;
 - The Havant Borough Council Planning Portal was searched for past and pending planning applications that may have associated ecological documents detailing results of bat surveys; and
 - Google Maps and Ordnance Survey (OS) Leisure Maps was utilised to view aerial photographs, maps and mapnik data, and to assess the ecological context of the site within the wider landscape.
- 4.2. Natural England has developed a tool to help assess the potential risks to Sites of Special Scientific Interest (SSSIs) by proposed developments. These are known as 'Impact Risk Zones' (IRZs) and they define the area around a SSSI that could be sensitive to development, considering the particular sensitivities of the feature for which the site is designated.
- 4.3. The IRZs help inform whether a development proposal may affect a SSSI and if so, whether it is necessary for the Local Planning Authority (LPA) to seek pre-application advice from Natural England. Information on the IRZs was determined from the MAGIC website to determine if the LPA is required to seek consultation for the current development.

Habitat Walkover Survey

- 4.4. Ecologist Abigail Harrington BSc (Hons) conducted a walkover survey at 22 Castle Avenue on 27th September 2023.
- 4.5. The walkover survey assessed habitats present within the application red line boundary for their potential to support protected species, including:
- Bats;
 - Great crested newts and common amphibians;
 - Reptiles;
 - Dormice;
 - Other terrestrial mammals, including hedgehog and badger;
 - Breeding birds; and
 - Invertebrates.

- 4.6. As there is no running water within the site, in combination with their nationally sparse distribution, it is considered highly unlikely that white clawed crayfish *Austropotamobius pallipes* would be using the site and they are therefore not considered further in this report.
- 4.7. The site was also searched for non-native, invasive plant species, with particular care to search for the most commonly occurring and problematic species, such as Japanese knotweed *Fallopia japonica*, Indian balsam *Impatiens grandiflora* and giant hogweed *Heracleum mantegazzianum*.

Building Inspection

- 4.8. Ecologist Abigail Harrington BSc (Hons) conducted an internal / external building inspection at the site at 22 Castle Avenue on 27th September 2023 according to the following methodology:

External Survey

- 4.9. An investigation was carried out of external features with potential for use by roosting bats, such as gaps under roof and ridge tiles, gaps at soffit boxes or fascias. A search for bat droppings was made beneath each potential entry/exit point identified where accessible. The surveyor used binoculars and powerful, low-heat LED torch.

Internal Survey

- 4.10. An investigation was carried out of the roof void (including the floor and walls) for signs of bats roosting and the access potential into the roof void for bats. The surveyor looked for bats, bat droppings, likely access points, signs of feeding, dead bats, scratch marks and staining, and made a suitability assessment of the structure of the roof.

Potential to Support Roosting Bats

- 4.11. Each building was assessed for its potential to support roosting bats as detailed in **Table 1** below which is taken from the Bat Conservation Trust 2023 guidelines Table 4.1, Table 7.1 and Table 7.2.

Table 1: Roost classification from the Bat Conservation Trust (2023) guidelines.

Category	Description of roosting habitat	Number of surveys required
None	No habitat features on site likely to be used by any roosting bats at any time of the year (i.e. a complete absence of crevices/suitable shelter at all ground/underground levels).	No further surveys
Negligible	No obvious habitat features on site likely to be used by roosting bats; however, a small element of uncertainty remains as bats can use small and apparently unsuitable features on occasion.	No further surveys
Low	A structure with one or more potential roost sites that could be used by individual bats opportunistically at any time of the year. However, these potential roost sites do not provide enough space, protection, appropriate conditions and/or suitable surrounding habitat to be used on a regular basis by large numbers of bats.	Single survey between May to August
Moderate	A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, condition and surrounding habitat but unlikely to support a roost of high conservation status.	Two surveys with at least one survey between May to August.
High / Confirmed	A structure with one or more potential roost sites that are obviously suitable for use by a larger number of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions and surrounding habitat. These structures have the potential to support high conservation status roosts.	Three surveys with at least two surveys between May to August.

Limitations

- 4.12. Ecological surveys are limited by factors that affect the presence of plants and animals such as the time of the year, weather, migration patterns. The survey was undertaken in September and therefore represents a valid sample of ecological evidence present on that date/season.
- 4.13. Ecological data is typically deemed valid for 18 months. This report remains valid for 2 years from the date of the survey, however, a walkover survey after 18 months may be required to demonstrate whether or not the habitats have remained as described.
- 4.14. The desk study does not include data from the local environmental records centre (LERC). However, following CIEEM guidelines (2017) it is possible to conduct a robust assessment without the need of LERC data, for example for small-scale projects or on sites such as;
- A field in active arable cultivation where there is no impact on any hedges, trees or water bodies;
 - A small area of cultivated garden/amenity grassland, as above; or
 - A small urban site comprising mostly asphalt or compacted hardstanding.
- 4.15. The site is a small plot set comprising a dwelling and small area of amenity garden set on the outskirts of a residential area and therefore the lack of LERC data is not considered a limitation to the ecological assessment of the site.

- 4.16. Many species of bat in the UK are crevice-dwelling, and bats or signs of bats can be difficult to find within a building.
- 4.17. No other limitations were encountered, or assumptions made during either the desk study or the field survey and it is considered that with the access gained and recording undertaken an accurate assessment of the site's ecological importance has been made.

5. SURVEY RESULTS

Desk Study

- 5.1. There are records of seven statutory designations within 2km of the application site including an Area of Outstanding Natural Beauty (AONB), one Ramsar site, one Special Protection Area (SPA), one Special Area of Conservation (SAC) and two Sites of Special Scientific Interest (SSSI). These are detailed in **Table 2**.
- 5.2. The site is located within the 5km buffer zone for the Chichester and Langstone Harbours Ramsar & SPA, and the Solent maritime SAC.

Table 2: Statutory designated sites within 2 km of the site at 22 Castle Avenue.

Designated sites	Name and designation type	Reason for designation	Approximate distance from site
Within Site Boundaries	There are no designated sites within the site boundaries		
Within 2km of Site	Chichester Harbour AONB	Backed by the South Downs, Chichester Harbour is a series of tidal inlets, with a narrow mouth to the sea. Wind-sculptured oaks and hawthorns line the shore. The saltmarsh and mudflats are a haven for around 55,000 birds who reside in or visit the harbour throughout the year. These include large flocks of Brent Geese <i>Branta bernicla</i>, Dunlin <i>Calidris alpina</i>, and Little Egrets <i>Egretta garzetta</i>.	250m southeast
	Chichester and Langstone Harbours Ramsar and SPA	Chichester and Langstone Harbours are large, sheltered estuarine basins comprising extensive mud and sand flats exposed at low tide. The site is of particular significance for over-wintering wildfowl and waders and also a wide range of coastal and transitional habitats supporting important plant and animal communities.	1.2km south
	Solent Maritime SAC	Annex I habitats that are a primary reason for selection of this site: • 1130 Estuaries • 1320 Spartina swards (<i>Spartinion maritimae</i>) • 1330 Atlantic salt meadows (<i>Glaucopuccinellietalia maritimae</i>) Annex I habitats present as a qualifying feature: • 1110 Sandbanks which are slightly covered by sea water all the time • 1140 Mudflats and sandflats not covered by seawater at low tide • 1150 Coastal lagoons * Priority feature • 1210 Annual vegetation of drift lines • 1220 Perennial vegetation of stony banks • 1310 Salicornia and other annuals colonizing mud and sand • 2120 "Shifting dunes along the shoreline with <i>Ammophila arenaria</i> Annex II species present as a qualifying feature: • 1016 Desmoulin's whorl snail <i>Vertigo moulinsiana</i>	1.2km south

	Warblington Meadow SSSI	An unimproved grazing marsh adjoining Chichester Harbour and is of special interest for its gradation from freshwater, baserich marsh to old reclaimed saltmarsh, and for its rich associated flora, with a total of 158 species of flowering plants having been recorded up to the time of notification.	900m south
	Chichester Harbour SSSI	The site is of particular significance for wintering wildfowl and waders and also breeding birds both within the Harbour and in the surrounding permanent pasture fields and woodlands. Bar-tailed godwit <i>Limosa lapponica</i> numbers are of European importance. Amongst the wildfowl, shelduck, teal and dark-bellied brent goose numbers are of international importance with 5% of the world population of the latter.	1.2km south
	Langstone Harbour SSSI	The harbour is of international importance as a rich intertidal system supporting high densities of intertidal invertebrates and large populations of migrant and overwintering waders and wildfowl. The harbour is among the twenty most important intertidal areas in Britain as a summer and autumn assembly ground for waders during the moult (when they require abundant high protein food) and as a post-moult wintering ground.	2km southwest

- 5.3. There are 3 areas of priority deciduous woodland within 1km of the site, the closest of which is an unnamed area approximately 250m southeast. These areas of woodland are also registered on the National Forest Inventory (Woodland - Broadleaved). There are no areas of ancient woodland within 1 km of the application site.
- 5.4. Further priority habitats within 1 km of the site comprise coastal and floodplain grazing marsh, good quality semi-improved grassland, and traditional orchards.

Habitat Walkover Survey

Habitats

- 5.5. During the habitat walkover, areas of modified grassland, introduced shrub, individual trees, hedgerows, scrub and hardstanding were identified within the site. A plan has been created for the site detailing the habitat areas identified on site (**Figure 3**).

Modified Grassland

- 5.6. The site was dominated by modified grassland which appeared to be well managed and maintained to a short sward length of less than 5 cm. A lack of species diversity was noted with species present comprising only common grassland species such as meadow grass *Poa annua*, selfheal *Prunella vulgaris*, dandelion *Taraxacum sp.*, and daisy *Bellis perennis*.

Introduced Shrub

- 5.7. Ornamental shrub was present within designated beds around the boundary of the application site and within the amenity grassland. Species recorded included rose *Rosa spp.*, Japanese spindle *Euonymus japonicus*, viburnum *Viburnum sp.*, holly *Ilex aquifolium*, honeysuckle *Lonicera periclymenum*, ivy *Hedera helix*, orpine *Hylotelephium telephium*, bloody crane's-bill *Geranium sanguineum*, yew *Taxus baccata*, Darwin's barberry *Berberis darwinii*, bramble *Rubus fruticosus*, and buddleia *Buddleia sp.*

Individual Trees

- 5.8. There were numerous individual semi-mature and mature trees scattered within the sections of introduced shrub and modified grassland. Species identified included apple *Malus domestica*, silver birch *Betula pendula*, fir species *Abies sp.*, beech *Fagus sylvatica*, and weeping willow *Salix babylonica*.

Hedgerow

- 5.9. Short sections of hedgerow were located on the northeast and southeast boundaries of the application site comprising privet *Ligustrum sp.*, holly, yew, and honeysuckle.

Bramble Scrub

- 5.10. A small section of scrub was present in the southeast corner. This was dominated by bramble with some willow saplings and common nettle *Urtica dioica*.

Bare Earth

- 5.11. A small area of bare earth was present underneath a silver birch adjacent to the paved patio and a 3m x 3m approximate section of garden in the northeast corner was bare earth covered in tarpaulin.

Hardstanding

- 5.12. Areas of hardstanding were present including a gravel driveway and a paved patio surrounding the main dwelling and garage.

Manmade Structures

- 5.13. One building comprising a dwelling and attached garage was present on site. This is detailed further in the **Building Inspection** section of the report.
- 5.14. A small garden waste pile contained by brick and timber panelled walls was present in the southeast corner of the application site. This was adjacent to a timber garden shed. This structure was assessed as providing negligible potential for roosting bats.
- 5.15. Two brick and mortar walls were identified within the site. One was used to border the designated planting bed in the driveway and the other was used as a decorative screening feature within the amenity garden. These were in good condition with no mortar missing.

Habitat Walkover Photos



Image 1: Modified grassland on site.



Image 2: Ornamental planting in the northeast corner.



Image 3: Scattered trees within modified grassland.



Image 4: Short section of hedgerow on the western boundary.



Image 5: Bramble scrub in the southeast corner.



Image 6: Gravel driveway and introduced stub in the western section of the site.



Image 7: Hardstanding patio surrounding the main dwelling.



Image 8: Compost bin and shed in the southeast corner.

Target Notes

TN1 Compost Pile



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

	Site Boundary		Grassland
	Wall		Scrub
	Fence		Building
	Hedgerow		Hardstanding

	Introduced Shrub
	Bare Ground
	Tree

TN#	Target Note No.
	Target Note location



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Project: 22 Castle Avenue

Figure 3: PEA Map

Date: November 2023

Protected Species

Bats

- 5.16. There is one record of a granted EPS mitigation licence for works impacting bats within 2km of the application site:
- EPS mitigation licence (2019-44235-EPS-MIT) to allow for the destruction of a resting place for soprano pipistrelle approximately 1.8km east.
- 5.17. A search of Havant Borough Council showed that there is no relevant ecological documentation regarding roosting bats to support a planning application in the nearby area in the last two years.
- 5.18. The hedgerows and densely vegetated shrub beds provided linear features that may be use by commuting bats and a variety of shrubs provide foraging habitat.
- 5.19. Mature trees on site did not offer potential roosting features for bats.

Building Inspection

External Assessment

- 5.20. The building at 22 Castle Avenue was a two storey, brick residential dwelling with an attached single storey garage on the northern elevation and a small porch on both the western and eastern elevation.
- 5.21. The main dwelling had a hipped roof with clay tiles that showed some cracks but no suitable crevices were identified. Clay tiles over the ridge and hips were in good condition. Two brick chimneys were present at the northern and southern ends of the ridge with tight lead flashing around the bases, and an intact timber fascia ran along on all elevations that sat tight to the brickwork.
- 5.22. The western porch was constructed of plastic and glass with lead flashing at the join between the two structures. No suitable gaps were identified.
- 5.23. The eastern porch was of brick construction with a single pitched roof covered in interlocking concrete tiles. These were in good condition and the cement verges were intact.
- 5.24. The garage was of brick construction with a flat roof covered in bitumen felt. A timber soffit box was present that showed signs of wear however no gaps were noted between it and the brickwork.

Internal Assessment

- 5.25. There was a single void present in the main dwelling measuring approximately 10m (l) x 7m (w) x 3m (h) to the apex. It had a timber frame with horizontal support trusses at waist height. Fibreglass insulation was present throughout which showed signs of ageing and

was only partially covered with boards in order to accommodate for storage. The western pitch of the roof was covered in breathable membrane and the eastern pitch and hips were covered in bitumen felt which were all in good condition with no tears. A high level of cobwebbing was present along the ridge beam and around the eaves. The space was cold and there was a slight draught. No droppings were found within the void.

- 5.26. The garage was approximately 13m (l) x 3m (w) x 3m (h). The space was used for regular storage and there was no void space. Window were present on the eastern and southern elevation which allowed a high level of light ingress into the space.
- 5.27. The building was assessed as providing **negligible potential** to support roosting bats.

Building Inspection Photographs



Image 9: View of the western elevation of the main dwelling and garage.



Image 10: View of the southern hip with tight lead flashing around the chimney and intact ridge and roof tiles.



Image 11: Tight roof tiles on eastern elevation.



Image 12: View of the western elevation of the main dwelling and garage.



Image 13: View of the loft void.



Image 14: Breathable membrane on the eastern pitch.

Great Crested Newt and Common Amphibians

- 5.28. There are no EPS licences, Great Crested Newt Pond Survey 2017 - 2019 or licence returns recorded on Magic Map for works impacting great crested newts within 1 km of the site.
- 5.29. There is one pond within 250m of the site located approximately 40m southeast (P1), and there is one further pond within 500m of the site located approximately 450m northeast (P2). These ponds were not accessible due to their location on private property. P1 is situated within a residential area, surrounded on all sides by developed land, and it is isolated from habitat in the wider area by a railway line approximately 230m north and the A27 approximately 150m southeast. Therefore, it is deemed to hold very low potential to be used as a breeding pond for great crested newt due to a lack of connectivity to other potential breeding ponds and suitable terrestrial habitat in the local landscape. P2 is also isolated from the site by the railway line to the north which would restrict commuting great crested newt.
- 5.30. Habitats on site including the modified grassland and hardstanding are suboptimal for great crested newt and other amphibians, however, the hedgerows surrounding the site, small area of scrub and densely vegetated introduced shrub could provide foraging, sheltering and hibernation opportunities for great crested newt and common amphibians in their terrestrial phase. The garden waste pile on site may act as discrete refugia.
- 5.31. The brick walls are not anticipated to provide suitability for hibernating amphibians.



Figure 4: Ponds within 500m of the application site.

Reptiles

- 5.32. Modified grassland provided limited opportunities for foraging, commuting and sheltering reptiles due to its lack of structural diversity. The hedgerows on the border of the site, small area of scrub and areas of densely vegetated introduced shrub could provide foraging and commuting opportunities, and the garden waste pile on site may act as discrete refugia.
- 5.33. There is some suitable habitat in the wider area to the south and northeast of the site, comprising areas of grassland and arable land, however, the A27 would act as a significant barrier to movement.
- 5.34. The brick walls are not anticipated to provide suitability for hibernating reptiles.

Dormice and other Terrestrial Mammals

- 5.35. There are no EPS licences for works impacting dormice within 1 km of the site boundaries.
- 5.36. The hedgerow on site provided some nesting opportunities for dormouse however it was on a small scale, is species poor, and does not have a good connection to suitable habitat in the wider area. Therefore, it is considered that dormouse are absent from the site.
- 5.37. No signs of badger activity (i.e. latrines, foraging scrapes, sett entrances) were recorded on site during the survey or within 20 m of the site boundary. The site has suitable habitat for hedgehog and badger foraging including grassland, scrub, introduced shrub and hedgerows.
- 5.38. There is some suitable habitat for badger and hedgehog in the wider area including a small area of woodland along the A27 and hedgerows associated with agricultural land, however, residential housing, the A27, and the railway line are likely to act as significant barriers on their movement between these areas and the application site.

Otter and Water Vole

- 5.39. Due to the small size of the site, lack of suitable habitat and limited connectivity it is considered highly unlikely that water vole or otter are present and are not considered further.

Breeding birds

- 5.40. Hedgerows, bramble scrub and hedgerows within the application site provided good foraging and nesting opportunities for a variety of common bird species which may be found in the local area.
- 5.41. No active nests were identified at the time of survey.

Invertebrates

- 5.42. The site likely supports an assemblage of common invertebrates. The introduced shrub planting offers a source of nectar/pollen for invertebrates, however, there is a lack of structural diversity within the grassland with and there is no standing water present.

Invasive Species

- 5.43. There is one invasive species recorded on site, however, it is not listed on Schedule 9 of the Wildlife and Countryside Act 1981 (WCA) on site: Darwin's barberry.

6. IMPACT ASSESSMENT

Designated Sites

- 6.1. It is not anticipated that the proposed works will impact any statutory designated sites, priority habitats or ancient woodlands through land take or other direct effects of the development. There will not be an increase in footfall and so it is unlikely that there will be significant impacts to surrounding designated sites for nature conservation.
- 6.2. The site is located in the 5km buffer zone of the Chichester and Langstone Harbours Ramsar & SPA, and the Solent maritime SAC. The proposals for this site include extensions to the existing dwelling and the construction of a detached garage which will not result in an increase in residential properties, is of a small development scale and will take place over a short time period. Therefore, it is not deemed necessary to apply for further assessment.

Habitats

Status on Site

- 6.3. During the habitat walkover, areas of negligible/low ecological value identified included modified grassland, hardstanding, bare ground and a number of buildings.
- 6.4. The mature trees present are of a moderate ecological value.
- 6.5. The hedgerow, bramble scrub, ruderal vegetation, introduced shrub and scattered trees provided valuable habitat for protected species.
- 6.6. There is one invasive species on site, Darwin's barberry.

Potential Impacts

- 6.7. Under the current development proposals, the works will largely be confined to areas of modified grassland, introduced shrub, hardstanding and bare ground. A small section of hedgerow will also be impacted as a result of the development.
- 6.8. The majority of the vegetation to be affected comprises amenity and ornamental species, and the native plants recorded within the affected habitats are common and widespread in the UK. Overall, the proposed development will result in the loss of **low** importance habitats, resulting in a permanent **low** negative impact on a **local** level.
- 6.9. The majority of trees on site are to be retained as part of the proposals, however, several small semi-mature trees including silver birch, fir and a fruit tree will be removed during the works. This will result in a **low** impact on a **local** level.
- 6.10. Invasive species spread fast and outcompete native species.

Mitigation

- 6.11. It is considered that removal of trees will not significantly reduce the ecological value of the site and will not significantly reduce opportunities for protected species due to the retention of mature trees within the site boundary. It is recommended that trees removed under the proposed development are replaced with suitable native trees in order to ensure that the biodiversity value of the site is retained after development.
- 6.12. All trees that are to be retained and remain unaffected by the development, including trees adjacent to the site boundary, should be protected throughout the development in accordance with British Standards BS 5837:2012. Root protection areas should be 12 x the diameter at breast height (DBH) or the reach of the longest branch (whichever is greater), unless otherwise advised by a qualified arboriculturist. Trees located off site but with their roots on site should also be protected. No materials should be allowed to be stored within these root protection areas and no heavy machinery should run over them.
- 6.13. It is recommended that invasive species are removed from the site and disposed of sensibly so as to not cause any further spread. Where new planting is considered in the plan, native tree and shrub species should be used to enhance the ecological value of the site.
- 6.14. Given the above mitigation strategies, it is considered likely that there will be no residual impacts on habitats.

Bats

Status of Bats on Site

- 6.15. The building was assessed as providing **negligible potential** to support roosting bats.

Potential Impacts

- 6.16. The proposed plans at 22 Castle Avenue include a loft conversion with the addition of dormer windows; a single storey extension at the rear of the dwelling; a two storey extension at the side and rear; and the erection of a detached garage. These plans will be completed in phases.
- 6.17. These proposed works will not result in the destruction of a bat roost and no further surveys are recommended.
- 6.18. **In the unlikely event that a bat is discovered during the works, all works must cease and a bat licensed ecologist contacted for advice.**
- 6.19. Any new lighting incorporated within the new development has the potential to impact bats using the application site or adjacent habitats, and specifically, those species that are considered to be most light-sensitive.

Mitigation

- 6.20. *Lighting:* Any new external lighting should be directed to avoid light spillage onto vegetation, particularly linear habitat features such as woodland edges or potential roosting sites within trees and buildings. Bats are sensitive to light and could potentially avoid the area if access points or the surrounding areas become lit. Appropriate lighting options will prevent a negative impact on bats potentially using the habitats on site and should be approved by a suitably qualified and licensed bat ecologist. Lighting plans should be approved and signed off by a licensed bat ecologist prior to submission, to ensure the scheme is suitable for bats. If appropriate measures are taken to reduce light spillage from the development, it is likely that there will be no negative impacts on local bat populations. See the **Appendix** for further information on designing lighting to minimise impacts on bats.
- 6.21. *Habitats:* The proposals do not result in a significant loss of foraging habitat for bats, however, a wildlife friendly landscaping scheme is recommended to enhance the site for bats and other wildlife.
- 6.22. Given the above mitigation strategies, it is considered likely that there will be no residual impacts on bats using the application site for foraging and commuting.

Great Crested Newt and Common Amphibians

Status on Site

- 6.23. Suitable terrestrial habitat within the site included the hedgerows on the borders of the site, bramble scrub and introduced shrub which provided opportunities for refuge and hibernation. The grassland on site was assessed as unsuitable for newts due to its short length and lack of refuge areas.
- 6.24. There is one pond within 40m of the application site, however, it is not considered to support a breeding population due to its lack of connectivity to suitable terrestrial habitat and other potential breeding ponds.

Potential Impacts

- 6.25. Areas of the site to be impacted are limited to areas of modified grassland, hardstanding bare earth and a short section of hedgerow around the main house and therefore it is considered unlikely newt populations in the wider area will be impacted.

Mitigation

- 6.26. Vegetation clearance works will be done by hand and only occur during the reptile key active season (March-end of September, inclusive). Weather should be 9 degrees or higher, and dry with no strong winds. This will allow active amphibians to move to more suitable habitat nearby, if they are present within the working area.

- 6.27. The vegetation will be cleared in a two stage cut. Vegetation will be cut to a height of 1m with the following cut one to two hours later. All clearance will be carried out from the centre of the working area towards retained areas of habitat. The arisings should be completely removed from the working area to prevent the creation of potential refuge areas.
- 6.28. The following Reasonable Avoidance Measures (RAMs) are required to reduce impacts on great crested newts and common amphibians should they be present during construction and demolition works:
- Open excavations should be sloped or a ramp placed inside to prevent entrapment;
 - Any excavations left over night will be covered during the night to prevent amphibians from being stuck in them.
 - Any materials brought to the site should be stored in a secure store, raised on pallets or stacked as far as possible from the development area to prevent animals from using these areas for hibernation or refuge.
- 6.29. Given the above mitigation strategies, it is considered likely that there will be no residual impacts on great crested newt or common amphibians.

Reptiles

Status on Site

- 6.30. Within the site suitable habitat for reptiles included small areas of hedgerow, bramble scrub and introduced shrub. There is suitable habitat in the wider landscape that reptiles could utilise, although connectivity is limited.

Potential Impacts

- 6.31. The proposed small scale vegetation clearance and construction works are not anticipated to result in a significant decrease in the quality of reptile habitat within the site due to the areas impacted being primarily ornamental and therefore of low quality for reptiles. However, due to the presence of other good quality reptile habitat within the local landscape, vegetation clearance and construction works have the potential to injure/kill reptiles if present on site at the time of works.

Mitigation

- 6.32. It is anticipated that the impacts to individual reptiles can be avoided through the recommendations and RAMs made above regarding great crested newt and common amphibians.
- 6.33. Given the above mitigation strategies, it is considered likely that there will be no residual impacts on reptiles.

Terrestrial Mammals

Status on Site

- 6.34. Hedgehog and badger may be present in the wider area due to the presence of some suitable habitat, however, it is considered that they do not use the site regularly due to limited connectivity.

Potential Impacts

- 6.35. Should badger and hedgehog be able to access the site during the proposed works, they may be injured due to the destructive activity or trapped in any excavations.

Mitigation

- 6.36. **Trenches and Excavations:** As a precautionary measure, during construction all trenches and holes are to be covered overnight to prevent wildlife falling in and becoming trapped. Contractors should also ensure that ramps are installed at any excavations or trenches, which must be checked before filling takes place.
- 6.37. Given the above mitigation strategies, it is considered likely that there will be no residual impacts on terrestrial mammals.

Nesting Birds

Status on Site

- 6.38. The trees, hedgerows and bramble scrub within the application site provided suitable nesting and foraging potential for birds.

Potential Impacts

- 6.39. The small area of bramble scrub in the southeast corner of the site is to be retained.
- 6.40. A small area of hedgerow in the southwest section of the site and several of the scattered trees are to be removed as part of the proposed plans.

Mitigation

- 6.41. Breeding birds are protected by law and must not be disturbed until the chicks have fledged or the nest has failed. Vegetation removal and building demolition should be avoided during breeding bird season (February - August) where possible.
- 6.42. If vegetation removal is required during the breeding bird season (February - August), a pre-works check by a suitability qualified ecologist will be conducted to ensure that no active nests are present. If active nests are recorded, a suitable buffer will be retained around these until all chicks have fledged (to be confirmed by a suitably qualified ecologist).

- 6.43. Given the above mitigation strategies, it is considered likely that there will be no residual impacts on birds.

Invertebrates

Status on Site

- 6.44. The site likely supports an assemblage of common invertebrates.

Potential Impacts

- 6.45. The habitats which will be lost have little ecological value to invertebrates.

Recommendations

- 6.46. Where possible, area of species rich grassland which will be attractive to invertebrates should be incorporated into the design of the site. Some areas of grassland should also be allowed to grow longer (for example along the hedgerows) to help improve structural diversity on site.
- 6.47. Where new planting is considered in the plan, native tree and shrub species should be used to enhance the ecological value of the site. Examples of these species include apple, box, heather, common poppy, cornflower, and oregano.
- 6.48. Given the above mitigation strategies, it is considered likely that there will be no residual impacts on invertebrates.

7. ENHANCEMENT RECOMMENDATIONS

- 7.1. National planning policy states that all developments should seek to enhance onsite biodiversity whether impacts on protected species are recorded or not. Incorporating enhancement features into new or renovated buildings should be carefully considered. These features can be simple and inexpensive, please see below for specific recommendations.

Wildlife Beneficial Landscaping Scheme

- 7.2. Any future landscape planting should seek to enhance biodiversity, improve connectivity to the surrounding habitats and provide food and shelter for a wide range of wildlife. All amenity planting and formally landscaped areas should be designed using a variety of plant species beneficial for wildlife. These do not necessarily have to be native but should be chosen for their ability to provide nectar or fruit and should be non-invasive species. There are a number of specialist seed mixes available specific to certain soil types, growing conditions and designed to benefit different groups of species such as bees or butterflies and moths.
- 7.3. All habitats should be managed in a suitable way to encourage a wide variety of insects and other wildlife to use the site.

Bats

- 7.4. Integrated bat boxes can be incorporated into the new building within the site or tree mounted bat boxes can be installed on suitable mature trees within the application site. These boxes will remain on site in perpetuity. The location will be determined by a licensed bat ecologist to ensure likelihood of repeated use is increased. The bat boxes will be installed at a height of at least 4m, preferably on a southern un-cluttered aspect with good connectivity to linear features such as other mature trees and hedgerows (see the **Appendix** for further details).

Reptiles and Amphibians

- 7.5. To provide new resting and hibernating habitat for reptile and amphibians, small deadwood piles or hibernaculum features can be incorporated at appropriate areas of the site (see the **Appendix** for further details).

Birds

- 7.6. Tree-mount bird boxes can be installed on any trees or building on site. Bird boxes should be installed at least 4 m from ground level and with unobstructed air space in front (see the **Appendix** for further details).

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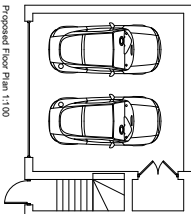
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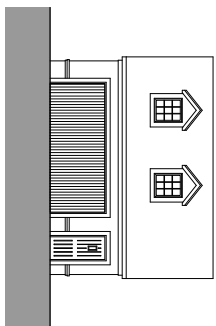
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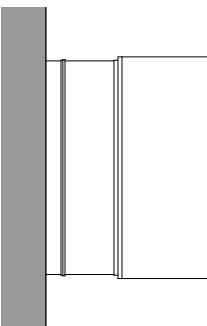
APPENDICES



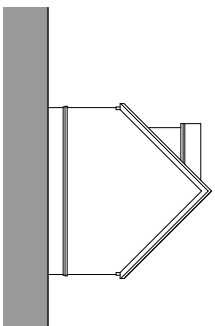
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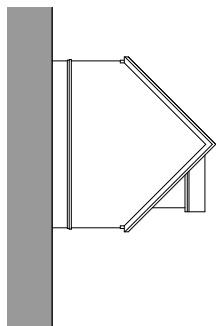
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Proposed Rear Elevation 1:100



Proposed Side Elevation 1:100



Proposed Side Elevation 1:100



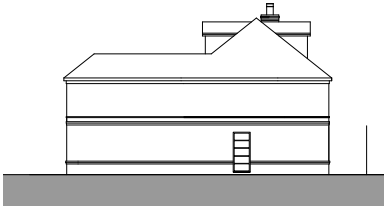
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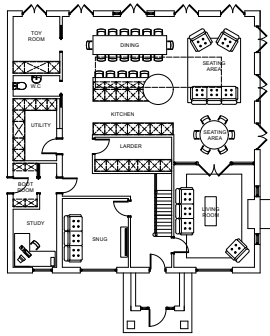
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Proposed Rear Elevation 1:100



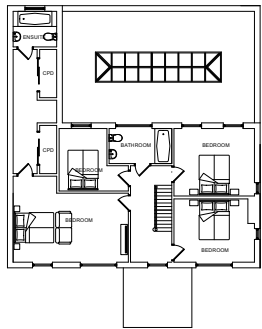
Proposed Side Elevation 1:100



Proposed Ground Floor Plan 1:100
(Main House)



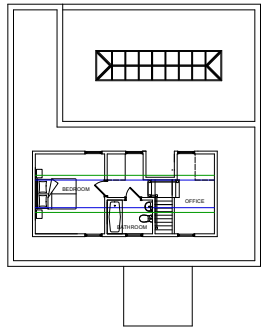
Proposed Sketch Render (NTS)



Proposed First Floor Plan 1:100
(Main House)



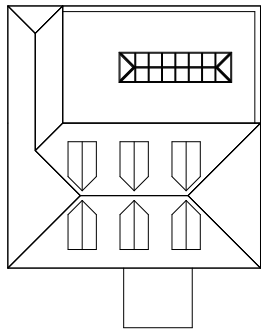
Proposed Sketch Render (NTS)



Proposed Second Floor Plan 1:100
(Main House)



Proposed Sketch Render (NTS)



Proposed Roof Plan 1:100
(Main House)



THE IMPACT OF LIGHTING ON BATS

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

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

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

and radiates light in multiple directions.

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

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

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

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

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

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

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

What lighting should I use?

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



What to avoid:

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

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

Key Points

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



TYPES OF BAT BOXES



Schwegler 2F Double Front Panel

- Manufactured from long-lasting woodcrete
- Lifetime - 20-25 years
- Suitable for pipistrelle and Myotis species
- A second inner wooden panel is fitted adjacent to the front panel imitating a cavity wall



Schwegler 1FD Double Front Panel

- Manufactured from long-lasting woodcrete
- Lifetime - 20-25 years
- Suitable for pipistrelle and Myotis species
- A second inner wooden panel is fitted adjacent to the front panel imitating a cavity wall
- Small entrance hole discourages birds from using the box



Vincent Pro Bat Box

- Manufactured from timber and recycled plastic
- The front and the top of the box is black, which helps heat absorption
- Suitable for a range of species including pipistrelle species, Myotis species, and brown long-eared bats.
- No maintenance required



Schwegler 2FN

- Manufactured from long-lasting woodcrete
- Lifetime - 20-25 years
- Suitable for pipistrelle species, Myotis species, serotine, brown long-eared, noctule and Leisler's bats
- Dual entrance
- Birds and dormice have also been found using this box
- A newer model is now available, Schwegler 3FN, designed with smaller entrance holes which discourage birds and dormice



Schwegler 1FS Large Colony Box

- Manufactured from long-lasting woodcrete
- Lifetime - 20-25 years
- Suitable for a range of bats including pipistrelle species, Myotis species, Noctule, and brown long-eared bats
- Three grooved inner wooden panels are connected to the front panel, which are ideal for bats to cling to.
- Accommodates large summer colonies



Schwegler 1FF Colony Box

- Manufactured from long-lasting woodcrete
- Lifetime - 20-25 years
- Suitable for a range of crevice dwelling bats including pipistrelle species, barbastelle, noctule, and brown long-eared bats
- Rough wooden surface for bats to cling onto and climb



Greenwoods Ecohabitats Small Hollow Bat Box

- Manufactured from long-lasting ecostyrocete
- Lifetime - 20-25 years
- Suitable for a range of bats preferring a cavity space, including pipistrelle species, myotis species, noctule, and brown long-eared bats
- Suitable for hibernating bats



Bark Boxes Large Twin Crevice Bat Box

- Suitable for range of bat species providing roosting opportunities similar to naturally formed tree roosts.
- Thermal mass suitable for spring and autumn roosts.
- Natural and discreet appearance for hanging on trees.
- No maintenance required.
- Made from over 50% recycled materials./



Design and creation

Deadwood habitat piles offer valuable habitats for an array of saprophytic (deadwood eating) invertebrates that will in turn provide food for a wide range of predatory species of insects, birds, mammals, reptiles and amphibians.



On sites where vegetation structure is limited, brash and log piles provide an instant enhancement. Deadwood habitat piles also provide shelter and refuge opportunities for larger animals, particularly reptiles and amphibians.

They can also be suitable hibernation sites during the winter for reptiles, amphibians and small mammals including hedgehogs. Think bonfire!

Habitat piles should be located in sunny or part shaded sites. A compact central core, with larger woody material in contact with the ground is recommended to provide the damp and decomposing wood conditions that are most suitable for benefiting saprophytic invertebrates. The outer layers should be laid more loosely on top. This provides a diverse structure within the habitat pile and provides suitable cover and basking opportunities for reptiles.

Habitat piles should be maintained by adding material every few years as the pile decomposes and do not require much management.



To provide optimal conditions for reptiles, amphibians and mammals, log piles should contain a mixture of sizes and shapes with plenty of small diameter material included. This introduces voids of different sizes and creates a complex internal structure.

They can be created to be an attractive feature of the landscape where a more formal appearance is required.





TYPES OF BIRD BOXES



Vivar Pro Seville 32mm WoodStone Nest Box

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



House Martin Nest Cups



Swallow Nest Bowl

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



Swift Nest Box

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



5KL Schwegler Nuthatch Nest Box

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



Open-fronted Nest Box

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



Sparrow Terrace Nest Box

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



Tawny Owl Nest Box

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



Little Owl Nest Box

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