

Environmental Enhancement Scheme for Nutts Lane, Hinckley

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November 2022

Client:



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1. SITE INFORMATION

1.1 Brief

This Ecological Enhancement scheme has been drawn up in order to ensure that adequate protection measures and safeguards for breeding birds, bats, amphibians and reptiles are in place and that the measures proposed to enhance the area are detailed. It is also required in order to ensure that adequate Ecological Mitigation is planned for the development, on site and to ensure discharge of a Reserved Matter (below) in relation to the Planned development:

10. Any reserved matters application relating to landscaping and layout shall be accompanied with full details of the ecological enhancements as recommended at Section 4.4 of the submitted Ecology Report prepared by Dr Stefan Bodnar March 2021. The development shall then be completed in accordance with the any subsequent approved details.

Reason: To enhance the ecological value of the proposed development in accordance with Policy DM6 of the Site Allocations and Development Management Plan Document.

Site Location

The development zone comprises a large garden area of mown grassland with a number of derelict outbuildings. It is flanked by a wooded railway embankment to the north and a native hedgerow to the south. The site location is described on the map in figure 1a below. A satellite image (figure 1b) and Phase One diagram (see Appendices) also show the areas concerned.

Site Location Plan

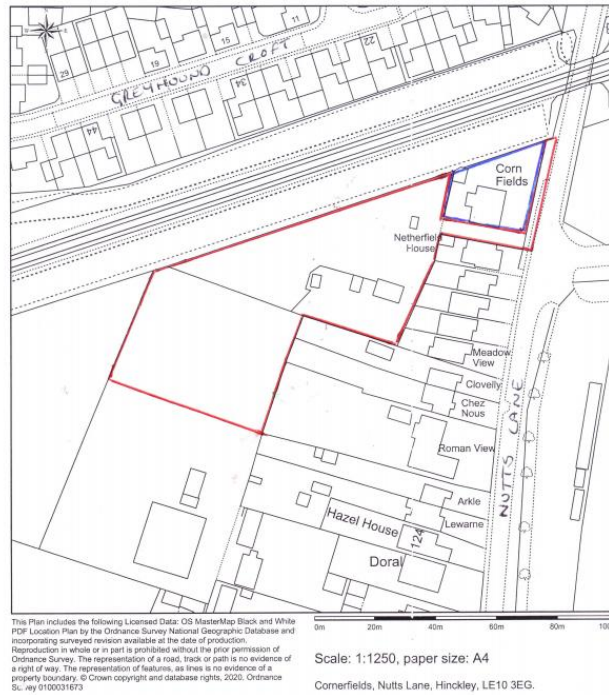


Figure 1a. Showing site location



Figure 1b. Showing site location

Map data 2021 © Google

1.2 Site Description

The development site is an area of amenity grass, dominated by perennial ryegrass *Lolium perenne*, with other species such as Daisy *Bellis perennis*, Creeping buttercup *Ranunculus repens* and Stinging nettle *Urtica dioica* also present. Around the edges of the site are a small number of planted landscape trees, and self set young trees, and groups of trees on the southern boundary which is an outgrown hedge. Along the northern boundary of the site is a railway embankment dominated by bramble and trees such as aspen. The main house (Cornfields) is excluded from the proposed development as is the immediate garden of the property. Within the site are a series of small sheds which are to be removed. To the south is an area of rough improved grassland dominated by cocksfoot and false oatgrass.

The surrounding land use is mainly residential, with remnant agricultural areas to the West and south of the A5 corridor. (See Appendix 1b).



1.3 Development

This is shown in the plan below:



1.4 Biological information

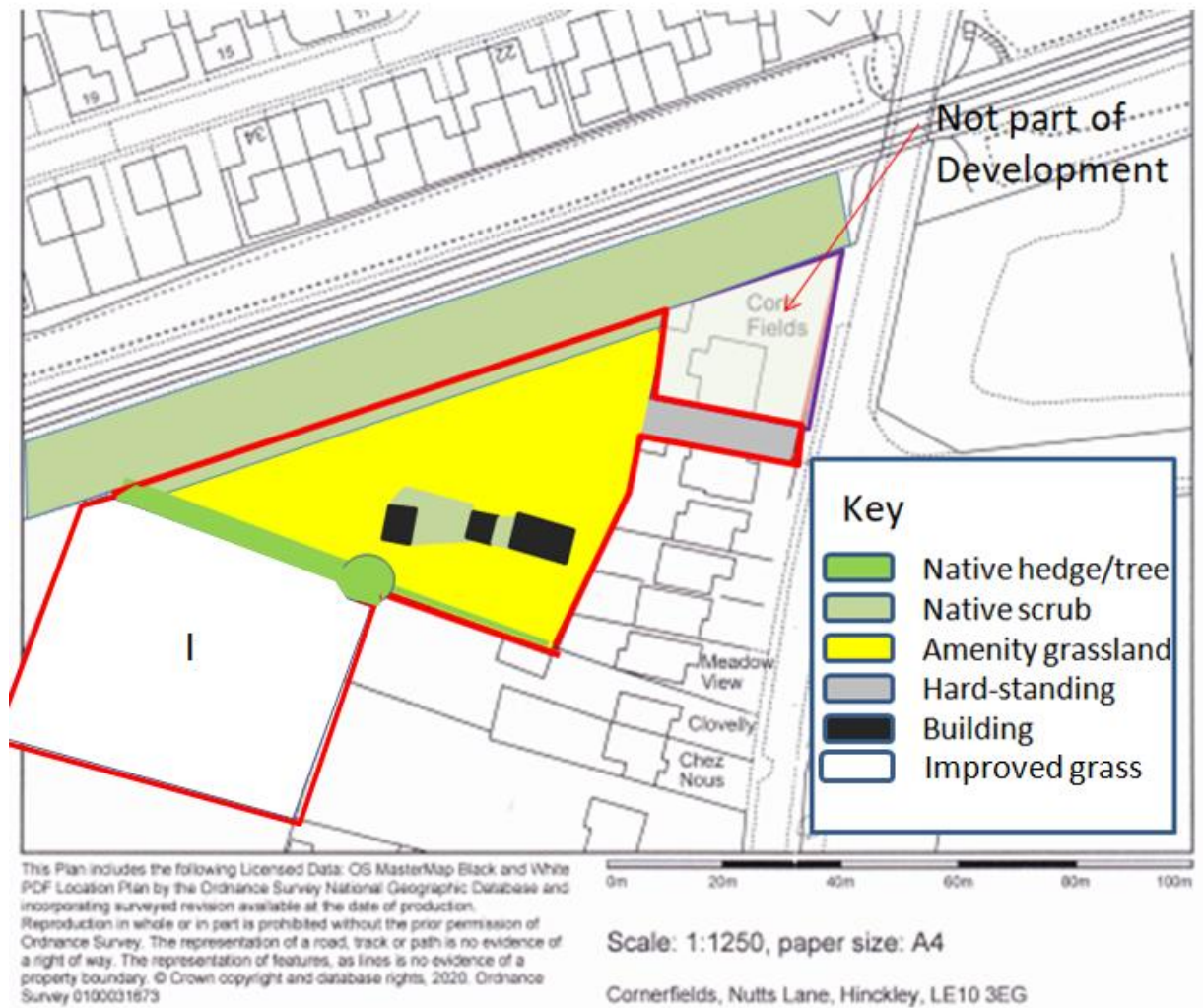
The biological information relating to the proposed development is provided in a Preliminary Ecological Appraisal (Phase 1 Ecology survey) of the site by Dr. Stefan Bodnar in August 2021. See below:

The development site is an area of amenity grass, dominated by perennial ryegrass *Lolium perenne*, with other species such as Daisy *Bellis perennis*, Creeping buttercup *Ranunculus repens* and Stinging nettle ***Urtica dioica* also present.** Around the edges of the site are a small number of planted landscape trees, and self set young trees, and groups of trees on the southern boundary which is an outgrown hedge. Along the northern boundary of the site is a railway embankment dominated by bramble and trees such as aspen. The main house (Cornfields) is excluded from the proposed development as is the immediate garden of the property. Within the site are a series of small sheds which are to be removed.

Habitats present:

- **Improved Grassland:** This covers the majority of the site. The sward is dominated by perennial ryegrass *Lolium perenne*, with other species such as Daisy *Bellis perennis*, Creeping buttercup *Ranunculus repens* and Stinging nettle *Urtica dioica* also present. Other species include ground elder, common field speedwell, and broad leaved dock.
- **Landscape Trees:** Planted trees such as Apple *Malus sylvestris*, and self set young trees especially aspen *Populus tremula*, ash *Fraxinus excelsior*
- **Native hedge:** A short length of mainly native outgrown hawthorn *Crataegus monogyna* hedge which is 7m in height. There is a large pollard goat willow *Salix caprea*, on this line. The eastern section of hedge is recently planted and hawthorn.
- **Hard-standing:** access drive beside house. **Buildings:** 3 standing buildings and the base and lower wall of a demolished structure. One building is a concrete panel garage with corrugated asbestos roof. The other 2 comprise a wooden garden shed with windows and a wooden former chicken shed with windows and no roofspace, base of breezeblock and corrugated asbestos roof.
- **Improved grassland:** dominated by cocksfoot and false oatgrass.
- **Off-site:** the scrub and wood covered embankment of the railway line, dominated by bramble *Rubus fruticosus* and aspen *Populus tremula*.

Phase 1 Habitat Map



1.5 Evaluation and Recommendations (PEA, 2021)

It is important that this proposed development should demonstrate no net loss of biodiversity from the site. This is a duty placed on Local Authorities in the Natural Environment and Rural Communities Act 2006, Section 40. There are requirements noted for this under The National Planning Policy Framework (2021) which refers to compensation/ mitigation. It is confirmed that the enhancement, mitigation and compensation within this section will comply with all the relevant UK and EU legislation relating to protection and enhancement of ecology.

Ecological Constraints

The value of the majority of the site, in terms of ecological value to wildlife, is low. The hedgeline to the south and semi-mature trees are the most valuable features of the site. The habitats present within the area consists of the following elements (see Phase 1 Habitat Map in Appendix 1d) which are not of European importance, although hedgerows are listed as UK Biodiversity Action Plan priority habitats, these on-site hedgerows are not of National or Regional importance:

- Native hedge
- Native scrub
- Amenity grassland
- Building
- Hard-standing
- Small areas of scattered tall herb also present (not mapped)

Additional Ecological Surveys Recommended

In respect of the barn owl presence, a barn owl strategy and mitigation plan should be produced in relation to the development of the rough meadow (improved grassland) section north of this barn, to avoid disturbance to this species.

Minimising Ecological Impact

This section states how the negative impacts of development can be addressed:

Protecting the Ecological Value of the Site

To avoid disturbance of badgers, wooden fencing should be used as the garden boundaries to the north to enable the creation of a 10m buffer around the main badger sett.

It is recommended that as many of the trees on and off site are retained and protected and enhanced by this development. Retained trees and hedge will be protected in accordance British Standard BS5837 (2012) Trees in Relation to Design, Demolition and Construction to ensure adequate root protection fencing.

As bats are negatively affected by light, the lighting on the proposed development should be minimal, low lux, cowled (directed downwards to prevent light splay), and used on timers or motion sensors.

The trees and hedgerow on site are suitable for breeding birds and potentially will have a number of nests during the breeding season. If small areas of vegetation are to be removed then it is recommended that all clearance should ideally take place outside of the bird breeding season. Bird breeding season is between mid March and mid July, although certain species can breed outside these months and if breeding birds are found then work should cease and the advice of an ecologist sought. If clearance is undertaken within the bird breeding season then all site features should preferably be checked immediately prior to clearance by a suitably qualified ecologist.

Following the built development there will be opportunities for enhancement of the site's ecological value by on site landscaping measures designed to encourage wildlife into the site, including native planting, bird and bat boxes on built structures. This is covered more in section 5.3.

Precautionary Measures during Development

The trees on site are particularly suitable for breeding birds and potentially will have a number of nests during the breeding season. It is recommended that all clearance should take place outside of the bird breeding season. Bird breeding season is between mid March and mid July, although certain species can breed outside these months and if breeding birds are found then work should cease and the advice of an ecologist sought. If clearance is undertaken within the bird breeding season then all site features should preferably be checked immediately prior to clearance by a suitably qualified ecologist.

The following precautions shall be employed in respect of great crested newts, other amphibians and reptiles:

1. If great crested newts are discovered at any time during processes involved with the development, work should cease immediately and the advice of a licensed ecologist sought.
2. All site staff involved with site clearance and construction works are to be made aware of the potential for encountering great crested newts through a tool kit talk and the appropriate measures to be taken if great crested newts are encountered.
3. Keep duration of groundworks as short as possible.
4. Undertake during the day works that might only affect newts above ground.
5. Backfill trenches and other excavations before nightfall, or leave a ramp to allow newts to easily exit.
6. Raise stored materials (that might act as temporary resting places) off the ground, e.g. on pallets.

Including where possible:

7. Undertaking ground-works along field boundaries when reptiles are active (March to October).
8. Ensuring storage of piles of materials and excavated earth on the site should be kept to a minimum.
9. Storing piles of materials and excavated earth away from the field boundaries to deter reptiles from using them for temporary cover.

Following the advice below will help developers to avoid committing offences. In accordance with the Protection of Badgers Act (1992) precautionary measures that should be taken to minimise disturbance and interference with badgers include;

- Any temporary exposed open pipe system should be capped to prevent badgers gaining access.
- Any ground-works that are to be left open overnight will be provided with a means of escape should a badger enter. This could simply be in the form of a roughened plank of wood placed in the trench as a ramp to the surface. This is particularly important if the trench fills with water.
- Any trenches/pits will be inspected each morning to ensure that no badgers have become trapped overnight. Should a badger become trapped in a trench it will likely attempt to dig itself into the side of the trench, by forming a temporary sett. Should a trapped badger be encountered the Named Ecologist should be contacted immediately for further advice who, if necessary, will contact Natural England in respect of legislative and licensing issues.
- The storage of topsoil or other 'soft' building materials on site will be given careful consideration. Badgers will readily adopt such mounds as setts; so as to avoid the adoption of any mounds, these will be kept to a minimum and any essential mounds subject to daily inspections (or nightly patrols if 24 hour security is present on site), with consideration given to temporarily fencing any such mounds to exclude badgers.
- The storage of any chemicals on site will be well away from the setts and contained in such a way that they cannot be accessed or knocked over by any roaming Badgers.

Opportunities for Biodiversity Gain

Following the site re-development there will be opportunities to enhance the site, through selective landscape plantings. Species should be selected, that are both native and wildlife friendly, focusing on measures to encourage birds and foraging bats, wherever possible. See appendix 4 for detailed information.

The opportunities for enhancement lie in the following main areas:

1. Planting with native nectar rich and berry bearing tree, shrub and plant species as an orchard in the north west corner of the site to provide foraging habitat for badgers.
2. Introduction of bat and bird friendly native planting schemes, bat hibernacula, and wildflower hedgerow edge mix seeding.
3. Bird and bat boxes incorporated within or on the new buildings or other built fabric, in particular should be included.
4. Use of FSC certified timber within the development.
5. No use of any peat based products within the landscaping of the site.
6. Selection of wildlife-friendly shrub/planting species as part of the terrestrial landscaping scheme within the development. The specification should include elements of landscaping details selected from a palette of species beneficial to wildlife (further information can be found in Appendix 4):
7. Planting of native deciduous specimen tree species.
8. Wildflower seeding areas (flowering lawn areas)
9. Hedgehog boxes and gaps at ground level within fencing to allow for hedgehog movement in and out of the site and between new development plots.
10. A number of bird and bat boxes could be attached to the built structures, as follows:

Bird box specifications

Bird boxes can be ordered from NHBS Ecology details can be found in appendix 5. Sufficient mitigation will be required for loss of bird nesting.

Bat Box Specifications

It is also suggested that bat boxes be attached to the corners of the built structures. Details can be found in appendix 5. Bat Box 1RFQ, NHBS Design is recommended

Conclusion

This Phase 1 Ecology Report illustrates that the majority of the site is of 'low ecological value', the boundary native hedgerow to the south and semi-mature trees are of most importance. However, there is an active badger sett adjacent to the site (within 30m of the site boundary), located within the embankment along the sites northern boundary and the embankment further West is likely to have more badger setts present. This may require modifications to the existing design would enable the development to co-exist with these badgers. No further ecological surveys are recommended.

It is understood that the majority of the trees and hedgerows will be retained and unaffected by the development. It is recommended that as many trees as possible be retained, and a tree protection area and root protection zone be established to avoid damage during the construction phase. All retained trees should be protected in accordance British Standard BS5837 (2012) Trees in Relation to Design, Demolition and Construction – Recommendations, to ensure require adequate root protection fencing. If any trees are to be lost within the scheme, these should be mitigated for by suitable 1:1 enhancement planting with native, nectar rich, berry bearing species.

Bats react adversely to intense lighting, to maintain the suitability of the site for roosting and foraging bats, any external lighting provision within the development should be as minimal as possible. External lighting should be minimal, where used it should be via directional downlighters, of low lux and where possible, on timers to ensure as little light spill as possible from the development. Recent guidance provided by BCT (2018) on external lighting should be followed in this regard.

In respect of the barn owl presence, a barn owl strategy and mitigation plan should be produced in relation to the development of the rough meadow (improved grassland) section north of this barn, to avoid disturbance to this species.

Any vegetation clearance should take place outside of the bird breeding season. Bird breeding season is between mid March and mid July, although certain species can breed outside these months and if breeding birds are found then work should cease and the advice of an ecologist sought. If clearance is undertaken within the bird breeding season then all site features should preferably be checked immediately prior to clearance by a suitably qualified ecologist.

There are no Statutory or Non-Statutory Designated Nature Conservation Sites within the site, within 1km from the site or at greater distances that will be impacted by this development. From the Biological Data Search no protected species were recorded within the site.

1.6 Further documents

In accordance with the recommendations of the PEA, and required for the discharge of other Reserved matters the following documents have been produced and inter-relate to this report:

- Nutts Lane, Hinckley badger Survey, 2022 Dr. Stefan Bodnar
- Nutts Lane, Hinckley Barn owl survey and mitigation report, 2022 Dr. Stefan Bodnar

2. Timings and specific guidance

	October	November	December	January	February	March	April	May	June	July	August	September
Bats												
Birds												
Trees												

AMBER = MODERATELY SENSITIVE PERIOD

GREEN = LESS SENSITIVE PERIOD

RED = HIGHLY SENSITIVE PERIOD

The above table demonstrates the range of protected species and habitats in terms of their most sensitive periods. It shows that the choice of site clearance April although having the potential to impact on bats was mitigated for by having an ecologist present and no bird nests were affected by the works. . Vegetation clearance would take place outside of the main bird-breeding season i.e. between October and February. If vegetation removal was required outside of this period, a survey by an experienced ecologist would be undertaken to ensure that no nesting birds would be affected. If active bird nests were found, work in that area would be delayed until eggs had hatched and chicks had fledged.

Measures for herpetiles:

To protect any reptiles or amphibians which might be using the site, it is recommended appropriate precautions should be taken during development. Including where possible:

- Ensuring storage of piles of materials and excavated earth on the site should be kept to a minimum.
- Storing piles of materials and excavated earth away from the field boundaries to deter reptiles from using them for temporary cover.
- Where grass is to be mown, this should be undertaken under supervision of an ecologist and in the first instance cut high - to a height of 150mm. If any reptiles / amphibians or other animals are encountered at this time they will be removed from danger and taken to a place of safety by the ecologist.

To ensure no newts or other amphibians are harmed as a result of this development, it is recommended appropriate precautions should be taken during development.

- If Great Crested Newts are discovered at any time during processes involved with the development, work should cease immediately and the advice of a licensed ecologist sought.
- All site staff involved with site clearance and construction works are to be made aware of the potential for encountering Great Crested Newts through a tool kit talk and the appropriate measures to be taken if great crested newts are encountered.
- Keep duration of groundworks as short as possible.
- Backfill trenches and other excavations before nightfall, or leave a ramp to allow newts to easily exit.
- Raise stored materials (that might act as temporary resting places) off the ground, e.g. on pallets.

Measures for birds:

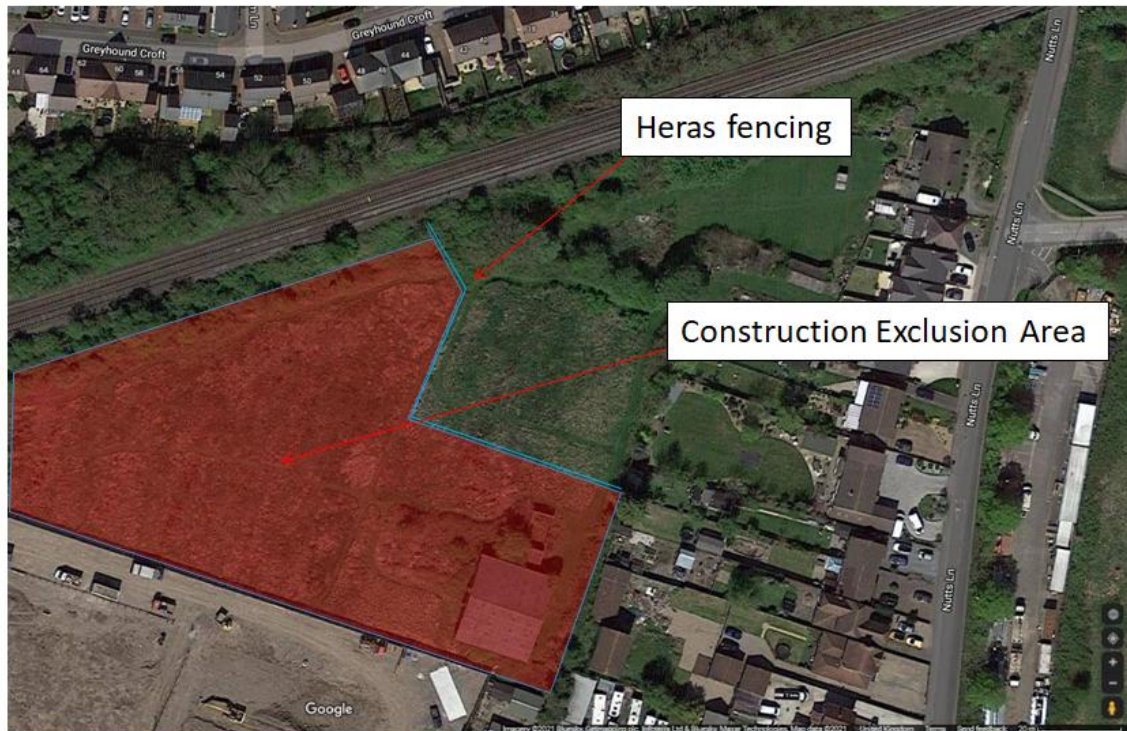
The trees (and derelict buildings) could all provide suitable nesting structures, therefore site clearance should be carried out outside of the bird breeding season. Bird breeding season is between mid March and mid August, although certain species can breed outside these months and if breeding birds are found then work should cease and the advice of an ecologist sought.

All retained hedges and trees should be treated in accordance British Standard BS5837 (2012) 'Trees in Relation to Design, Demolition and Construction – Recommendations, to ensure require adequate root protection fencing.

Specific precautions are required in respect of barn owls that are recorded nearby:

Measures for barn owls:

.It is proposed that this is undertaken by installation of site fencing (Heras) along the development edge and to create a Construction Exclusion Zone:



The protected area is to be regarded as sacrosanct, and, once installed, barriers and ground protection is not to be removed or altered without prior recommendation by the project ecologist and, where necessary, approval from the Local Planning Authority.

All weather tree protection posters (an example is detailed in Figure 4 below) are to be securely fixed to the tree protection fencing in plain view.

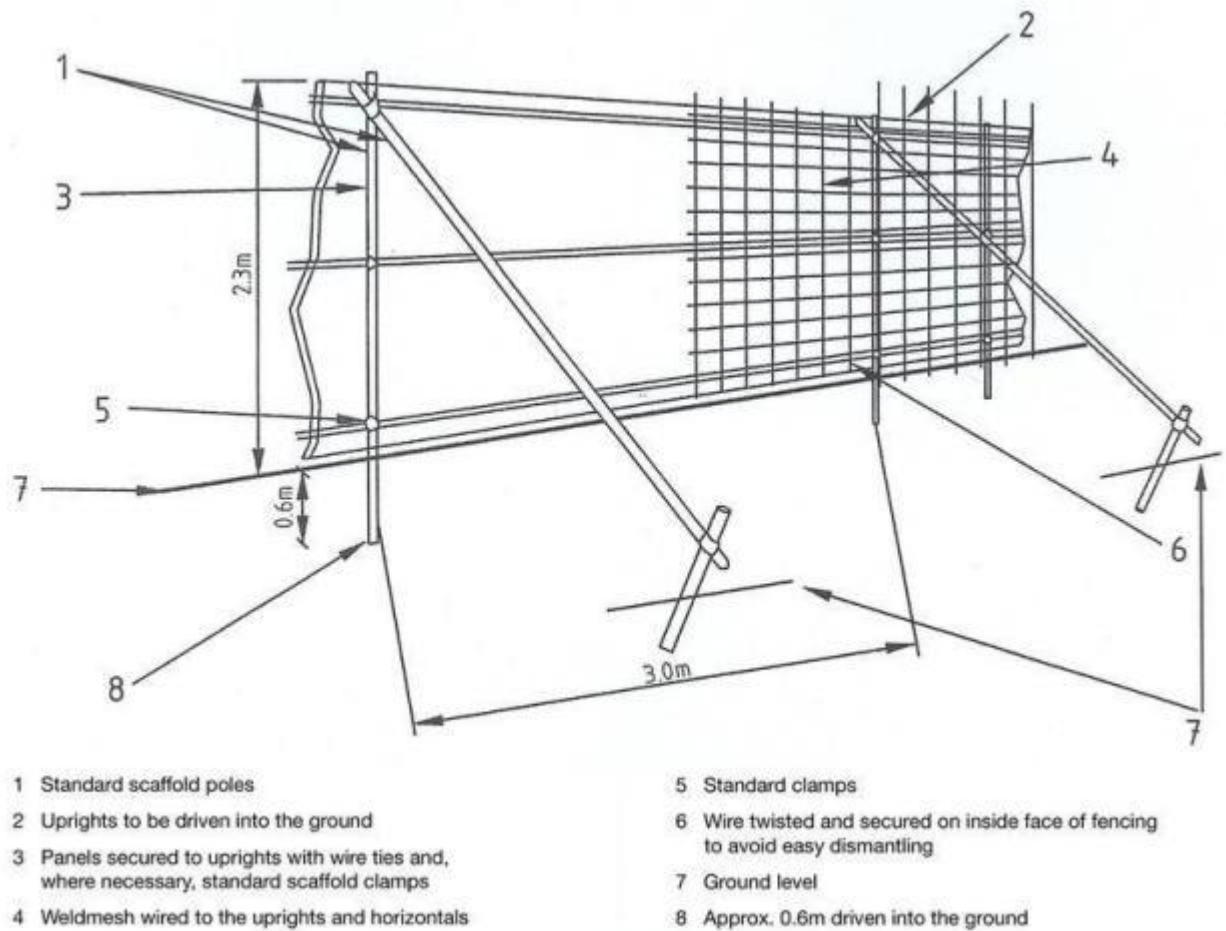


Figure 3. Example of protective fencing required for Construction Exclusion Zone.



Figure 4. Example of poster

All site staff should be made aware of the nearby presence of barn owls and the need to observe the safeguarding area via a Toolkit talk, see below:

Toolbox talk 4: protected species

Birds

Toolbox talk 4: Birds

What are they and how are they recognised?

More than 400 bird species are regularly recorded in the UK. These consist of resident breeding species and migrants. Birds occur in both rural and urban areas, with many species adapted to living in bridges, buildings, houses and gardens. Used and unused nests made of twigs, grass and moss, droppings and food pellets or food remains may also be found.

Where are their nests found?

Species show different preferences as to where they nest. Most are more likely to nest in scrub or hedgerows than in trees, but some build nests in or on buildings, ledges, cliffs and on the ground.

When are they found?

Birds in the UK typically build their nests and lay their eggs between March and August. The peak months for breeding are May and June. Exceptions include the barn owl, which may breed for a longer period, and the collared dove and wood pigeon, which nest all year round. However, birds may be found breeding on a construction site at unexpected times of the year.

What should be done if nesting birds are found?

All wild birds are protected by law throughout the UK and in particular when they are nesting. It is illegal to kill, injure or take any wild bird, or damage or destroy the nest while that nest is in use or being built, or eggs of breeding birds. This includes commonly seen species, such as blackbirds and robins.

Certain birds receive additional protection whereby it is illegal to disturb them when they are nesting (eg barn owl, peregrine falcon, kingfisher, black redstart etc).



If nesting birds are found on site, all works in that area will have to stop until the birds have completed breeding. Nesting sites should be inspected only by experienced ecologists. Works must not damage the nests of breeding birds or be conducted near the nests of those species receiving additional protection.

Birds may nest on machinery or scaffolding and other temporary site structures. If this happens the equipment cannot be used until the birds have finished nesting, and areas may need to be sealed off to prevent disturbance.

Where possible avoid clearance works during the nesting season.

Penalties

Breaking the law can lead to fines of up to £5000 per offence and, potentially, prison sentences of up to six months. Any vehicle used to commit the offence may be forfeited. Both the company and/or individuals can be held liable.

Measures for badgers (and other mammals):

Precautionary Measures During Works

Following the advice below will help developers to avoid committing offences. In accordance with the Protection of Badgers Act (1992) precautionary measures that should be taken to minimise disturbance and interference with badgers include;

- Disturbance in the vicinity of a sett where breeding is confirmed or expected is to be avoided during 1st December – 30th June. Badgers are particularly vulnerable at this time of year and sett interference can result in dependent cubs being abandoned. A protection zone is to be established at 30m radius around used setts.
- Disturbances, such as loud noises or vibrations, that might agitate badgers occupying a sett should be avoided or limited to areas well away from the sett.
- Noise in the vicinity of protection zone is to cease 2 hours before sunset.
- Badger tunnels can extend to 20m from the entrance holes and are located between 0.2 and several meters deep, depending on the soil topography. Excavation work and heavy machinery should be kept well away from where it could result in damage to the sett or disturbance to any badger occupying the sett.
- Any security lighting is to be directed away from setts.
- Fires and chemicals should not be used within 20 metres of sett.
- Trenches and excavations are to be covered at the end of each working day, or include ramps as a means of escape for any animal falling in.
- Any temporary exposed open pipe system should be capped to prevent badgers gaining access.

General Site Construction Safeguards

- Any ground-works that are to be left open overnight will be provided with a means of escape should a badger enter. This could simply be in the form of a roughened plank of wood placed in the trench as a ramp to the surface. This is particularly important if the trench fills with water.
- Any trenches/pits will be inspected each morning to ensure that no badgers have become trapped overnight. Should a badger become trapped in a trench it will likely attempt to dig itself into the side of the trench, by forming a temporary sett. Should a trapped badger be encountered the Named Ecologist should be contacted immediately for further advice who, if necessary, will contact Natural England in respect of legislative and licensing issues.
- The storage of topsoil or other ‘soft’ building materials on site will be given careful consideration. Badgers will readily adopt such mounds as setts; so as to avoid the adoption of any mounds, these will be kept to a minimum and any essential mounds subject to daily inspections (or nightly

patrols if 24 hour security is present on site), with consideration given to temporarily fencing any such mounds to exclude badgers.

- The storage of any chemicals on site will be well away from the setts and contained in such a way that they cannot be accessed or knocked over by any roaming Badgers.
- The specific seasonal sensitivity of this species is summarised at Table 1.

Species	J	F	M	A	M	J	J	A	S	O	N	D
Badger	H	H	H	H	M	M	L	L	L	L	L	H

Table 1. Summary table of seasonal sensitivity of habitats and species found within the site. (L = Low Sensitivity, M = Moderate Sensitivity, H = High Sensitivity).

As works are required within the season of high sensitivity, these have been the subject of special scrutiny by the ecologist, with exclusion zones, and an increased level of on-site supervision employed.

Responsible Persons

- Prior to the commencement of works, in order to ensure compliance with the method statement and to sufficiently mitigate against potential effects on Badgers, the project manager will take responsibility or appoint a person to be responsible for ensuring the following:
 - ☐ Compliance with legal requirements relating to nature conservation;
 - ☐ Installation of physical protection measures during construction;
 - ☐ Implementation of sensitive working practices during construction;
 - ☐ Regular inspection and maintenance of physical protection measures and monitoring of working practices during construction; and

Until such time as a responsible person has been appointed, the project manager shall be responsible for ensuring that the above points are addressed.

3. Enhancement Measures

The PEA noted that the development should demonstrate **Net Biodiversity Gain**, in accordance with **National Planning Policy Framework 2021**. There is also a duty to ensure no net loss of biodiversity placed on Local Authorities in the Natural Environment and Rural Communities Act 2006, Section 40. There are requirements noted for this under The National Planning Policy Framework (2021) which refers to compensation/ mitigation.

3.1 On site measures:

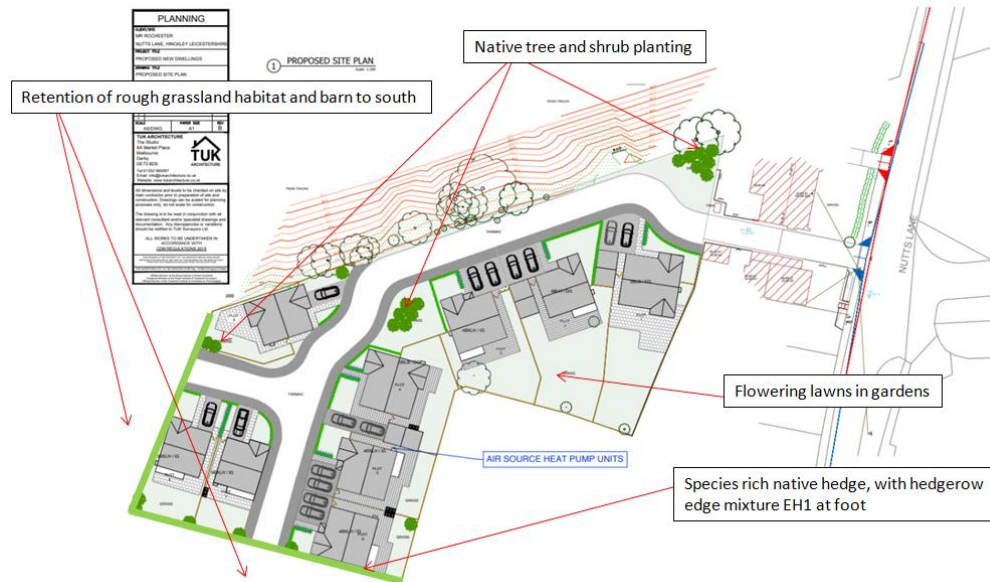
Summary of measures recommended below:

- Retention of structural tree planting within site
- Retention of off-site rough grassland (significant as foraging habitat for barn owl.)
- Retention of existing off site barn (breeding site for barn owl) and protection during site works
- New native tree planting see below
- A designed barn owl loft in one building
- Native shrub mixtures, see below
- Native species rich hedgerows
- Wildflower areas, Emorsgate EHF1 and EM8 mixtures
- Measures for birds and bats (boxes)
- Measures for hedgehogs (primarily gaps in fencing)

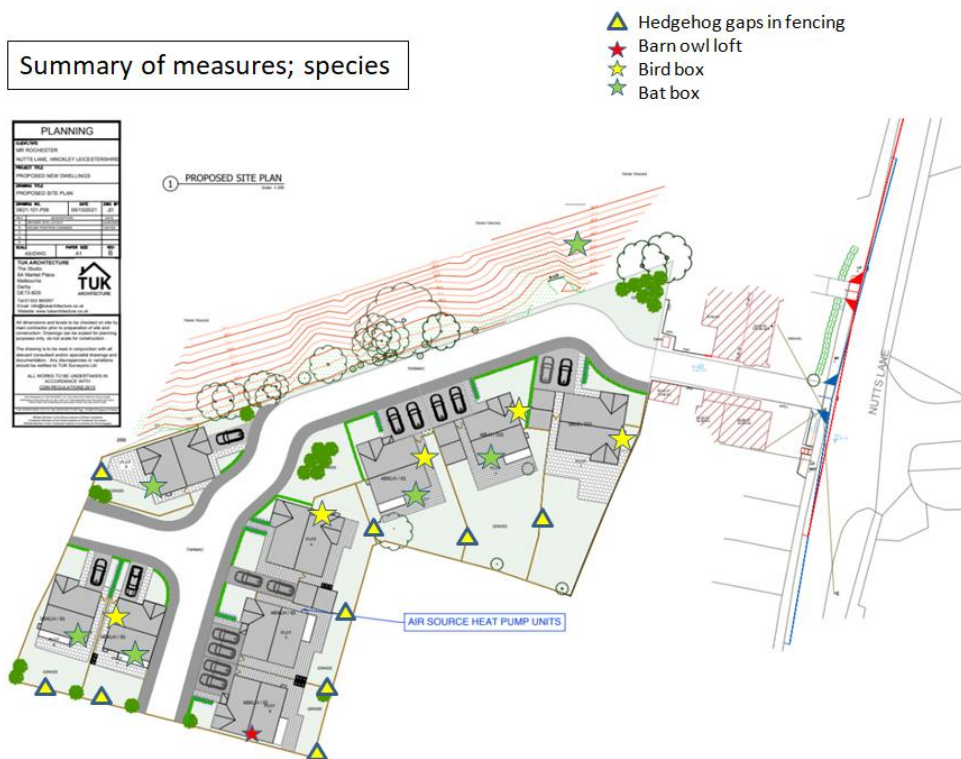
Environmental Enhancement Scheme, Nutts Lane, Hinckley

Summary of measures;

Summary of Enhancement Measures: habitat



Summary of measures; species



3.1a Terrestrial landscaping scheme

The plan overall shows a minimal retention of existing trees within the site though there is existing dense vegetation on the railway line, which will be appropriately protected and retained in line with BS5837:2012. No landscape design plan is shown for the site but the following will apply in all cases

Further details of ecological enhancement in the landscape design

The landscape design plan will incorporate all the required ecological protection and mitigation that is to be achieved via the terrestrial landscaping scheme.

The detailed final design plan will need to be reflective of recommended wildlife-friendly species (a palette of species from which the design is informed). In particular:

- a. Where possible, the scheme should use UK native species.
- b. Where non-native species are used these should have a recognised wildlife value
- c. The final balance of UK native to non-native species should be at least 75% UK native.
- d. Incorporation of grass/wildflower mixture into the design scheme

However the landscape design will need to recognise the constraints associated with such a development and species selection should also reflect:

- a. The desire for prevention of root penetration into foundations and other features of hard landscaping such as walls and footpaths.
- b. Avoidance of excessive shading of the new buildings and eventual size in relation to new build.
- c. The future maintenance that the species planted are likely to receive and incorporating minimal maintenance costs.
- d. The landscape impacts of the species selected, both singly and in combinations.
- e. Suitability of ground conditions to the species selected.

The main opportunities in respect of ecological mitigation within the design come from the landscape plantings, detailed previously

Wildflower planting: this will be Emorsgate EH1F and EL1 flowering lawn mixtures

Composition

EH1 is a complete mix composed of 20% native wild flowers and 80% slow growing grasses (by weight).

Wild Flowers

Environmental Enhancement Scheme, Nutts Lane, Hinckley

Agrimonia eupatoria – Agrimony

Alliaria petiolata – Garlic Mustard

Arctium minus – Lesser Burdock

Anthriscus sylvestris – Cow Parsley

Carex echinata – Star Sedge

Centaurea nigra – Common Knapweed

Chaerophyllum temulum – Rough Chervil

Cruciata laevipes – Crosswort

Daucus carota – Wild Carrot

Dipsacus fullonum – Wild Teasel

Filipendula ulmaria – Meadowsweet

Galium album – (Galium mollugo) – Hedge Bedstraw

Geranium pratense – Meadow Crane's=bill

Leucanthemum vulgare – Moon Daisy

Origanum vulgare – Wild Marjoram

Primula veris – Cowslip

Rumex acetosa – Common Sorrel

Saponaria officinalis – Soapwort

Silene dioica – Red Campion

Silene vulgaris – Bladder Campion

Torilis japonica – Upright Hedge-parsley

Vicia cracca – Tufted Vetch

Grasses

Agrostis capillaris – Common Bent

Environmental Enhancement Scheme, Nutts Lane, Hinckley

Anthoxanthum odoratum – Sweet Vernal-grass

Brachypodium sylvaticum – False Brome

Cynosurus cristatus – Crested Dog's-tail

Deschampsia cespitosa = Tufted Hair-grass

Festuca rubra – Red Fescue

Poa nemoralis – Wood Meadow-grass

Emorsgate EL1 Mixture

EL1 is a complete mix composed of 20% wild flowers and 80% slow growing grasses (by weight). The flower and grass components are also available to order separately as EL1F for the flower component and EG1 for the grass component. For quicker establishment of grass cover EL1 may be sown with an additional 10g/m² EG1 or lawn mixtures EG21 or EG22. Higher grass sowing rates will however reduce the time and space available for flower establishment, especially in good growing conditions.

(a) Composition

Wild Flowers 20%

1.0 *Betonica officinalis* – Betony

2.4 *Centaurea nigra* – Common Knapweed

1.2 *Galium verum* – Lady's Bedstraw

0.8 *Leontodon Hispidus* – Rough Hawkbit

2.4 *Lotus corniculatus* – Birdsfoot Trefoil

2.8 *Plantago lanceolata* – Ribwort Plantain

0.8 *Primula veris* – Cowslip

1.2 *Ranunculus acris* – Meadow Buttercup

0.4 *Salix silaus* – Pepper Saxifrage

0.4 *Vicia cracca* – Tufted Vetch

5.0 *Medicago lupulina* – Black Medic (Ag)

5.0 *Trifolium repens* – Small Leaved White Clover (Ag)

Environmental Enhancement Scheme, Nutts Lane, Hinckley

Grasses 80%

8.0 *Agrostis capillaris* – Common Bent (Ag)

1.0 *Carex flacca* – Glaucous Sedge

39.0 *Cynosurus cristatus* – Crested Dogtail (Ag)

28.0 *Festuca rubra* – Red Fescue (Ag)

4.0 *Phleum bertolonii* – Smaller Cat's-tail (Ag)

Native Hedge Mixture:

There are opportunities for mitigation native hedge planting within the site, which could contribute additional species and structure. The recommended mixture is below:

Hawthorn *Crataegus monogyna*

Blackthorn *Prunus spinosa*

Hazel *Corylus avellana*

Holly *Ilex aquifolium*

Field maple *Acer campestre*

Guelder rose *Viburnum opulus*

Wild privet *Ligustrum vulgare*

Field rose *Rosa arvensis*

Dogwood *Cornus sanguinea*

Crab apple *Malus sylvestris*

Spindle *Euonymus europaeus*

The seeded hedgerow marginal grassland is Emorsgate EH1.

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Native Trees/shrubs that are wildlife friendly:

Selected from species in Appendix 3, and particularly table 3a.

3.1b Lighting:

Any new outside lighting for the proposed development should conform to Bat Conservation Trust (BCT) guidelines. See guidance below and refer to BCT (2018) guidance 'Bats and Artificial Lighting'.

Note is made of a Reserved Matter that refers to provision of a lighting plan and this should take into account the requirements for wildlife and bats in particular:

14. No external lighting of the site shall be installed until details have first been submitted to and approved in writing by the Local Planning Authority. This information shall include a layout plan with beam orientation and a schedule of equipment proposed in the design (luminaire type, mounting height, aiming angles and luminaire profiles). The lighting shall be installed, maintained and operated in accordance with the approved details.

Reason: To protect the adjacent railway track and neighbouring residential properties from glare and nuisance from artificial light in accordance with Policies DM7 and DM10 of the adopted Site Allocations and Development Management Policies Development Plan Document (2016).

The exterior lighting plan for the new proposed development should be sympathetic to the needs of roosting, foraging and commuting bats. The retained woodland and retained/created wood/scrub strips on the site boundaries should not be illuminated by the proposed housing development. All areas towards the perimeter of the development should not be illuminated; however, if lighting is required for security only shrouded down lighters used on the lighting poles in these areas should be used or lights should be positioned close to the ground and directed downwards to minimise light spill. The lights should be activated by a time sensor with a low movement sensitivity, so as not to be triggered by wildlife. The most significant areas are the edges and wooded sections of the site, we consider that the proposed housing development should not add to the level of illumination to these areas. Further detailed guidance on which the lighting specification should be based is provided by the Bat Conservation Trust publication 'Bats and Artificial lighting, 2018 which should be reference to demonstrate compliance with this requirement in addition to the brief guidance below:

MITIGATION OF LIGHTING IMPACTS ON BATS

- FORAGING AND COMMUTING Type of lamp (light source) The impact on bats can be minimised by the use of low pressure sodium lamps or high pressure sodium instead of mercury or metal halide lamps where glass glazing is preferred due to its uv filtration characteristics.

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- Luminaire and light spill accessories Lighting should be directed to where it is needed and light spillage avoided. This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only. Planting can also be used as a barrier or manmade features that are required within the build can be positioned so as to form a barrier. **Suitable examples shown below:**

Double Asymmetric Luminaire



Simple Hood



- Lighting column The height of lighting columns in general should be as short as is possible as light at a low level reduces the ecological impact. However, there are cases where a taller column will enable light to be directed downwards at a more acute angle and thereby reduce horizontal spill. For pedestrian lighting this can take the form of low level lighting that is as directional as possible and below 3 lux at ground level. **Aim for lighting column of 5m or less, hooded and cowed to prevent light spill, for main lighting columns**
- Light levels The light should be as low as guidelines permit. If lighting is not needed, don't light. Timing of lighting The times during which the lighting is on should be limited to provide some dark periods. Roads or trackways in areas important for foraging bats should contain stretches left unlit to avoid isolation of bat colonies. These unlit stretches should be 10 metres in length either side of commuting route. **So the lighting to be restricted to the main buildings and roadways in and out, and car parking areas only. Car parking areas angle lighting inwards.**
- SECURITY LIGHTING Power It is rarely necessary to use a lamp of greater than 2000 lumens (150 W) in security lights. The use of a higher power is not as effective for the intended function and will be more disturbing for bats.
- Movement sensors Many security lights are fitted with movement sensors which, if well installed and aimed, will reduce the amount of time a light is on each night. This is more easily achieved in a system where the light unit and the movement sensor are able to be separately aimed. Timers If the light is fitted with a timer this should be adjusted to the minimum to reduce the amount of 'lit time'.

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- **Aim of light** The light should be aimed to illuminate only the immediate area required by using as sharp a downward angle as possible. This lit area must avoid being directed at, or close to, any bats' roost access points or flight paths from the roost. A shield or hood can be used to control or restrict the area to be lit. Avoid illuminating at a wider angle as this will be more disturbing to foraging and commuting bats as well as people and other wildlife.
- **Suitable types shown below (note that these are wall mounted and directed downwards)**

Circular Louvre



Cowl & Louvre



Cowl (or Hood)



References: Bats and lighting BCT guidance and Guidance notes for the reduction of obtrusive lighting.

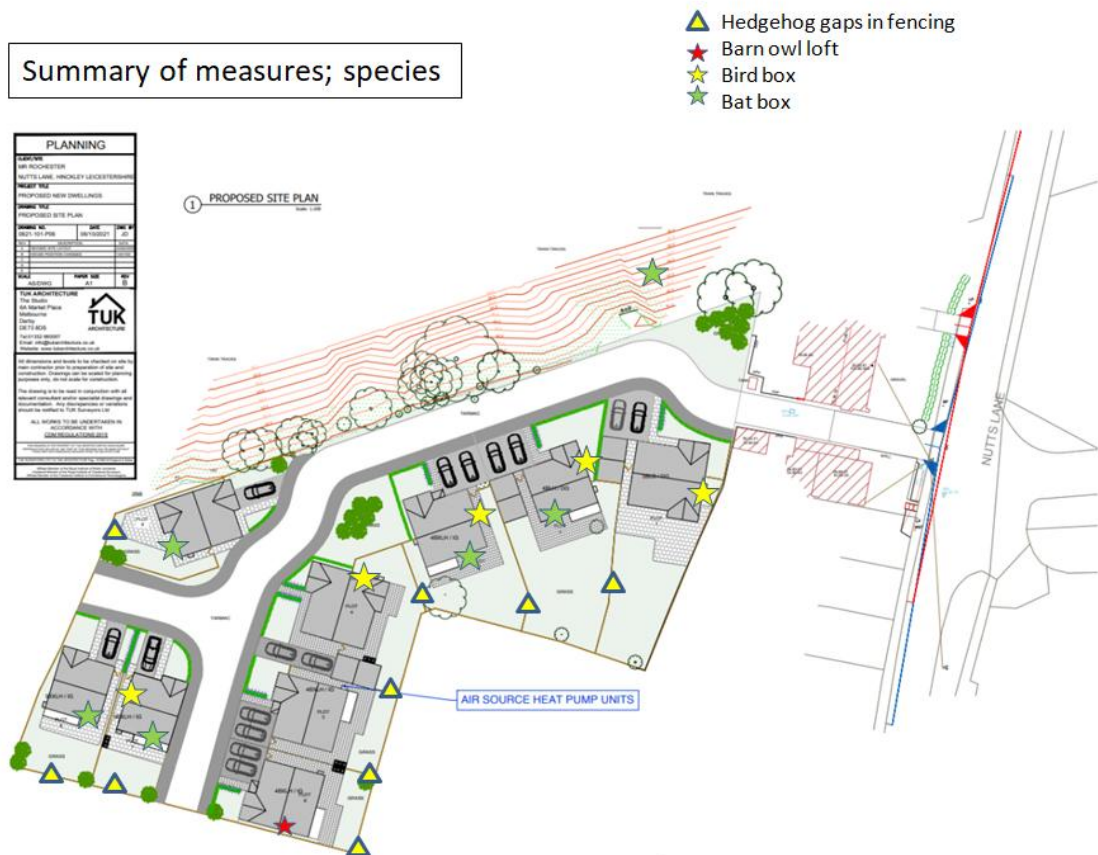
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3.1c Bird and Bat boxes, measures for hedgehogs:

In addition, bird and bat boxes are recommended as enhancements, as follows. The mitigation will need to be suitable for the species that are likely to utilise the area and surrounds post development.

- The installation of 6 integrated bat bricks in total across the development (specifications provided in appendix 1 of report)
- The installation of 6 bird nest boxes birds in total across the development (specifications provided in appendix 2 of report)
- Hedgehog holes of minimum 130 x 130mm should be incorporated into each units fencing to allow movement.

Location of bird and bat boxes, hedgehog gaps: (refer to plan below);



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The following guidance on the dimensions and construction is from The Barn Owl Trust web site and should be used by the site architect to design a suitable feature within the building:

(b) Building regulations compliance

- Owl spaces should be constructed inside the building but outside of the 'U-value envelope'. Thus, the envelope/membrane may have to be slightly diverted.
- Consult the book by Dr. Carol Williams (2010), *Biodiversity for Low and Zero Carbon Buildings: A Technical Guide for New Build*, (RIBA Publishing) for details.
- The second edition also deals with conversions; Kelly Gunnell, Brian Murphy and Carol Williams (2013), *Designing for Biodiversity: a Technical Guide for New and Existing Buildings*, (RIBA Publishing).

(c)

(d) Design requirements – owl hole dimensions and ledge (exercise platform)

- Owl hole minimum size: 100mm wide x 200mm high, optimum size 130mm x 250mm, maximum size 200mm x 300mm.
- The bottom of the hole must not have any sharp edges or narrow gaps in which a toe or talon could get caught.
- Where necessary there can be a 'tunnel', minimum 150mm wide x 200mm high, between the hole and the nest space.
- A grippable ledge (e.g. stone or slatted timber) below the owl hole provides an exercise platform for emerging owlets.
- *In cases where the owl hole goes directly into a nest space less than 700mm deep, an exercise platform is considered essential;* the bigger the better, but not less than 250mm x 500mm wide with a grippable raised edge.



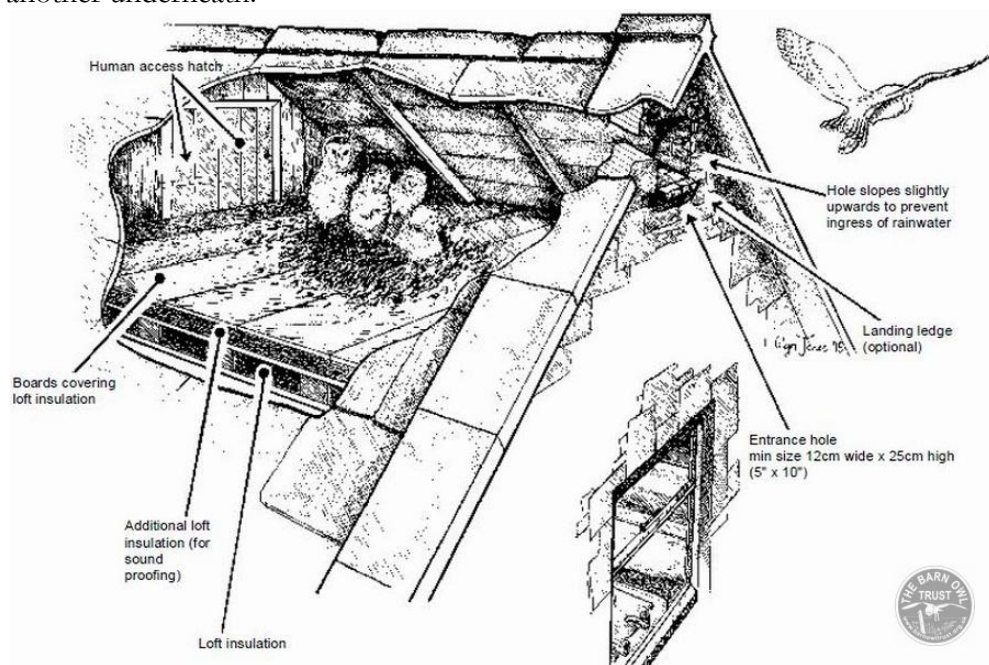
(e)

(f) Design requirements – nest space & dimensions

- Floor area of nest chamber: absolute minimum 0.4m² (e.g. 500mm x 800mm or 400mm x 1m), ideal size is 1m² (1 metre x 1 metre). These dimensions are bigger than those for nestboxes because built-in provision usually lacks an external exercise platform that would permit maximum wing stretching prior to fledging.

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- Where there is no external exercise platform the internal box depth from bottom of entrance hole to floor of nesting area must be not less than 700mm. Note: the ideal depth for Barn Owls is at least 1 metre which should be achieved wherever space permits.
- Depth from bottom of entrance hole to floor of nesting area must be not less than 450mm provided that there will definitely be an easy-to-grip external exercise platform for fledglings to stand on outside the owl hole.
- In a large loft simply partition off a section behind the owls' entrance hole. See images of **the construction of an owl partition in a loft**.
- Stone, brick and timber are all suitable materials. Although owls are not destructive and seem unharmed by soft insulation materials, these are usually best avoided.
- In an unheated building, no insulation is required. See images of **the construction of a built-in nest space in an unheated outbuilding**.
- Lining the space is not essential although some owl workers think that a thin layer of wood flakes encourages occupation.
- An internal perch positioned *as high or higher* than the access hole may be beneficial as long as the space is big enough to accommodate one without resulting in one perched bird defecating on another underneath.



(g) Design requirements – insulation

- From the owls' point of view, insulation is not required.
- However, there should be some form of moisture insulation between the owl space and the building interior.
- Where space is at a premium, use a highly efficient heat insulation board (e.g. 50mm Celotex polyurethane foam).
- Where space allows, use a more environmentally sustainable (and thicker) heat insulation board (e.g. a wood fibre board like Pavatex) to which a sound insulation board can be added (e.g. 60mm Pavatherm) if required.

(h) Design requirements – human access and cleaning out

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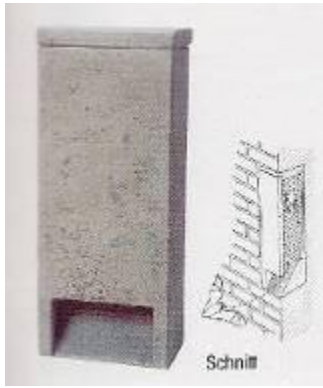
Human access is essential. Here is the interior part of an owl nest-space with its insulated inspection panel removed.

Human access is essential as the nest space will need to be cleared out very occasionally.

- A generous removable inspection hatch or door in the back of the owl space (accessible from the building interior) is usually the preferred option but in some cases an external arrangement may be a practical option.
- In the case of a loft partition, create an integral crawl-through doorway.
- The access should permit all or most of the nest space floor to be reached by hand.

Appendix 1:

Bat Boxes and Bat Brick Specifications to Provide Bat Habitat on Buildings



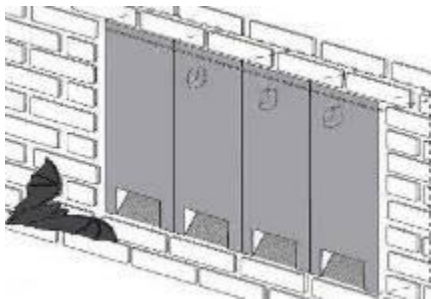
Schwegler 1FR can be installed within brick masonry just leaving the entrance and can be rendered over.



Ibstock Enclosed Bat Box B is designed specifically for the pipistrelle bat.



Schwegler WI integral Summer & Winter Bat Box.



Schwegler 2FR Bat Tube is the same design as the 1FR but with holes in the sides. Multiple tubes to be placed next to each other to form a much larger roost.



Schwegler 27 wall can be installed within brick masonry. It can be rendered over.



Schwegler 1FQ wall-mounted bat box.

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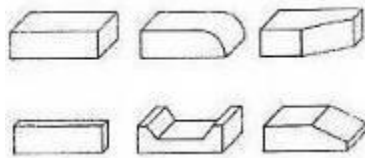
Schwegler 1FE Bat Access Panel can be surface-mounted or integrated. The open back enables bats access through exterior walls.



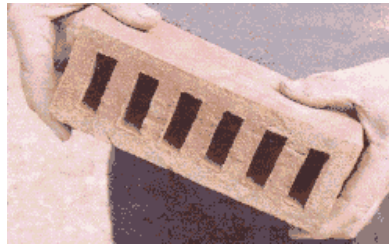
Ibstock Bat Box with Engraved Motif C is designed specifically for the pipistrelle bat and is available in all brick colours.



Ibstock Free Access Bat Box allows bats to access the cavity wall of the building.



Modified bricks for creating bat access points. A standard brick is shown top left. Purpose made bat bricks can also be used.



Norfolk Bat Brick allows bats to access the cavity wall of the building. The slits are the perfect size for Natterer's bat, Daubenton's bat, Brandt's bat and Brown long-eared.



Marshall's Bat Access Brick
(Also available in stone) allows bats access into the cavity wall of the building.

APPENDIX 1: Insect Box Specifications

A variety of insect boxes is recommended to encourage a diversity of insect species and encourage bats.

Wooden Insect House

A general insect habitat for beneficial insects in summer and, later in the year, over wintering ladybirds and lacewings. Locate in a sheltered place near nectar or pollen plants or by a pond. Durable and strong construction in acacia, oak or larch with no maintenance necessary.

Dimensions: $22 \times 13.5 \times 13.5$ cm.



Woodcrete Insect House

An insect nest made from long-lasting, insulating, woodcrete, with holes of different sizes providing homes for a variety of beneficial insects such as bees and solitary wasps. Dimensions: $14 \times 8 \times 26$ cm; Weight: 3.65kg



Insect House with Inspection Tubes

This nesting and hibernation box for insects has a woodcrete exterior with a wooden front panel which can be removed for observation. Through the transparent tubes you can see the usually hidden lifecycle of many solitary types of bees and hymenoptera including egg-laying, development of larvae and sealing of brood chambers. Typical inhabitants are wild bees and thread-waisted wasps. All the species attracted to this box are harmless non-aggressive pollinating insects.

Dimensions: $33 \times 21 \times 51$ cm; Weight: 7.1kg.



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Appendix 2: Bird Box Specifications

Schwegler boxes have the highest occupation rates of all box types. They are carefully designed to mimic natural nest sites and provide a stable environment for chick rearing and winter roosting.

They can be expected to last 25 years or more without maintenance.

Schwegler No 11 House Martin Nest (Code: 002097D)



It is increasingly difficult for swallows and house martins to find suitable nest-building material. The mud they do find, if any, is often poor quality. In addition, the walls of buildings are nowadays often very smooth. As a result, nests tend to fall down, sometimes with the nestlings inside. In many places, the vibration caused by heavy vehicles shakes the nests loose. This nest has been developed to enable House Martins to breed successfully on external facades without overhanging eaves and has proved highly

successful.

Schwegler No 16 Swift Box (Code: 002087D)

The design of this box mimics bell tower louvres. It has a removable panel for easy inspection of the nest chamber.



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2H Robin Box (Code: 002015D)



This box is attractive to robins, pied wagtails, spotted flycatcher, wrens and black redstarts. Best sited on the walls of buildings with the entrance on one side.

Sparrow Terrace



House sparrows are gregarious and prefer to nest close to each other, so this woodcrete box provides room for three families under one roof. Made from long-lasting, breathable woodcrete. No maintenance required. Designed for fixing to walls (not suitable for fences or sheds due to the weight of the box). Available in choice of stone colour (pictured) or brown.

Schwegler 1B Bird Box

The most popular box for garden birds, the 1B appeals to a wide range of species, and is the official nest box of National Nest Box Week. The box can be nailed to the trunk of a tree, or hung from a branch. Woodcrete, 23cm high x 16cm diameter. Available in choice of four colours - brown, green, red or white. Available with 32mm entrance hole (standard) or with 26mm hole



Schwegler Built-in Multi-System Main Cavity Bird Box (Code: 002101D)



The multi-system has exchangeable front panels for kestrels, jackdaws or swifts. The system can be installed in all types of buildings, whether constructed of concrete, brick or timber. To meet the needs of various species of bird, different types of front panel are available for use with the main cavity. The main cavity is supplied without a front panel which should be ordered separately. **Positioning:** At heights of 5m or more on a sheltered external wall. **Suitable for:** Dependant on the type of front panel

chosen. **Material:** Woodcrete **Height:**415mm **Width:** 445mm **Depth:**415mm **Weight:**2.8Kg

Appendix 3 Wildlife Friendly Plants

3.1 Native trees and shrubs

British Native Trees - Habitats and Growing conditions.



Species	Average mature / ultimate height			Growth rate			Soil/ground conditions					Tolerant of sites that are				Valuable for	
	0.5-5m	6m-15m	16m+	Fast	Medium	Slow	Wet ground	Light sandy soils	Heavy soils	acid	alkaline	Shaded	Polluted	Coastal	Exposed	Birds	Insects
Alder		•		•			■		•		•	•	•		•		•
Ash			•		•		▲	•	•		•	•	•		•		•
Aspen		•		•					•	•	•		•	•	•		•
Beech			•			•		•			•	•					•
Birch, Downy		•		•			▲			•			•		•		•
Birch, Silver		•		•				•					•		•		•
Blackthorn	•			•					•	•	•				•	•	•
Broom	•				•			•		•	•	•	•		•		•
Buckthorn, Alder	•					•	▲			•							•
Cherry, Wild		•			•			•	•		•		•				•
Cherry, Bird		•			•			•	•	•		•				•	•
Crabapple		•				•		•	•	•	•	•				•	•
Elder		•		•				•	•	•	•	•	•	•	•		•
Elm, Wych		•			•			•	•			•	•	•	•		•
Gorse	•				•			•		•	•					•	•
Hawthorn	•				•			•	•	•	•		•	•	•	•	•
Hazel		•		•					•		•						•
Holly		•				•		•	•	•	•	•	•	•	•	•	•
Lime, small-leaved			•		•				•		•						•
Maple, Field		•										•	•				•
Oak, Pedunculate			•			•			•		•				•	•	•
Oak, Sessile		•				•	▲	•	•	•		•			•	•	•
Pine, Scots			•		•			•		•					•		•
Poplar, Black			•	•			▲	•	•		•						•
Rose, Dog	•				•			•			•	•	•		•		•
Rose, Guelder	•				•		▲		•		•	•					•
Rowan		•		•				•		•			•	•	•	•	•
Spindle	•				•				•		•	•					•
Whitebeam, Common		•			•			•	•	•							•
Wild Service	•					•			•		•	•		•		•	•
Willow, Crack		•		•			■				•		•	•	•	•	•
Willow, Goat		•		•	•		■		•			•	•	•	•	•	•
Willow, White		•	•	•			■				•	•	•	•	•	•	•
Yew		•				•		•			•	•			•	•	•

■ Only species to survive waterlogged sites with anaerobic conditions.
▲ Will tolerate wet ground if there is some seasonality of 'flushing' (water movement) within the soil.

Appendix 3.2: Non-native plants to attract wildlife

Buddleja X weyeriana cultivars

You can plant the orange-flowered B. X weyeriana hybrids with a clear conscience as they don't appear to produce viable seed, they also attract a broad spectrum of insects including both butterflies and bees, and they flower late into the season when nectar is scarce. The beautiful B. x fallowiana 'Lochin' with silver leaves is attractive to butterflies and is also said not to produce seeds. The orange ball Buddleja (B. globosa) from South America seems to attract bees rather than butterflies.

Bupleurum fruticosum ('Shrubby Hare's Ear')

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A shrubby evergreen umbellifer from Southern Europe, where it is often cultivated. It has leathery aromatic foliage and umbels of yellowish flowers, a bit like those of Fennel, that are very attractive to hoverflies and other small insects. Well worth growing for this reason.

Ceanothus X 'Gloire de Versailles'

Ceanothus come from the Western United States. Most Ceanothus have bunches of very small flowers that don't seem very attractive to insects. 'Gloire de Versailles' however is a hybrid with loose bunches of pale blue tubular flowers that are very attractive to butterflies and bees.

Caryopteris X clandonensis 'Kew Blue'

A deciduous shrub from China for a sunny position, has small tubular blue flowers attractive to insects.

Clethra alnifolia ('Sweet Pepper Bush')

A deciduous shrub from the Eastern United States that likes damp, acid or woodland soil.

Has spikes of small scented white flowers attractive to moths and butterflies.

Hebe X 'Great Orme' and H. X 'Midsummer Beauty'

Hebes are close relatives of the herbaceous genus Veronica, and come from New Zealand. Some are much more attractive to insects than others. 'Great Orme' is a medium-sized hybrid with pale pink flowers that are attractive to butterflies. It is a distinctive cultivar and available true to name in the nursery trade.

'Midsummer Beauty' seems to be more of a generic name for a series of large shrubs with

blue or grey-blue flowers in long spikes, attractive to both bees and butterflies. There are a number of other blue and white flowered Hebes that seem very popular with bumblebees.

Myrtus communis ('European Myrtle')

An attractive evergreen shrub from the South of France and Spain with small evergreen

aromatic leaves. It has been grown in our gardens for centuries, but is susceptible to hard

frost and prefers a site against a warm sunny wall. Fluffy white flowers in early summer are bumblebees' heaven. Purplish berries follow later which are stripped by blackbirds in

January.

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Amelanchier species ('Shad Bush')

Shrubs with white cherry-like blossoms early in the year, followed by blackish berries in late summer. Valuable for the berries as a source of food for berry-eating birds when most other berries are not yet ripe.

Erica terminalis ('Corsican Heath')

A shrubby heather-like plant popular with bumblebees. The Cornish Heath, *Erica vagans*, from the Atlantic fringes of Europe is also a good bee plant. *Erica manipuliflora*, from

Southern Europe, and its hybrid *Erica X griffithii* have fragrant flowers that attract butterflies.

Eupatorium ligustrinum

A late-flowering evergreen bush that looks very like a privet, but has bunches of white fluffy flowers in September and October. These flowers seem very attractive to range of insects, especially hoverflies.

Ribes sanguineum (Flowering Currant)

It is a very good early flower for bumblebees, as indeed are the flowers of the closely related blackcurrants and gooseberries.

Appendix 3.3: Plants good for moths, with species of moth they encourage beside

Bird's Foot Trefoil (*Lotus corniculatus*) - *Burnet*, *Belted Beauty*, *Chalk Carpet*, *Latticed Heather*
Bladder Campion (*Silene vulgaris*) - *Campion*, *Marbled Coronet*, *Nettle Pug*, *Marbled Clover*, *Dark Brocade*, *Sandy Carpet*

Borage (*Borago officinalis*) - *Crimson Speckled*

Chives (*Allium schoenoprasum*)

Wild Clary (*Salvia horminoides*) - *Twin-spot Carpet*

Biting Stonecrop (*Sedum acre*) - *Yellow Ringed Carpet*, *Northern Rustic*

Cowslip (*Primula veris*) - *Plain Clary*, *Northern Rustic*

Daisy - *Bordered Straw*

Dropwort (*Filipendula hexapetala*) - *Satyr Pug*

Evening Primrose (*Oenothera biennis*) - *Elephant Hawk*

Field Scabious (*Knautia arvensis*) - *Marsh Fritillary*, *Narrow Bordered Bee Hawk*, *Lime Speck Pug*, *Shaded Pug*

Foxglove (*Digitalis purpurea*) - *Lesser Yellow Underwing*, *Foxglove Pug*

Golden Rod (*Solidago*) - *Lime Speck Pug*, *Bleached Pug*, *Golden Rod*, *Wormwood Pug*, *V Pug*

Greater Stitchwort (*Stellaria holostea*) - *Dart*, *Yellow Underwing*, *Marsh Pug*, *Plain Clary*

Hedge Bedstraw (*Gallium mollugo*) - *Ruddy Carpet*, *Royal Mantle*, *Common Carpet*, *Wood Carpet*, *Water Carpet*, *Beech Green Carpet*, *Mottled Grey*, *Green Carpet*

Hedge Woundwort (*Stachys sylvatica*) - *Rosy Rustic*, *Plain Golden Y*, *Sub-angled Wave*

Hemp Agrimony (*Eupatorium cannabinum*) - *Wormwood Pug*, *V Pug*, *Lime Speck Pug*, *Marsh Pug*, *Gem*, *Scarce Burnished*

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Herb Bennet (*geum urbanum*) - *Riband Wave*
Herb Robert (*geranium robertianum*) - *Barred Carpet*
Hollyhock (*althaea rosea*) - *Mallow*
Kidney Vetch (*anthyllis vulneraria*) - *6-belted Clearwing*
Lady's Bedstraw (*gallium verum*) - *Hummingbird Hawk, Small Elephant Hawk, Gallium Carpet, Plain Wave, Riband Wave, Bedstraw Hawk, Archer's Dart, Red Chestnut, Ruddy Carpet, Royal Mantle, Common Carpet, Water Carpet, Beech Green Carpet, Red Twin Spot Carpet, Wood Carpet, Mottled Grey, Green Carpet*
Lady's Mantle (*alchemilla mollis*) - *Red Carpet*
Lesser Knapweed (*centaurea nigra*) - *Silver Y, Lime Speck Pug, Satyr Pug*
Lesser Meadow Rue - *Marsh Carpet*
Maiden Pink (*dianthus deltoides*) - *Marbled Coronet*
Marjoram (*majorana origanum*) - *Sub-angled Wave, Lace Border*
Marshmallow (*althaea officinalis*) - *Marshmallow*
Meadow Clary (*salvia pratensis*) - *Brown Spot Pinion, Hebrew Character, Powdered Quaker, Emperor*
Meadowsweet (*filipendula ulmaria*)
Mullein - *Mullein, Striped Lychnis*
Navelwort (*umbilicus rupestris*) - *Weaver's Wave*
Pink - *Hawk*
Primrose (*primula vulgaris*) - *Pearl Bordered Yellow Underwing, Double Square Spot, Green Arches, Triple Spotted Clary, Ingrained Clary, Silver Ground Carpet*
Purple Loosestrife (*lythrum salicaria*) - *Emperor, Small Elephant Hawk, Powdered Quaker*
Ragged Robin (*lychnis flos cuculi*) - *Campion, Lychnis, Twin-spot Carpet, Marbled Clover*
Red Campion (*melandrium rubrum*) - *Rivulet, Campion, Lychnis, Twin-spot Carpet, Sandy Carpet, Marbled Clover*
Red Clover (*trifolium pratense*) - *Latticed Heath, Chalk Carpet, Belted Beauty, Mother Skipton, Shaded Broad Bar, Narrow-bordered 5-spot Burnet*
Red Valerian (*centranthus ruber*) - *Elephant Hawk*
Rock Rose (*helianthemum mummularium*) - *Amulet, Cistus Forester, Silky Wave, Ashworth's Rustic, Argus, Wood Tiger, Northern Brown*
Rosebay Willowherb - *Twin-spot Carpet, Small Phoenix, White Banded Carpet*
Small Scabious (*scabiosa columbaria*) - *Lime Speck Pug, Shaded Pug*
Soapwort (*saponaria officinalis*) - *Marbled Clover*
St John's Wort - *Treble Bar*
Sweet Rocket (*hesperis matronalis*)
Sweet Violet (*viola odorata*) - *Broad Bordered Yellow Underwing, Lesser Broad Bordered Yellow Underwing*
Tansy (*tanacetum vulgare*) - *Essex Emerald*
Thrift (*armeria maritima*) - *Amulet, Feathered Ranunculus, Thrift Clearwing, Black Banded*
Thyme - *Thyme Pug, Satyr Pug, Lace Border*
Toadflax (*linaria vulgaris*) - *Toadflax Pug, Marbled Clover*
Valerian (*valeriana officinalis*) - *Valerian Pug, Lesser Cream Wave*
Viper's Bugloss (*echium vulgare*)
White Campion (*silene latifolia alba*) - *Marbled Coronet, Marbled Clover, Sandy Carpet*
Wild Basil (*clinopodium vulgare*)
Wild Clematis (*clematis vitalba*) - *Lime Speck Pug, Hawthorn's Pug, Small Emerald, The Fern, Pretty Chalk Carpet, Least Carpet, Pug, Chalk Carpet, Small Waved Umber*
White Clover (*trifolium repens*) - *Cloudy Wing Skipper, Orange, Clouded Sulphur*
Wild Pansy (*viola tricolor*) - *Pluvia*

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Wild Strawberry (*fragaria vesca*) - *Amulet, Yellow Shell, Beautiful Carpet, Dark Marbled Carpet*
Wild Wallflower - *Flame Carpet*
Wormwood (*artemesia absinthium*) - *Wormwood Pug*
Yarrow (*achillea millefolium*) - *Essex Emerald, Lime Speck Pug, Straw Belle, Wormwood Pug, Ruby Tiger, Yarrow Pug, V Pug, Sussex Emerald, Grey Pug, Tawny Speckled Pug, Common Pug, Mullein Wave*
Yellow Flag Iris (*iris pseudacorus*) - *Belted Beauty, Water Ermine*
Barberry - *Scarce Tissue, Wheat*
Blackthorn/Sloe - *March, Common Emerald, Little Emerald, Mottled Pug, Feathered Thorn, Orange, Scalloped Hazel, Scalloped Oak, August Thorn, Brimstone, Early Thorn, Pale Brindled Beauty, Blue Bordered Carpet, Broken Barred Carpet, November, Pale November, Winter, Sloe Pug, Green Pug, Sharp Angled Peacock, The Magpie*
Broom - *Grass Emerald, The Streak, Broom-tip, Lead Belle, Spanish Carpet, Frosted Yellow*
Dog Rose - *V Pug, Little Thorn, Shoulder Stripe, Barred Yellow, Streamer*
Hawthorn - *March, Common Emerald, Little Emerald, November, Pale November, Winter, Mottled Pug, Pinion Spotted Pug, Common Pug, Grey Pug, Peppered, Brindled Beauty, Pale Brindled Beauty, Feathered Thorn, Scalloped Hazel, The Magpie, Scalloped Oak, Large Thorn, Early Thorn, Oak Tree Pug, Broken Barred Carpet*
Hazel - *Oak Beauty, Small White Wave, The Magpie, Clouded Border, Barred Umber, Winter, Pale November*
Oak - *Brindled Pug, Oak Tree Pug, Spring Usher, Peppered, Oak Beauty, Brindled Beauty, Pale Brindled Beauty, Small Brindled Beauty, Feathered Thorn, Orange, Lunar Thorn, Purple Thorn, Scalloped Hazel, Scalloped Oak, Scorched Wing, Large Thorn, August Thorn, November, September Thorn, Pale November, Winter, March, Blotched Emerald, Common Emerald, Little Emerald, False Mocha, Maiden's Blush, Marbled ug, Red-green Carpet, Broken Barred Carpet*
Rowan - *Orange Underwing, Welsh Wave, Mottled Pug, Red-green Carpet*
Wild Privet - *Lilac Beauty, Barred Toothed Striped, Yellow Barred Brindle, Small Bloodvein*

Appendix 3.4: Plants and habitats to attract bats

1.1.2 *Flower Borders and Lawns*

Larvae and adults of many insects will be catered for by introducing a wide range of food, in the form of nectar, seeds and fruit as well as vegetation.

- Grow night scented flowers. These attract moths and other night flying insects of particular importance to bats.
- Plant herbs and old fashioned cottage-garden annuals attractive to insects.
- Leave part of your lawn un-mown from about mid May to encourage insect larvae which feed on grass. Allow to seed before cutting, and rake up the hay afterwards.
- Sow wild flower seed collections in your borders.

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1.1.3 *Trees and Shrubs*

At woodland edges space and sunshine combine with the trees to give shelter and warmth, and insects will concentrate there. So even in the smallest garden try to have at least one tree or shrub. Native trees are more attractive to insects than foreign species.

If space is limited, silver birch and goat willow are quick growing and are host to many insect visitors. With a little more space, try to make a bank of vegetation to give your garden a woodland edge structure.

1.1.4 *Shelter Belts*

Rows of bushes or trees can be created or improved, encouraging concentrations of insects and providing a feeding area for bats,

- Plant up gaps in natural hedges,
- A row of fast-growing cypress can be valuable.
- Train climbers using battens against a wall or fence, to provide possible roosting sites.
- Create a sheltered corner by using any combination of walls, fences, hedges or woodland edge at two angles.

Scented herbs

Chives, Borage, Lemon balm, Marjoram, Mint - many varieties **Night scented flowers for the border** (in approximate order of flowering)

Bedding Plants

Nottingham catchfly	<i>Silene nutans</i>
Night-scented catchfly	<i>S. noctiflora</i>
Bladder campion	<i>S. vulgaris</i>
Night-scented stock	<i>Matthiola bicornis</i>
Sweet rocket	<i>Hesperis matronalis</i>
Evening primrose	<i>Oenothera biennis</i>
Tobacco plant	<i>Nicotiana affinis</i>
Cherry pie	<i>Heliotropium x hybridum</i>

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Soapwort

Saponaria officinalis

Climbers

European honeysuckle

Lonicera caprifolium

July-November

Italian honeysuckle

L. etrusca superba

July-August

Japanese honeysuckle

L. japonica halliana

August-October

Honeysuckle (native)

L. periclymenum...

July-August

White jasmine

Jasminium otiicinale

Dogrose

Rosa canina

Sweetbriar

R. rubiginosa

Fieldrose

R. arvensis

Ivy

Hedera helix

Bramble - many species

Large trees, small trees and shrubs

Oak

Quercus robur & Q. petrea

Ash

Fraxinus excelsior

Silver birch

Betula pendula

Field maple

Acer campestre

Hawthorn

Crataegus monogyna

Alder

Ainus glutinosa

Goat willow

Salix caprea

Guelder rose

Viburnum opulus

Hazel

Coryllus avellana

Blackthorn

Prunus spinosa

Elder

Sambucus nigra

Buddleia davidii

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Rock plants for walls

Ivy-leaved toadflax

Cymbana muralis

Wall pennywort

Umbilicus rupestris

Stonecrop

Sedum acre bertianum

Appendix 3.6: Plants to feed birds.

Many shrubs, climbers, trees, garden and 'wild' plants provide food, directly or indirectly, through berries, seeds or the insects they attract.

Berry or fruit bearing trees and shrubs will attract members of the Thrush family, Blackbird, Fieldfare, Mistle and song Thrush, Redwing and Robin. Also Starlings and, in some winters, Waxwing and even some Warblers, e.g., Blackcaps who eat berries in the early autumn before they migrate. Unless mentioned, the berries attract all the above birds plus others as specified.

Shrubs with berries.

- Aronia arbutifolia (Red Chokeberry) : bright red fruits
- Berberis: most forms have black/purple berries, especially loved by Blackbirds.
- Callicarpa 'Profusion': bright violet coloured berries.
- Cornus (Dogwood): blue tinted white berries (not C.Mas).
- Cotoneaster : prolific red, orange or yellow berries - birds often choose red first, through orange to yellow last. (Note berries are poisonous to humans).
- Euonymus europaeus (spindleberry: large bright red fruits which open to emit orange red seeds.(Note berries are poisonous to humans).
- Ilex (Holy): red, orange or yellow berries - red berries preferred (need partner to fruit).(Note berries are poisonous to humans).
- Mahonia: decorative black berries.
- Rosa rugosa : large red hips, particularly attractive to Greenfinches which pick out the seeds.
- Sambucus (Elder): red or black berries - over 32 species reported eating them, especially Blackcap and, occasionally, Collar Doves.
- Viburnum opulus (Guelder Rose) : translucent berries
- Viscum album (Mistletoe): familiar white globular berries of this parasite that grows in trees, especially apple, are a good food source for Blackbirds.

Climbers With Berries.

- Chaenomeles (Flowering Quince/Cydonia): Autumn Quinces.
- Hedera (Ivy) : shiny black berries
- Lonicera (Honeysuckle: red or black berries attract Thrushes plus Bullfinches and Marsh and Willow Tits. (Note berries are poisonous to humans).
- Pyracantha (Firethorn) :red, orange or yellow berries - choose red for the birds to eat before Christmas usually with orange or yellow to follow in a hard winter.

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- Clematis vitalba (Old Man's Beard): seed heads are enjoyed by many birds.

Trees with Berries or Fruits.

- Crataegus monogyna (Hawthorn : red berries.
- Malus (Crab Apple: red fruited varieties are best for birds.
- Prunus (Cherries): fruits quickly picked off.
- Sorbus aucuparia (Mountain Ash/Rowan) :red, orange or pink flushed white berries. The darker the fruits the more attractive they are to birds. Occasionally bring Spotted Flycatchers to the garden.
- Taxus (Yew): sparse red berries attract a wide range of birds. Attractive also to Badgers.(Note berries are poisonous to humans).

Trees with Seed Cones.

- Alnus glutinosa (Alder), and Betula (Birch): seeds from cones enjoyed by Goldfinches, Greenfinches, Redpolls, Siskins and Tits.
- Pinus sylvestris (Scots pine) : pine cones from which Crossbills and Great Spotted Woodpeckers prise seed.

Trees with Blossom.

- Although not always welcome, Bullfinches strip the buds of fruit trees in late winter and early spring.

Garden Plants.

- Crocus: yellow and orange flowers are attractive to Sparrows because they contain yellow pigment carotene to brighten up their plumage for the breeding season.
- Echinops ritro (Globe Thistle: seed heads are eaten by Goldfinches and flower heads attract insects.
- Helianthus (Sunflower: seed heads are eaten by Greenfinches. The nectar attracts a wide range of insects.
- Lavandula (Lavender): flowers going to seed are attractive to Goldfinches.
- Primula (Polyanthus/Primrose): yellow and orange flowers are attractive to Sparrows.

Wild Plants.

You can provide a haven for wild plants to exist in their own right recreating a wild meadow to attract insects which, in turn, attract birds and other wildlife. We sell nursery grown 'wild' plants throughout the year so that you can go wild in a corner of your garden.

- Betony.
- Bird's Foot Trefoil.
- Common Poppy - seeds are favourite food of Finches.
- Field Scabious.
- Greater Knapweed.

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- Meadow Cranesbill.
- Musk Mallow.
- Ox Eye Daisy.
- Oxlip.
- Primrose.
- Rough Hawkbit.
- Self Heal.
- Teasel - seed heads are a favourite food of Goldfinches.
- Wild Strawberry

The Lawn.

This is one of the principal sources of food for birds who enjoy feeding on insects including:-Ants eaten by Green Woodpeckers; Leatherjackets by Starlings; Snails by Song thrushes; Slugs by Toads and Worms by Blackbirds, Robins and Thrushes.

Cover and Protection.

By surrounding your garden by thick and often prickly hedging and dotting suitable shrubs around, you can provide safe nesting havens that are protected from marauding cats and even the unwelcome attention of unfriendly humans.

The most successful shrubs and trees for this purpose include:-

- Conifers especially chamaecyparis, Taxus (Yew) and Thuja Placata.
- Crataegus.
- Eleagnus.
- Hedera (Ivy) up a tree.
- Ligustrum (Privet) especially for Blackbirds.
- Lonicera (Honeysuckle).
- Pittosporum.
- Salix caprea (Weeping Kilmarnock Willow).
- Viburnum.

Appendix 3.7: Native Plants for Bees

Native plants should be your first choice to help our native bees. Listed below are some plants that are good sources of nectar or pollen for bees. Both the common and Latin names of the plant genus are given. This list is not exhaustive; there are many other plants good for bees. Individual species have not been included because we hope the list will be useful across the U.S. Not all of these genera will have species in your local area, but they do represent plants that will grow in a variety of environments. Use a wildflower guide or contact local nurseries to find your local species.

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- Aster *Aster*
- Black-eyed Susan *Rudbeckia*
- Caltrop *Kallstroemia*
- Creosote bush *Larrea*
- Currant *Ribes*
- Elder *Sambucus*
- Goldenrod *Solidago*
- Huckleberry *Vaccinium*
- Joe-pye weed *Eupatorium*
- Lupine *Lupinus*
- Oregon grape *Berberis*
- Penstemon *Penstemon*
- Purple coneflower *Echinacea*
- Rabbit-brush *Chrysothamnus*
- Rhododendron *Rhododendron*
- Sage *Salvia*
- Scorpion-weed *Phacelia*
- Snowberry *Symphoricarpos*
- Stonecrop *Sedum*
- Sunflower *Helianthus*
- Wild buckwheat *Eriogonum*
- Wild-lilac *Ceanothus*
- Willow *Salix*

Garden plants for bees

Flower beds in gardens, business campuses, and parks are great places to have bee-friendly plants. Native plants will create a beautiful garden but some people prefer "garden" plants. Many garden plants are varieties of native plants, so this list only includes plants from other countries--"exotic" plants--and should be used as a supplement to the native plant list. As with the native plants, this list is not exhaustive.

- Basil *Ocimum*
- Cotoneaster *Cotoneaster*
- English lavender *Lavandula*
- Giant hyssop *Agastache*
- Globe thistle *Echinops*
- Hyssop *Hyssopus*
- Marjoram *Origanum*
- Rosemary *Rosmarinus*
- Wallflower *Erysimum*
- Zinnia

Appendix 4: Lighting guidance

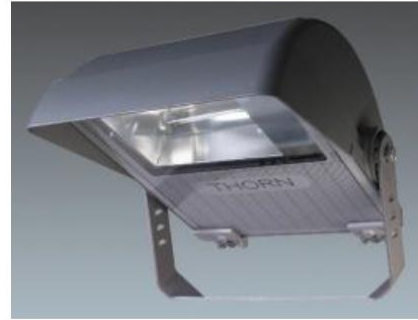
MITIGATION OF LIGHTING IMPACTS ON BATS

- **FORAGING AND COMMUTING** Type of lamp (light source) The impact on bats can be minimised by the use of low pressure sodium lamps or high pressure sodium instead of mercury or metal halide lamps where glass glazing is preferred due to its uv filtration characteristics.
- **Luminaire and light spill accessories** Lighting should be directed to where it is needed and light spillage avoided. This can be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvres and shields to direct the light to the intended area only. Planting can also be used as a barrier or manmade features that are required within the build can be positioned so as to form a barrier. **Suitable examples shown below:**

Double Asymmetric Luminaire



Simple Hood



- **Lighting column** The height of lighting columns in general should be as short as is possible as light at a low level reduces the ecological impact. However, there are cases where a taller column will enable light to be directed downwards at a more acute angle and thereby reduce horizontal spill. For pedestrian lighting this can take the form of low level lighting that is as directional as possible and below 3 lux at ground level. **Aim for lighting column of 5m or less, hooded and cowled to prevent light spill, for main lighting columns**
- **Light levels** The light should be as low as guidelines permit. If lighting is not needed, don't light. **Timing of lighting** The times during which the lighting is on should be limited to provide some dark periods. Roads or trackways in areas important for foraging bats should contain stretches left unlit to avoid isolation of bat colonies. These unlit stretches should be 10 metres in length either side of commuting route. **Direct lighting so that the hedgerow dark corridors to the northern edge and southern edge of the site remain unlit. So the lighting to be restricted to the main buildings and roadways in and out, and car parking areas only. Car parking areas angle lighting inwards.**
- **SECURITY LIGHTING Power** It is rarely necessary to use a lamp of greater than 2000 lumens (150 W) in security lights. The use of a higher power is not as effective for the intended function and will be more disturbing for bats.
- **Movement sensors** Many security lights are fitted with movement sensors which, if well installed and aimed, will reduce the amount of time a light is on each night. This is more easily achieved in a system where the light unit and the movement sensor are able to be separately aimed. **Timers** If the light is fitted with a timer this should be adjusted to the minimum to reduce the amount of 'lit time'.
- **Aim of light** The light should be aimed to illuminate only the immediate area required by using as sharp a downward angle as possible. This lit area must avoid being directed at, or close to, any bats' roost access points or flight paths from the roost. A shield or hood can be used to control or restrict the area to be lit. Avoid illuminating at a wider angle as this will be more disturbing for foraging and commuting bats as well as people and other wildlife.

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- Suitable types shown below (note that these are wall mounted and directed downwards)

Circular Louvre



Cowl & Louvre



Cowl (or Hood)



References: Bats and lighting BCT guidance and Guidance notes for the reduction of obtrusive lighting.