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Landscape and Ecology Management Plan and Biodiversity Enhancement

New Barn School, Broadbridge Heath, West Sussex

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Report Summary

1. The Ecology Co-operation was commissioned by Lytle Associates to provide a Landscape and Ecology Management Plan (LEMP) and Biodiversity Enhancement Strategy with regards to a proposed development at New Barn School, Broadbridge Heath. This document details site-wide mitigation for habitats and protected species as well as targeted enhancement measures. It also includes management objectives, responsibilities and maintenance schedules including remedial responsibilities, should they be necessary. It will be submitted to Horsham District Council in order to discharge condition 5. and 13. of the approved planning application DC/21/2350.

2. A Preliminary Ecological Appraisal of the site was undertaken in August 2020 by The Ecology Co-op. The following Phase 2 surveys indicated a moderate meta-population of great crested newts within the area, the site is used by common and widespread bat species for foraging and commuting and an absence of reptiles on site.

3. Section 3 of this report outlines pre-construction mitigation measures which will be covered under a great crested newt European Protected Species Licence (EPSL) and includes the instillation of semi-permanent amphibian fencing around the whole of the proposed construction zone, to include the working footprint of the site, additional landscaping areas, any material storage areas and areas to be tracked over by machines. Following the instillation, amphibian trapping visits will take place from as early as mid-March, with a target of at least 60 visits. Pitfall trapping for great crested newts will be undertaken between March and October with a minimum of 60 trapping nights completed. The GCN licence must be in place before any pre-construction mitigation takes place.

4. Section 4 of this report details mitigation measures during construction and the operational phase of the development, including the inclusion of a sensitive ecological lighting scheme and continual management of the site and amphibian fencing to ensure the site remains free of great crested newts.

5. Section 6 of this report outlines the proposed biodiversity enhancement features, there design and location in relation to the planning application. The biodiversity enhancement measures include the creation of hedgerows, ponds, an area of wildflower meadow and scrub. Section 7 outlines the short and long term management responsibilities and remedial actions should they be necessary.

6. Site staff must be briefed prior to the commencement of construction on the importance of contacting an ecologist in the event that any wildlife is identified within the construction zone.

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1 INTRODUCTION

1.1 Purpose of the Report

The Ecology Co-operation was commissioned by Lytle Associates to produce a LEMP and biodiversity enhancement plan for a proposed development of a school on land at New Barn School, Broadbridge Heath, West Sussex. This document details site-wide mitigation for habitats and protected species as well as targeted enhancement measures. It also includes the management objectives, responsibilities and maintenance schedules including remedial responsibilities, should they be necessary. It will be submitted to Horsham District Council with regards to condition 5. And 13. of the approved planning application DC/21/2350.

Condition 13. No part of the development hereby permitted shall be occupied until a Biodiversity Enhancement Strategy for protected and Priority species as been submitted to and approved in writing by the local planning authority. The content of the biodiversity Enhancement Strategy shall include the following: a) Purpose and conservation objectives for the proposed enhancement measures; b) detailed designs to achieve stated objectives; c) locations of proposed enhancements by appropriate maps and plans; d) persons responsible for implementing the enhancement measures; e) details of initial aftercare and long-term maintenance (where relevant). The works shall be implemented in accordance with the approved details prior to occupation and shall be retained in that manner thereafter.

The prescribed mitigation measures described within this document will be issued to relevant works contractors to ensure that they are carried out in full. Implementation of this will be overseen by a suitable ecological consultancy, and the works contractor will be given contact details for an ecologist so that any issues can be resolved promptly.

1.2 Background to the Proposed Development

The site is located at New Barn School located off the A281 Guildford Road, Broadbridge Heath, Horsham, West Sussex. The central grid reference for the site is TQ 1360 3215. The location of the site is shown in Figure 1.

The site is situated adjacent to Rapkyns Care Centre, found to the west of the site and under the same land ownership. The field north of New Barn School was designated as a wildlife area that was created to facilitate the construction of the care centre many years ago.

The proposed development/project includes a new building for the primary and secondary school. Two new outdoor play spaces, new artificial pitches, reconfiguration of parking and new parking areas, as well as new access (see Figure 2).



Figure 1. An aerial image showing the location of the application site. The approximate boundary of the proposed construction zone is outlined in red. Images produced courtesy of Google maps (Map data ©2023 Google).



Figure 2. Proposed plans for the development at New Barn School, Broadbridge Heath. Provided in January 2023 courtesy of Lytle Associates, Drawing No. 1960_021E.

1.3 Summary of Previous Survey Work

A Preliminary Ecological Appraisal (PEA) was completed by The Ecology Co-op in August 2020 which identified the potential for reptiles, great crested newts *Triturus cristatus* to be present on the site and an important area for foraging and commuting bats with the potential for roosts to be found in nearby trees. Further surveys were recommended for these species.

Suitable habitat was identified for [redacted] breeding birds and other notable species such as hedgehogs. Dormice were considered likely to be absent from the site. Mitigation and avoidance measures were recommended for these species.

Phase 2 surveys identified that reptiles are likely absent within the site based upon surveys between August and October 2020[1]. The wider area, containing several ponds, supports a medium sized meta-population of great crested newts. The site is used by bats for foraging/commuting for at least seven species: common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, serotine *Eptesicus serotinus*, noctule *Nyctalus noctula*, Nathusius' pipistrelle *Pipistrellus nathusii*, brown long-eared *Plecotus auritus* and an unknown species of *Myotis spp.* All species were recorded in low numbers with soprano pipistrelles recorded most frequently.

1.4 Management Plan Strategic Vision

The aims and objectives for the landscape and biodiversity elements of this development project are as follows:

- retain and protect valuable existing 'green assets' where possible, including hedgerows, broadleaved woodland, ponds and bramble scrub;
- creation of new green assets including: hedgerows with trees/without trees, scattered tree lines, street tree planting, wildflower/rough grassland areas, scrubs and pond creation/restoration;
- minimise impacts and ensure compliance with legislation on key species: bats (roosting, commuting and foraging), breeding birds, dormice, great crested newts, and reptiles;
- provide targeted and appropriate habitat enhancement features for bats, birds and amphibians.

2 LEGAL PROTECTION

Legal protection applying to relevant bird, mammal and herpetofauna species is detailed in Appendix 1 of this report. This includes both national and European legislation that protects [redacted] bats, dormice, reptiles, great crested newts and breeding birds.

[1] The Ecology Co-op (2021). Phase 2 Surveys. New Barn School, Broadbridge Heath.

3 PRE-CONSTRUCTION MITIGATION MEASURES

3.1 Bats

No trees are planned to be removed from the site as part of the works. In the event that this changes due to unforeseen circumstances, a bat licenced ecologist will need to undertake an inspection of each tree to ensure there are no roosting features prior to removal. If potential roosting features are identified, further surveys, in line with guidance by the Bat Conservation Trust[2], will be necessary to ensure no roosts are impacted. Heras fencing will be placed around the woodland on the western boundary to avoid any accidental damage to trees and their potential to support bat roosts. The fencing should be situated at least 5m from the canopy cover, where possible, to prevent any risk of blocking access to potential roosts.

3.2 Great Crested Newt

A European Protected Species Licence (EPSL) has been applied for and will cover all of the below measures. No works can be conducted until the great crested newt EPSL has been granted by Natural England.

3.2.1 Amphibian Fencing Installation

The whole of the proposed construction zone, to include the working footprint of the site, additional landscaping areas, any material storage areas and areas to be tracked over by machines, will need to be fenced with semi-permanent, amphibian and reptile- proof fencing. A semi-permanent polypropelene material that is tough and stabilised against ultraviolet light should be installed to a depth of not less than 20cm below ground and supported by stakes every 2 metres fixed with clout nails and washers (See figure 3). The bottom and top panels of the fence will be bent at right angles to prevent individual newts from going under or over the fence. The fencing should be backfilled with earth and tightly compacted to make sure that it acts as an impassable barrier. The advantage of the semi-permanent fence is that it is less susceptible to damage by dogs, deer, foxes and other animals as well as any accidental damage by construction staff and is suitable for developments where fencing may need to remain in-situ over a long period of time.

[2] https://cdn.bats.org.uk/uploads/pdf/Resources/Bat_Survey_Guidelines_2016_NON_PRINTABLE.pdf?v=1542281971.



Figure 3. An example of the semi-permanent fencing material that will be used.

The fencing would be required to make a continuous fence line to separate the construction site from all adjacent green habitats, where amphibians might migrate onto the site and would need to remain in-situ until all construction work deemed a risk to amphibians has been completed- i.e. earthworks and associated landscaping. This will prevent any animals from the surrounding areas migrating onto the site during works. The fencing would need to be tied off, where the new access route is to be located. Figure 4 shows the proposed route for the fence around the site at New Barn School, Broadbridge Heath. The blue line covers the construction zone and the purple line covers the location of the new pond to be created. There must be amphibian proof fencing between the pond creation area and the rest of the construction site at all times, although an access point can be cut into the fence when needed provided the fence is repaired afterwards.

The installation of the fencing would need to be overseen by an ecologist, with a hand search conducted of the fencing construction line ahead of the line being strimmed. A trencher or small excavator will then follow the strimmed line, digging the trench for the installation of the fence. The fence will be installed outside of the newt hibernation period (generally October to late February dependent of weather conditions) to minimise the risk of killing or injury of herptiles during the fence installation.

Construction method:

1. At least 24 hours prior to the fence installation, the fence route would be hand searched by a suitably qualified ecologist and strimmed (using brush- cutters where necessary) of vegetation to a height of no more than 5cm and a two metre width, with all cuttings raked off and removed. This will ensure that newts are discouraged from the fencing construction zone. The strimming process will be completed in two passes, with the grass cut to a height of 10- 15cm on the first pass, to reduce the risk of harming amphibians during the strimming process.
2. The fencing construction zone will not be allowed to grow taller than 5cm prior to construction

of the fence and materials will not be stored along the fencing route, which could otherwise attract amphibians to them as refugia.

3. The entire length of the fence must first be established by excavating a 20cm wide 20cm deep trench, overseen under watching brief by a suitably qualified ecologist. Excavated earth will be piled on the outside edge of the trench so that it is easily backfilled once the fence has been installed.
4. Excavation work for the fencing trench will be carried out by an excavator or trencher not larger than 1.5 tons in weight to minimize ground disturbance.
5. Fence stakes will be positioned every 2 metres and will be sunk into the ground to a depth of at least 30cm to ensure they are secure.
6. The fencing material (which is supplied in 100kg rolls) will be rolled out along the outside edges of the trench and will be lifted into place when each full roll has been unravelled or cut into manageable sections.
7. The fencing sheet will be attached to the stakes using 2 clout nails and plastic washers at the top and 15cm from the bottom of each stake.
8. Once fixed the excavated earth will be backfilled along the trench and trodden in to ensure that it is lightly compacted to prevent animals from digging into it.
9. After establishment, fence checks would be undertaken every week to look for any signs of damage. Once construction has commenced, the fence checks and maintenance will become the responsibility of the works contractor.
10. Site staff must be briefed prior to the commencement of construction on the importance of protecting the amphibian fencing and contacting an ecologist in the event that any amphibians or other wildlife is identified within the construction zone.

In order to prevent amphibians from migrating around the entrances to the site, the fence will have ‘cut backs’ on each of its ends (See figure 5). This is where the fence loops back on itself, so that any animals travelling along the edge of the fence are guided away from the site entrance. In addition to this the grassy cover around the edge of the fencing will be monitored regularly to ensure that the grass is kept short and unsuitable for amphibians and reptiles to deter them away naturally where necessary.

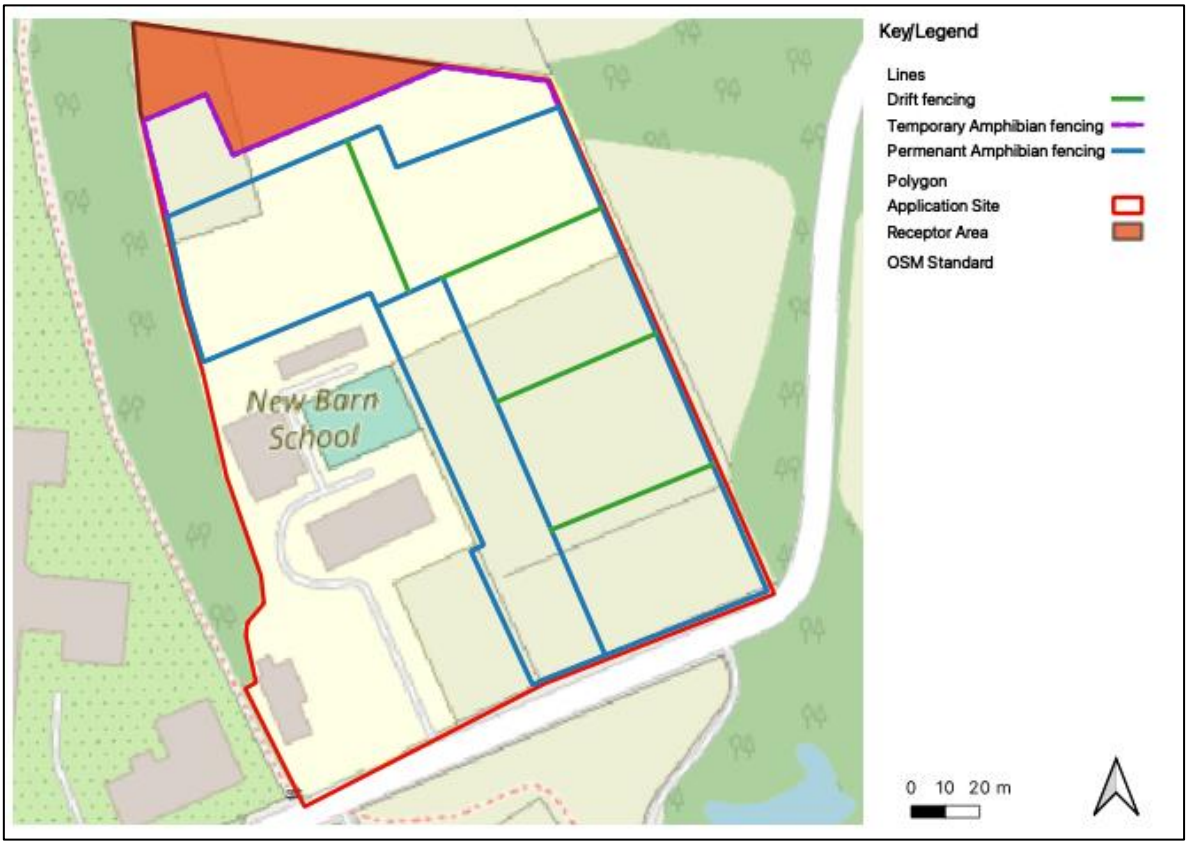

Figure 4. The proposed fencing route of permanent fencing at land at New Barn School, Broadbridge Heath, to enclose a large proportion of the construction and landscaping zone of the site is shown in blue. The site boundary is shown in red. The amphibian receptor area is shown in orange. The purple outlined area indicates where temporary fencing will be installed to be used temporarily as workspace and to create the wildlife pond. The green lines highlight the proposed locations for drift fencing (this may need to be adjusted to allow continual use of the existing school buildings.

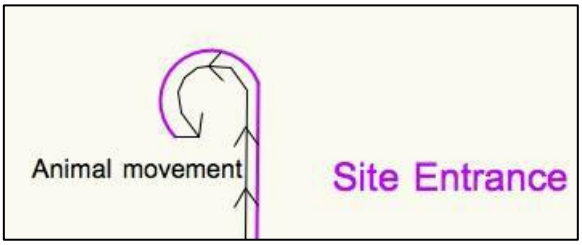

Figure 5. Cutbacks' used to guide animals away from the site entrance.

3.2.2 Amphibian Translocation Strategy

Pitfall trapping will need to be undertaken between February and October. The English Nature 'Great Crested Newt Mitigation guidelines' recommend a minimum of 60 trapping nights for a medium population of great crested newts. These trapping nights must be undertaken under suitable weather conditions, when the night air temperature is more than 5 degrees Celsius and the ground is not too dry (i.e. that there has been recent rainfall or dew). The trapping process would need to incorporate a combination of drift fencing and pitfall traps and mats at a density of at least 100 traps per hectare. Drift fencing would need to include at least five fences that crossed the site, with pitfall traps and carpet matting sheets positioned up against the fencing to increase capture success. An illustrative suggestion

of this is shown below (extract from the great crested newt mitigation guidelines). These would need to remain in place until all trapping had been completed.

The installation of the pitfall traps will be overseen by an experienced ecologist to ensure that they are positioned correctly and include suitable cover inside the bucket trap and an escape route for small mammals. In addition, a hole must be drilled in the bottom of the bucket to allow water to drain and a float so that any non-target animals falling into the trap can seek refuge in the event excessive rainfall causes water to accumulate. Pitfall traps would be spaced apart by between 5 and 10 metres to ensure suitable trapping density.

All pitfall traps must be checked daily before 11am as a condition of the European Protected Species license. Any newts found will be safely moved to the designated receptor area as outlined in Figure 4 and in Section 3.2.3.

3.2.3 In situ Amphibian Receptor Area

The land in the north section of the red line boundary will be enhanced and converted into a wildlife area specifically for great crested newts (Orange and purple outlines Figure 4). This newly created area will sit directly adjacent (south) of the original designated wildlife area that was created to facilitate the care centre to the west.

At current it is an area of neutral grassland that is generally left un-managed. This area will be enhanced for great crested newts through creation of an area of species rich rough grassland, scrub planting, hedgerow planting, creation of 1 new pond and restoration of Pond 8_1 and the inclusion of 6 hibernacula (detailed in Section 6). This area will provide high value terrestrial habitat that provides good connectivity to the surrounding ponds where presence has been identified including the existing wildlife area found further north of the application site.

Two of the six amphibian hibernacula must be built close to the rejuvenated Pond 8 prior to trapping starting so that the area is in a position to receive great crested newts. The remaining elements can be done alongside the trapping efforts as long as precautionary mitigation measures are followed detailed below in section 6.

3.3 Other Protected/Notable Species

[redacted]

Breeding Birds

Any scrub, trees or hedgerows to be cleared must be removed outside of the nesting bird season (1st March to 31st August) unless features are first hand search by a suitably qualified ecologist. Where a nest is discovered, work would need to cease in this area (Minimum. 5m radius) until all young have fledged.

Dormice

It is recommended that reasonable avoidance measures are used, all suitable habitat for dormice including bramble scrub and the woodland outside the site boundaries will be retained and protected.

Reptiles

While the results of the surveys indicate reptiles are likely absent from the site, there is suitable habitat within the area and reptiles can quickly colonise a site. As the area will already be fenced for amphibian trapping, it is likely that should the odd individual reptile be present it will be found under one of the carpet tiles being put out as part of the trapping effort. Any reptiles caught will be relocated into the newly created wildlife area as detailed in 3.2.3.

Other Notable Species

It is recommended that reasonable avoidance measures are used, all suitable habitat for hedgehogs including the scrub, hedgerows and log piles are retained where possible and protected by heras fencing prior to work commencement. If suitable habitat has to be removed an ecologist should inspect the area and complete a hand search, where considered necessary.

3.4 Existing Trees and Vegetation

Mature and veteran trees shall be managed in accordance with the guidance published by Natural England entitled 'Veteran Trees: A Guide to Good Management (IN13)'. For details refer to Appendix C and F. The Tree Protection Plan should be read in conjunction with Appendix 2 of the Arboriculture Assessment and Method Statement by Ian Keen Limited.

All operations shall be carefully carried out to avoid damage to the trees. No trees to be retained shall be used for anchorage or winching purposes.

All retained trees should be checked annually for signs of deterioration or distress and the appropriate actions taken, where a potential safety hazard is identified. Unless required to remove or avoid an immediate risk of serious harm, all tree works shall be carried out outside normal bird breeding season (i.e. not between the beginning of March and end of August) and all trees where works are required are to be inspected visually for bird nests prior to any works being undertaken.

Prior to any pruning or felling works of larger trees (typically with a diameter at chest height in excess of 300mm), the tree should be assessed for its potential to support roosting bats. If any ivy which has a stem diameter of over 50mm needs to be removed from the tree, they should be checked for bats. This can be completed under a precautionary method statement for bat as advised by an ecologist. Any features such as rot holes, split limbs or loose bark, which could support roosting bats, should be inspected by an Ian Keen Limited, in the first instance, with subsequent assessment and survey by a suitably experienced ecologist if required, with appropriate licenses obtained should this be necessary.

Heavy Ivy infestation is not recommended in development situations, where wind risk may be a concern. The form of the tree can also be affected and it is therefore proposed to remove any dense infestation of Ivy if evident on site or during the maintenance period.

When a tree has been felled (because it has died, is diseased or has become unsafe) it should be replaced with the same species, or an appropriate alternative species, where relevant. Normally the tree should be planted in the immediate vicinity of the felled tree. If the tree was felled because it was dangerous by virtue of its location, a replacement should be planted at an acceptable location nearby. This clause does not apply if a tree has been removed/died for the benefit of others (e.g. woodland management).

4 CONSTRUCTION PHASE MITIGATION MEASURES

4.1 Bats

Bright external lighting can have a detrimental impact upon foraging and commuting bat flight paths, but more importantly can also cause bats to remain in their roosts for longer. Guidelines issued by the Bat Conservation Trust must be considered while designing the lighting scheme (see Appendix 2). This includes the following measures:

- no 'upward pointing' or bare bulb lights will be installed anywhere on the development. The lighting scheme will be designed to minimize light spill onto any established or created semi-natural habitats;
- all street lighting lamp-posts will be limited to 3.5m in height and will have shields installed to focus light towards footpaths and roads only (see Figure 6 for example). No lamps will be allowed to emit light past horizontal (90 degrees from the ground). No external lights will be installed on new buildings above a height of 2m and all external lights will have shields to direct light to prevent light spill;
- 'dark corridors' must be established around the site boundary and retained hedgerow and trees through the development site as shown in Figure 7 below. This means that no street light columns shall be positioned within or adjacent to the no-light zones and all artificial lighting should be screened to direct light away from these areas;
- lighting on pedestrian routes will be kept to a minimum required to maintain safety and security. Where possible, reflective white line-painting will be used as an alternative to lights, and where lighting cannot be avoided, these should be mounted on 1m high pillars and directed down towards the path to minimize light spill;
- the frequency spectrum of light sources should be selected that has reduced attraction to insects.



Figure 6. An example of suitable downward shielded street lighting column.



Figure 7. Locations of 'dark corridors'(outlined in red) through the proposed development where no artificial light will be shone towards those areas.

4.2 Great Crested Newts

Once the trapping effort has been completed and the construction area is deemed to be likely absent of great crested newts, the grass will need to be turf stripped and this must be done under the supervision of a licenced ecologist, in case the odd individual newt is found hiding underground.

4.3 Habitat/Site Management

The habitat on site will need to be continually managed during the construction phase, with the aim to maintain a short sward length across the site to avoid colonisation of reptiles or amphibians after translocation. This is until the area has been turf stripped at which point the area will be completely unsuitable for amphibians.

Amphibian fencing will need to be checked every week whilst there is still grassland within the construction zone and post strong winds to ensure the fencing remains intact and there are no gaps in which amphibians or reptiles may re-enter the site.

Heras fencing will need to be put up to prevent any access into the proposed receptor area found immediately north of the site.

5 OPERATION PHASE MITIGATION MEASURES

5.1 Bats

Bright external lighting can have a detrimental impact upon foraging and commuting bat flight paths, but more importantly can also cause bats to remain in their roosts for longer. Guidelines issued by the Bat Conservation Trust must be considered while designing the lighting scheme (see Appendix 2). This includes the following measures outlined in Section 4.1.

'Dark corridors' must be established around the site boundary and retained hedgerow and trees through the development site as shown in Figure 8 below. This means that no street light columns shall be positioned within or adjacent to the no-light zones and all artificial lighting should be screened to direct light away from these areas;

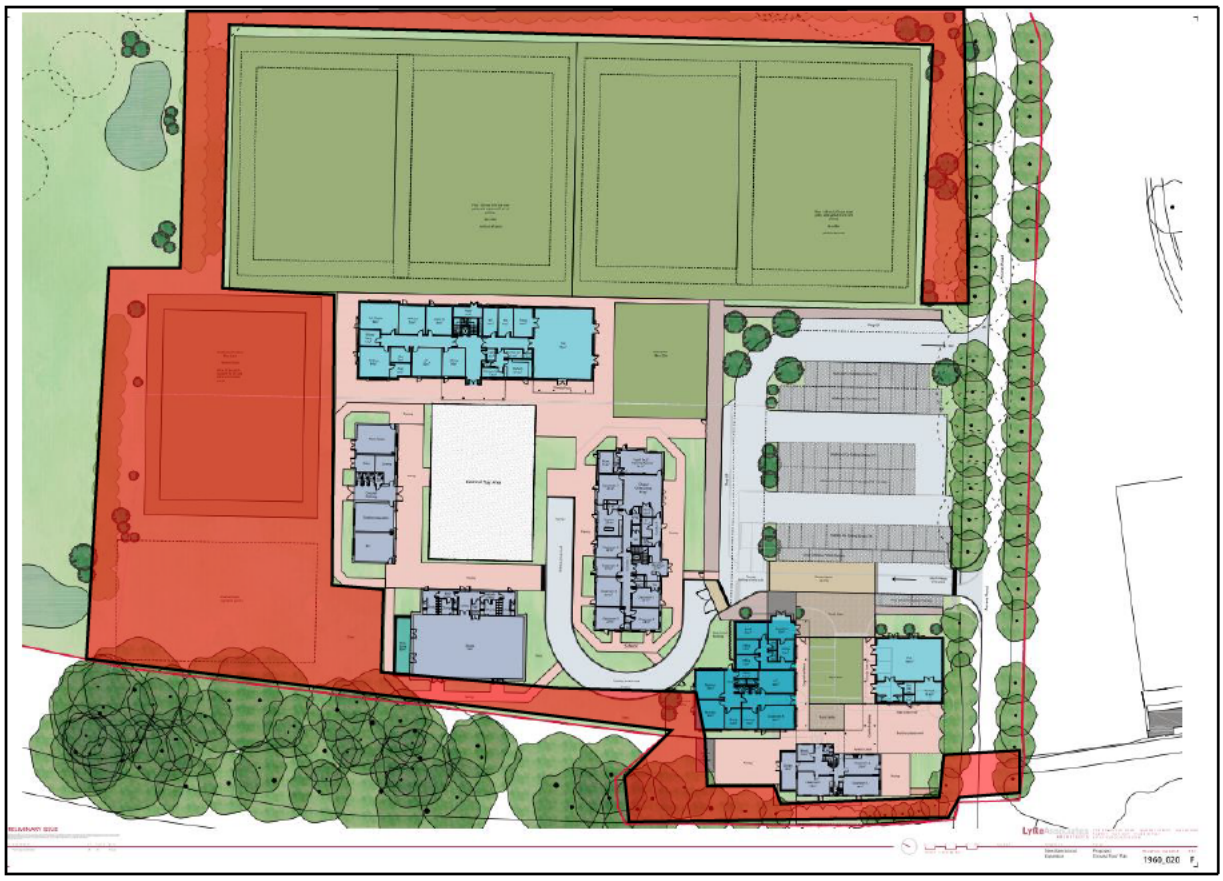

Figure 8. Locations of 'dark corridors'(outlined in red) through the proposed development where no artificial light will be used.

6 BIODIVERSITY MITIGATION/ENHANCEMENT MEASURES

The biodiversity enhancements to be made at the site include: the creation of hedgerows, wildflower meadow/rough grassland, scrub, a pond and tree planting. The development will look to enhance; existing hedgerows and a pond. The area will include bird and bat boxes and 6 hibernacula. The area is shown in Figure 9.

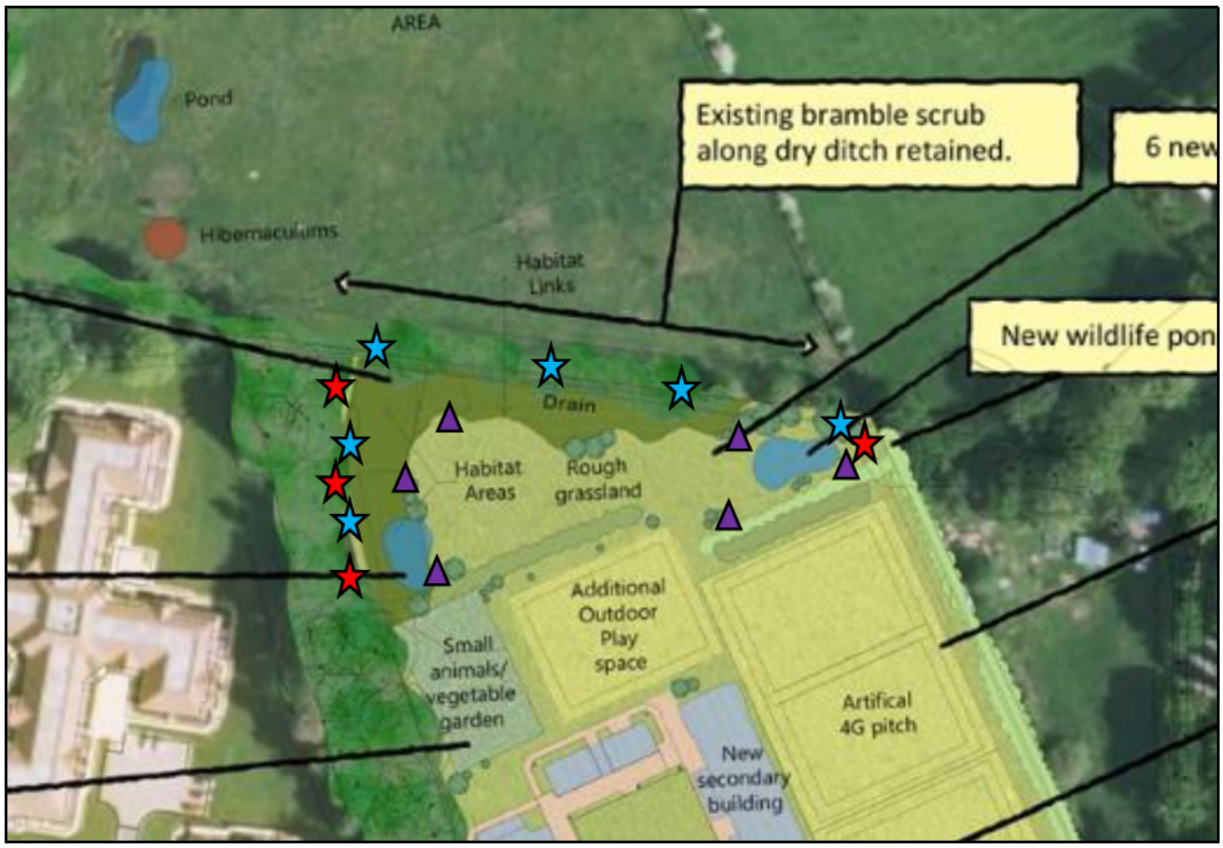

Figure 9. Habitat enhancement map of New Barn School, Broadbridge Heath. The ponds are indicated in blue, the one on the left is for restoration and pond on the right is to be created. Light green – Wildflower meadow/rough grassland, Dark Green – Scrub. Red star – recommended location of bat box; Blue star – recommended location of bird box; Purple triangle – Location of hibernacula.

6.1 Wildflower Meadow Creation

An area of species rich grassland/wildflower will be created within the land due to be enhanced. This will measure approximately a total area of 0.3ha and will remain undeveloped (see Figure 9). This will increase the suitability for great crested newts and benefit bats, birds, reptiles, other amphibians and pollinating insects. To establish this as a wildflower area, a process of light rotavating and seeding should be employed with good ground preparation essential to the success of the wildflower meadow. The sowing process is best undertaken between late August and the end of September during mild and wet weather best suited to seeding or during mid-March to mid-May when the ground has sufficient moisture and there is very little risk of frosts. The rotavating process is to create an area of largely bare ground to allow the wildflower seed mix to establish. Immediately following rotavating, a suitable seed mixture containing not less than 20 wildflower and grass species should be sown across the ground at a density of four grams per square metre. The species included must all be of native British origin. A recommended seed mixture is EM4 – Meadow mixture for clay soils, which is available from Emorsgate seeds. Table 1 details the composition of this mixture.

As part of on-going management, the sward should be cut and gathered to a height of approximately 5cm at least three times in its first year of establishment to control the flush of annual weeds which will grow during the first growing season. Thereafter the sward should be cut (with all cuttings removed and composted) between mid-August and late September every year. Cutting in the spring (March/April) should be included if the sward grows too vigorously.

To ensure that reptiles or amphibians are not harmed during the rotavating process needed to establish the wildflower meadow habitat manipulation techniques must be used as detailed within 3.2 prior to this process. Cutting the grass sward very short prior to rotavating the ground will also help to prepare a more suitable growing base. It is recommended that this rotavation work is done between March and May alongside the trapping period and when adult newts will be spending the majority of their time in ponds as it will be the breeding season for this species.

Table 1. Composition of Em4 – Meadow mixture for clay soils in the new wildlife area of the site.

Wildflowers		
%	**Latin name**	**Common name**
0.5	*Achillea millefolium*	Yarrow
1	*Betonica officinalis - (Stachys officinalis)*	Betony
3	*Centaurea nigra*	Common Knapweed
1.5	*Galium verum*	Lady's Bedstraw
1	*Leucanthemum vulgare*	Oxeye Daisy
0.5	*Lotus corniculatus*	Birdsfoot Trefoil
2.6	*Plantago lanceolata*	Ribwort Plantain
0.3	*Primula veris*	Cowslip
2	*Prunella vulgaris*	Selfheal
3	*Ranunculus acris*	Meadow Buttercup
1.5	*Rhinanthus minor*	Yellow Rattle
1.5	*Rumex acetosa*	Common Sorrel
0.1	*Silene flos-cuculi - (Lychnis flos-cuculi)*	Ragged Robin
0.1	*Trifolium pratense*	Wild Red Clover
1.4	*Vicia cracca*	Tufted Vetch
Grasses		
10	*Agrostis capillaris*	Common Bent
2	*Alopecurus pratensis*	Meadow Foxtail (w)
1	*Anthoxanthum odoratum*	Sweet Vernal-grass (w)
1	*Briza media*	Quaking Grass (w)
36	*Cynosurus cristatus*	Crested Dogstail
24	*Festuca rubra*	Slender-creeping Red-fescue
2	*Hordeum secalinum*	Meadow Barley (w)
4	*Phleum bertolonii*	Smaller Cat's-tail

6.2 Scrub Planting

An area of native scrub will be created within the land due to be enhanced. This will measure approximately a total area of 0.2ha and will remain undeveloped (see Figure 9). This will provide suitable refuge and foraging habitat for great crested newts as well as benefits for bats and birds. The creation of scrub should include native species only and the recommended planting density is 1 shrub per 1 metre squared. A minimum of 5 species should be chosen from the recommended list below:

- hawthorn *Crataegus monogyna*
- blackthorn *Prunus spinosa*
- dog rose *Rosa canina*
- wild cherry *Prunus avium*
- hazel *Corylus avellana*
- field maple *Acer campestre*
- dogwood *Cornus sanguinea*
- elder *Sambucus nigra*

All shrubs would need to be planted as bare root stock between late November and late February to avoid the need for watering, stress on the roosts and an increased risk of failure.

6.3 Pond Creation/Restoration

6.3.1 Pond Creation

A new pond will be created within the receptor site for amphibians. It will be designed to offer new breeding habitat for amphibians, as well as invertebrates, and will help to preserve and enhance the local great crested newt population. This pond should be approximately 200m^2 in area and due to the lie of the land, it has been advised that the pond should be positioned in the northeast corner of the retained green space (see Figure 9).

The pond should be designed to have an irregular shape and ledges to provide a variety of depths increasing its value for wildlife. To allow for planting and to increase the wildlife value the pond should have a natural earth bottom which can be achieved by either using a buried pond liner, or by incorporating Bentonite clay into the pond bed where necessary. Furthermore, it should be designed to retain at least 20cm of water throughout the year (thus ensuring successful breeding by a number of species), though some drying of the pond can potentially have benefits for biodiversity. It is important that fish are not introduced to the pond as these predate upon great crested newts, particularly at their larval stage.

As the area where the new pond will be located will be within the fenced line to be trapped, it will free of great crested newts at the end of the trapping period. An ecologist must be present for the turf strip to ensure no individual newts are harmed during the creation of the pond. Finally, the process must be undertaken during the active season (April to September) for reptiles and amphibians.

Plants should be introduced to the pond and must include a combination of marginal aquatic plants and oxygenating plants. This should include the following:

1. 10 bunches of hornwort *Ceratophyllum derersum*, 10 bunches of curled pondweed *Potamogeton crispus* and 10 bunches of water crowfoot to act as oxygenating plants as well as for egg laying.
2. 20 watermint plugs *Mentha aquatica*, 20 water forget-me-not *Myosotis palustris* bareroot plugs, 20 purple loosestrife *Lythrum salicaria* and 20 yellow loosestrife *Lysimachia vulgaris* for marginal planting that can be used for egg laying and cover.
3. 10 bunches of yellow fringe water lilly *Nymphoides peltata* planted in baskets to provide areas

of shelter for maturing newt efts.

The plants listed above are available in early autumn and spring, dependent upon species, and should be planted as soon as possible following the creation of this pond.

6.3.2 Pond Restoration

Pond 8 (TQ 13501 32256) will be restored as part of the development (see Figure 9); at current, the pond is full of leaf litter and lacked water during the entire survey season. Pond rejuvenation will be done by removing specific trees growing in the pond and in the immediate surrounding area to allow light in. Any remaining water will be drained and silt/detritus removed so that the original contours of the pond are exposed as best as possible. Pond 8 will then be re-dug / re-shaped and lined with bentonite clay or lining where necessary. The pond will be planted up with vegetation (as above) beneficial to breeding great crested newts.

6.4 Creation And Enhancement of Hedgerows

A new species-rich native hedgerow is to be planted along the northern boundary between the proposed development and enhancement area and along the entire eastern boundary from the southern tip of the south field to the northeast tip of the north field creating a wildlife corridor between two high value habitats for newts and providing increased foraging and commuting habitat for bats plus nesting areas for birds.

These new species-rich hedgerows must use only native species from UK stock and include at least 50% blackthorn (*Prunus spinosa*) so that it is consistent with the surrounding landscape and traditional hedge planting schemes. The remaining 50% should be made up of at least five of the following species: hawthorn (*Crategous monogyna*), spindle (*Euonymus europaeus*), dogwood (*Cornus sanguinea*), Wayfaring-tree (*Viburnum lantana*), field or dog rose (*Rosa arvensis/ Rosa canina*), guelder rose (*Viburnum opulus*), field maple (*Acer campestre*), wild privet (*Ligustrum vulgare*) and hazel (*Corylus avellana*). It is also recommended that native honeysuckle (*Lonicera periclymenum*) is introduced along these lengths.

6.5 Tree and Shrub Planting

A minimum of 33 trees will be planted within the development around the proposed new car park and buildings (as set out in the Landscape plan provided and illustrated in Figure 2). The landscaping plan will incorporate a variety of trees with most species to be UK natives sourced from UK stock. This will create greater habitat for a variety of birds and invertebrates. Given the arrival of ash dieback, it is not recommended that ash *Fraxinus excelsior* saplings are planted anywhere on the site. Tree species to be planted within the site are:

- silver birch *Betula pendula*
- beech *Fagus sylvatica*
- pendunculate oak *Quercus robur*
- wild service tree *Sorbus torminalis*
- field maple *Acer campestre*

- alder *Alnus glutinosa*
- crab apple *Malus sylvestris*
- wild cherry
- common whitebeam *Sorbus aria*
- rowan *Sorbus aucuparia*

All trees will be planted with tree guards.

6.6 Hibernacula Creation

The area immediately north of the construction site, which will remain undeveloped, is to be used as the receptor area. As part of the translocation strategy at least three hibernacula will be created at the western end close to the pond being rejuvenated to increase the carrying capacity for great crested newts. These should be created prior to translocation. A further three hibernacula will be created at the eastern end of the area close to the newly created pond to provide compensation/enhancement (See Figure 9).

Hibernacula should be built using logs and branches, piled on top of each other, with grass cuttings, earth and turf laid over the top to provide insulation (See Figure 10. Illustration on how to build a reptile hibernaculum. Image taken from the 'Reptile Habitat Management Guidelines' by Herefordshire Amphibian and Reptile Team and the Herefordshire Nature Trust.). This hibernaculum would also provide benefits for other species including solitary bees, wasps and other insects. The proposed locations for these will be set within the new enhancement area.

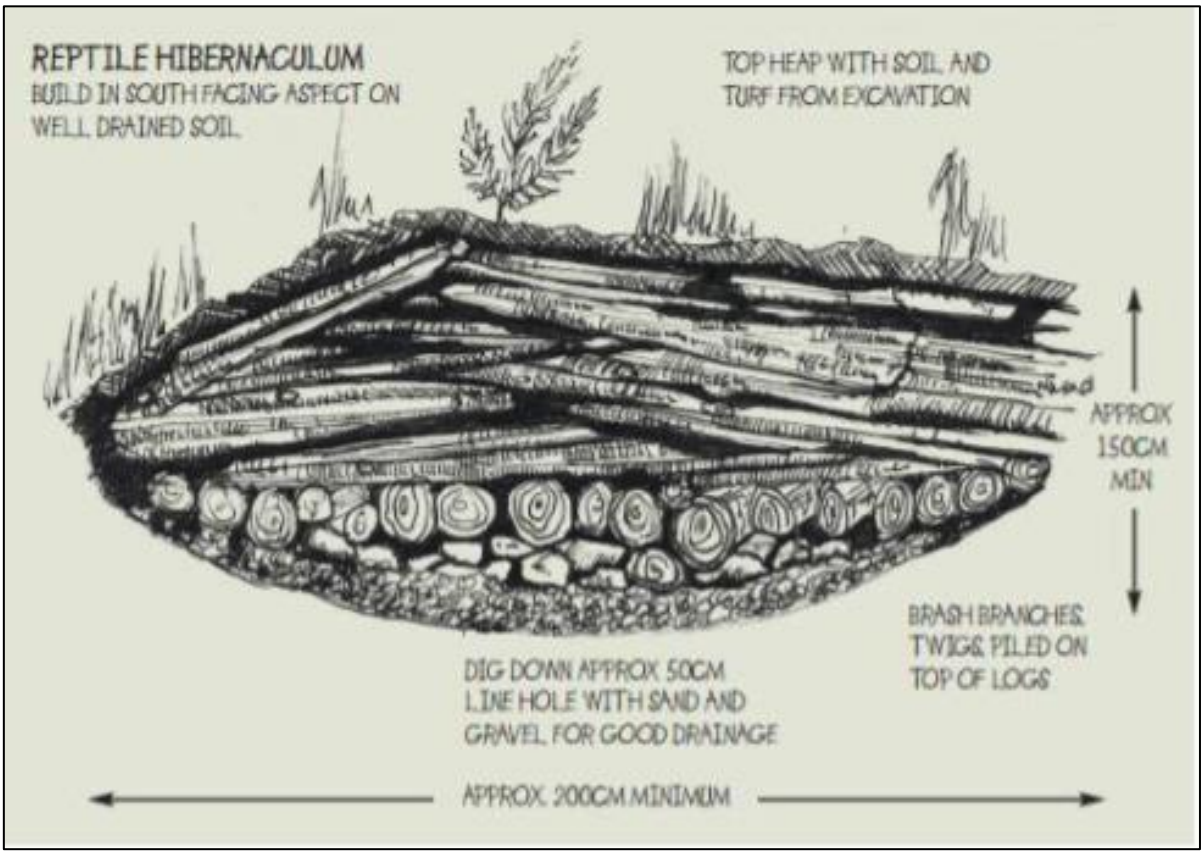

Figure 10. Illustration on how to build a reptile hibernaculum. Image taken from the 'Reptile Habitat Management

Guidelines' by Herefordshire Amphibian and Reptile Team and the Herefordshire Nature Trust.

6.7 Enhancements for Bats

As a measure to enhance roosting opportunities for bats, a minimum of four Schwegler woodcrete bat boxes (two 2F and two 2FN Schwegler bat boxes, or similar: see Figure 11) will be hung on suitable mature trees upon the northern boundary of the site, adjacent to the area of land left undisturbed by the development. The recommended locations have been outlined in Figure 9. The boxes will need to be hung by a suitably qualified ecologist to ensure that this positioning is most suitable, but generally locations above 3.5 metres in the most south-easterly facing aspect of a tree is best.



Figure 11. Recommended bat boxes. Left – 2F Schwegler Bat Box; Right – 2FN Schwegler Bat Box.

6.8 Enhancements for Nesting Birds

In order to enhance the site for nesting birds a minimum of 6 nesting boxes will be put up across the site (recommended boxes are shown in Figure 12). The boxes will look to support a variety of species and should be attached to mature trees at least 3 metres high along the northern boundary. The recommended locations have been outlined in Figure 9.



Figure 12. Recommended bird boxes. Left – Vivara Pro Seville 32mm WoodStone Nest Box; Middle – Vivara Pro Barcelona WoodStone Open Nest Box. Right – Schwegler 1b Nest Box.

7 POST CONSTRUCTION MANAGEMENT PLAN

The management procedures described below form a 5 year management plan that will continue to be adhered to in perpetuity. It is the responsibility of Treehouse Educare Limited to ensure that the management procedures are undertaken post construction.

7.1 Wildflower Meadow Management

Optimal Habitat

Areas with good species diversity across the site including both grassland and wildflowers. The wildflower habitat must support a variety of flowering plant species to provide colour, texture and ecological value.

Management

As part of on-going management, the wildflower habitat should be cut and gathered once each year to a height of approximately 40–60mm after flowering in August. This process can be carried out through strimming or using a light weight machine. This is important to ensure that species diversity of the area is maintained, and grass species do not become dominant. Where necessary, a second cut could be taken in March each year if the sward is growing too coarsely. The grassland should not be cut between the 1st of April and mid-August so that plants are given the opportunity to flower. A yearly check for invasive species and appropriate removal of any invasive species identified.

When cutting the wildflower area in the northern section this should be undertaken during autumn (September – October) when amphibians and reptiles remain active and prior to the sward becoming to wet. It is also important that the grassland habitat is mown to a height of 10cm and that machinery does not track over any of the receptor areas to avoid soil compaction.

Once the wildflower habitat establishes, it will require little management.

7.2 Scrub Management

Optimal Habitat

A variety of healthy, semi-mature shrub species with a diverse age range and surrounded by variety of other habitats.

Yearly Management

The scrub area should be annually checked for signs of disease and success of establishment. If disease is identified advice should be sought from an arboriculturist regarding the appropriate treatment method. To avoid scrub maturing to woodland it should be maintained through a cutting regime. The area of scrub should be divided into three sections, with each section cut every 5 years, in order to maintain variation in shrub maturity. Where possible shrubs shouldn't be cut until February, so that valuable winter food associated with fruiting shrubs/trees is retained for over-wintering birds. Further detail on scrub management can be found in a guidance document from the Natural England[3].

7.3 Pond Management

Optimal Habitat

Variation in water height across the pond and throughout the year but importantly with water during the breeding season for great crested newts (March-August). Native aquatic emergent and sub-merged plants around the pond but don't dominate the entire surface of the pond.

Yearly Management

The ponds should be checked annually to ensure water levels remain and where aquatic vegetation dominates the pond above 80% it should be cleared back to 20%. Any work should be done in the autumn or winter between September and February.

7.4 Retained and Created Hedgerows

Optimal Habitat

A variety of healthy, semi-mature and mature hedgerows, some with trees across the development site.

Yearly Management

Hedgerows should annually be checked for signs of disease and more frequently while new ones are establishing. If disease is identified advice should be sought from an arboriculturalist regarding the appropriate method of treatment.

Trees and shrubs should be allowed to grow unhindered where possible. However, it may be necessary to trim back trees and shrubs in some circumstances, such as where there is a risk to health and safety, or for maintenance of the ecological feature. Cutting of shrubs and trees must only be timed outside the bird nesting season (avoiding 1st March to 31st August). Where possible they shouldn't be cut until February, so that valuable winter food associated with fruiting shrubs/trees is retained for over-wintering birds.

[3] Natural England, 2011. *The Scrub Management Handbook*. Available at: http://publications.naturalengland.org.uk/publication/72031.

7.5 Tree And Shrub Planting

Optimal Habitat

A varied structure, permeated by flowering shrubs that include a variety of colours and attract a variety of pollenating invertebrates.

Yearly Management

Trees should annually be checked for signs of disease and more frequently while new ones are establishing. If disease is identified advice should be sought from an arboriculturist regarding the appropriate method of treatment.

Trees and shrubs should be allowed to grow unhindered where possible. However, it may be necessary to trim back trees and shrubs in some circumstances, such as where there is a risk to health and safety, or for maintenance of the ecological feature. Cutting of shrubs and trees must only be timed outside the bird nesting season (avoiding 1st March to 31st August). Where possible they shouldn't be cut until February, so that valuable winter food associated with fruiting shrubs/trees is retained for over-wintering birds.

7.6 Hibernacula And Bird/Bat Boxes

Management

The hibernacula should be maintained in perpetuity, and regularly checked for damage within the first 5-years the development is in operation. If they are found to be damaged or removed, they will need to be replaced immediately.

The bat boxes will largely be maintenance-free, apart from an annual check that they remain in position. Any damaged boxes are to be replaced like for like. Bird nesting boxes should be emptied of nesting material in winter to prevent the build-up of parasites. Bat boxes should only be maintained by a suitably qualified/licensed ecologist, as they may support roosting bats.



8 WORK SCHEDULE

Table 2 below provides the timetable to aid correct timing of the 'green asset' management at the site across the year and table 3 details the timings of the works under a five year plan. The plan will be reviewed after five years to develop an ongoing plan for the future of the site to protect the habitats created.

Table 2. Work schedule across a year for New Barn School.

Action for green assets	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
Check trees for signs of any disease							X	X	X			
Cutting of hedgerows, trees and scrub		X										
Cutting and gathering of wildflower habitat during the first year					X	X	X	X	X	X		
Cutting and gathering of wildflower habitat on a yearly basis								X				
Keeping tree saplings well-watered	X	X	X	X	X	X	X	X	X	X	X	X
Inspection of tree guards and fences	X	X	X	X	X	X	X	X	X	X	X	X
Replacement planting of failed trees or shrubs	X	X	X								X	X
Receptor site monitoring surveys (after one and three years) using eDNA			X	X	X	X						
Inspection of bat boxes, bird boxes and hibernacula									X	X	X	
Clearance of old bird nests from bird boxes										X	X	
Inspection of ponds				X	X	X	X	X				
Management/work to pond (if required)	X	X							X	X	X	X



Table 3. The schedule of works under a five year management plan for New Barn School

Habitat / Feature	Action	Timing	Year				
			2025	2026	2027	2028	2029
Created scrub / new hedgerows	Check trees for signs of any disease	July – September inclusive	X		X		X
	Keeping tree saplings well watered	All year round for first five years. Once established this can stop.	X	X	X	X	X
	Inspecion of tree guards	All year round for first five years. Once established this can stop.	X	X	X	X	X
	Replacement of failed trees or shrubs	Nov to March	X	X	X	X	X
Created scub / retained hedgerows / new hedgerows / new trees	Cutting back to prevent encroachment – to be completed every five years	Winter – Ideally February					X
Wildflower / rough grassland	Cut and gather in first year, at least three times	Between May and Oct	X				
	Cut and gather for remaining years	August in hot weather	X	X	X	X	X
New and rejuvenated ponds	Monitor presence of great crested newts using e-DNA to stop after the first five years if presence is confirmed	Mid-april to end of June	X	X	X	X	X
	Inspection of ponds for excess macrophyte cover, invasive and/or non-native species, holding water	April to August	X	X	X	X	X
	Management/ work to ponds (if required)	September to Feb	X	X	X	X	X
Bat boxes	Inspection for damage / fallen down	Sept – Nov	X		X		X
Bird boxes	Clearance of old nest material	Oct and Nov	X	X	X	X	X

9 MONITORING AND REVIEW

Monitoring of the retained and new biodiversity assets should be undertaken to determine the success or failure of each compartment and if necessary, change management actions. Furthermore, if any invasive species are identified within any of the compartments suitable control methods would be outlined in detail.

10 COMPETENCIES, STANDARD AND SPECIFICATIONS OF WORKS

The following competencies/standards/specifications should be adhered to:

- All tree works are to be undertaken by a suitably qualified arboriculturalist.
- The installation of bat boxes is to be undertaken or overseen by a suitably qualified ecologist.
- A site inspection of all green assets post-construction should only be undertaken by a suitably qualified ecologist.
- An ecologist should be consulted prior to any management/works undertaken within the ponds.

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

APPENDIX 1 – Wildlife Legislation and National Planning Policy

Introduction

The following text is intended for general guidance only and does not constitute comprehensive professional legal advice. It provides a summary of the current legal protection afforded to wildlife in general and certain species. It includes current national planning policy relevant to nature conservation.

The 'Birds Directive', 'Habitats Directive' and 'Natura 2000 Sites'

The Council Directive 79/409/EEC on the Conservation of Wild Birds ("the Birds Directive") sets a framework for the protection of wild birds. Under the Directive, several provisions are made including the designation and protection of 'Special Protection Areas' (SPAs) – areas which support important bird populations, and the legal protection of rare or vulnerable species.

The Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the "Habitats Directive") directs member states of the EU to take measures to maintain the favourable conservation status of important habitats and species. This requires the designation of a series of sites which contain important populations of species listed on Annex II of the Directive (for example Bechstein's bat *Myotis bechsteinii*, Barbastelle bat *Barbastella barbastellus* and white-clawed crayfish *Austropotamobius pallipes*. Together with 'Special Areas of Conservation' (SACs), SPAs form a network across Europe of protected areas known as the 'Natura 2000 sites'.

Annex IV lists species in need of more strict protection, these are known as "European Protected Species (EPS)". All bat species, common dormice *Muscardinus avellana*, otter *Lutra lutra* and great crested newts *Triturus cristatus* are examples of EPS that are regularly encountered during development projects.

The 'Habitats Regulations'

The Conservation of Habitats and Species Regulations 2017, as amended (the "Habitats Regulations") is the principle means of transposing the Habitats Directive and the Birds Directive, and updates the Conservation (Natural Habitats, &c.) Regulations 1994 ("the 1994 regulations") in England and Wales.

'Natura 2000' sites, now known as National Site Network sites under the Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019, receive the highest level of protection under this regulation which requires that any activity within the zone of influence of these sites would be subject to a Habitats Regulations Assessment (HRA) by the competent authority (e.g. planning authority), leading to an Appropriate Assessment (AA) in cases where 'likely significant effects' to the conservation objectives are identified.

For European Protected Species, Regulation 41 makes it a criminal offence to:

- deliberately capture, injure or kill any such animal;
- deliberately disturb wild animals of such species;
- deliberately take or destroy their eggs (where relevant);
- damage or destroy a *breeding or resting place* of such an animal;
- possess, control, sell or exchange any live or dead animal or plant, of such species;
- deliberately pick, collect, cut, uproot or destroy a wild plant of such species.

The Habitats Directive and Habitats Regulations provide for the derogation from these prohibitions for specific reasons provided certain conditions are met. An EPS licensing regime allows operations that would otherwise be unlawful acts to be carried out lawfully. Natural England is the licensing Authority and, in order to grant a license, ensures that three statutory conditions (sometimes referred to as the 'three derogation tests') are met:

- a licence can be granted for the purposes of "preserving public health or safety or for other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment" (Regulation 53 (2) (e);
- a licence can be granted if "there are no satisfactory alternatives" to the proposed action;
- a licence shall not be granted unless the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

Wildlife and Countryside Act (1981) as amended

This remains one of the most important pieces of wildlife legislation in the UK. There are various schedules to the Act protecting birds (Schedule 1), other animals including insects (Schedule 5), plants (Schedule 8), and control of invasive non-native species (Schedule 9).

Under the Wildlife and Countryside Act (WCA) 1981, all wild birds (with the exception of those listed on Schedule 2), their eggs and nests are protected by law and it is an offence to:

- take, damage or destroy the nest of any wild bird while it is in use or being built
- take or destroy the egg of any wild bird
- disturb any bird listed on Schedule 1, while it is nest building, or at a nest with eggs or young, or disturb the dependant young of any such bird.

Schedule 5 lists all non-avian animals receiving protection to a varied degree. At its strongest, the Act makes it an offence to intentionally kill, injure or take any wild animal listed on Schedule 5, and prohibits interference with places used for shelter or protection, or intentionally disturb animals while occupying such places. Examples of species with *full protection* include all EPS, common reptile species, water vole *Arvicola amphibius*, white-clawed crayfish *Austropotamobius pallipes* and Roman snail *Helix pomatia*. Other species are protected from sale, barter or exchange only, such as white letter hairstreak *Satyrium w-album*.

The Act makes it an offence to intentionally pick, uproot or destroy any plant or seed, and sell or possess any plant listed on Schedule 8. It is also an offence to intentionally uproot any wild plant not listed on Schedule 8 unless authorised [by the land owner]. Species on Schedules 5 and 8 are reviewed every 5 years when species can be added or removed.

Measures for the prevention of spreading non-native species which may be detrimental to native wildlife is included in the Act, which prohibits the release of animals or planting of plants into the wild of species listed on Schedule 9 (for example Japanese knotweed *Fallopia japonica*, Himalayan balsam *Impatiens glandifera*, New Zealand Pygmyweed *Crassula helmsii*).

The Wildlife and Countryside Act 1981 (as amended) also prohibits certain inhumane methods of traps and devices for the capture or killing of wild animals and certain additional methods such as fixed trap, poisoning with gas or smoke, or spot-lighting with vehicles for killing species listed on Schedule 6 of the Act (this includes all bat species, [redacted] otter, polecat, dormice, hedgehog and red squirrel).

Natural Environment and Rural Communities (NERC) Act (2006)

The NERC Act (2006) created the statutory nature conservation body Natural England, and places a statutory duty on all public bodies, including planning authorities, under Section 40, to take, or promote the taking by others, steps to further the conservation of *habitats and species of principal importance for the conservation of biodiversity* in England (commonly referred to as the 'Biodiversity Duty'). This duty extends to all public bodies the biodiversity duty of Section 74 of the Countryside and Rights of Way (CROW) Act 2000, which placed a duty only on Government and Ministers. Section 41 of the NERC Act lists the habitats and species of principle importance. This includes a wide range of species from mosses, vascular plants, invertebrates through to mammals and birds. It originates from the priority species listed under the UK Biodiversity Action Plan (UK BAP) with some omissions and additions.

Environment Act (2021)

The Environment Act sets a target of halting the decline in species through the inclusion of a legally binding 2030 species abundance target. Aiming to restore natural habitats and enhance biodiversity, the Act requires new developments to improve or create habitats for nature (through mechanisms such as mandatory Biodiversity Net Gain), and tackle deforestation. Going forwards, UK businesses will need to look closely at their supply chains as amongst other measures they will be prohibited from using commodities associated with wide-scale deforestation. Woodland protection measures are also strengthened through the Act.

The Act enables the reform of the Habitats Regulations and further improves protection for nature through the establishment of Local Nature Recovery Strategies that support national Nature Recovery Networks. In addition, the Act provides for the production of Protected Site Strategies and Species Conservation Strategies, aimed at supporting the design and delivery of strategic approaches to deliver better outcomes for nature.

[redacted]

National Planning Policy Framework

The National Planning Policy Framework (NPPF 2021)[4] sets out the Government's view on how planners

[4] HM Government (2021). National Planning Policy Framework. Department for Communities and Local Government. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

should balance nature conservation with development and helps ensure that Government meets its biodiversity commitments with regard to the operation of the planning system.

Paragraph 179b, which states that council policies should "*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*." The Office of the Deputy Prime Minister (ODPM) Circular 06/2005, 2005) [5]. In accordance with the NPPF, it is important that developments should contribute to and enhance the natural and local environment by:

- minimising impacts on existing biodiversity and habitats;
- providing net gains in biodiversity and habitats, wherever possible;
- establishing coherent ecological networks that are more resilient to current and future pressures.

UK Post-2010 Biodiversity Framework

The UK Biodiversity Action Plan (UK BAP), first published in 1994, was the UK's response to the commitments of the Rio Convention on Biological Diversity (1992) until 2010, when the UK BAP was replaced by the UK Post-2010 Biodiversity Framework. This framework covers the period 2011 to 2020 and forms the UK government's response to the new strategic plan of the United Nations Convention on Biodiversity (CBD) published in 2010. This promotes a focus on individual countries delivering target for protection for biodiversity through their own strategies.

The most recent biodiversity strategy for England, 'Biodiversity 2020: A strategy for England's wildlife and ecosystem services' was published by Defra (2011), and a progress update was provided in July 2013 (Defra 2013).

'Biodiversity 2020' builds on the Natural Environment White Paper for England – 'The Natural Choice', published on 7 June 2011, and sets out the strategic direction for biodiversity policy for the next decade.

Biodiversity 2020 deliberately avoids setting specific targets and actions for local areas and species because the Government believes that local people and organisations are best placed to decide how to implement the strategy in the most appropriate way for their local area or situation.

Birds of Conservation Concern (BoCC)

In 1996, the UK's leading non-governmental bird conservation organisations listed the conservation status of all bird species in the UK against a series of criteria relating to their population size, trends and relative importance to global conservation. The lists, known as the 'Red', 'Amber' and 'Green' lists (in order of decreasing concern) are used to inform key conservation policy and decisions. The lists are reviewed every five years and are a useful reference for determining the current importance of a particular site for birds. The most recent review was undertaken in 2021 (Stanbury et al, 2021), which provides an up to date assessment of the conservation status of birds in the UK.

References

[redacted]

[5] HM Government (2005) ODPM Circular 06/05 Government Circular: *Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System*. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/7692/147570.pdf.

Circular 06/2005 (2005). Government Circular: Biodiversity and geological conservation – statutory obligations and their impact within the planning system. Office of the Deputy Prime Minister, London. Available at:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7692/147570.pdf

Council Directive 79/409/EEC on the Conservation of Wild Birds ("the Birds Directive"). Available at: http://jncc.defra.gov.uk/page-1373

Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (the "Habitats Directive"). Available at: http://jncc.defra.gov.uk/page-1374

The Conservation of Habitats and Species Regulations 2017 (the Habitats Regulations"). Available at: http://jncc.defra.gov.uk/page-1379

The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019. Available at: https://www.legislation.gov.uk/ukdsi/2019/9780111176573

Countryside and Rights of Way (CRoW) Act (2000). HMSO London. Available at: http://www.legislation.gov.uk/ukpga/2000/37/contents

Defra (2011) Biodiversity 2020: A strategy for England's wildlife and ecosystem services. Available at: www.gov.uk/government/publications/biodiversity-2020-a-strategy-for-england-s-wildlife-and-ecosystem-services.

Defra (2013) Progress Update. Available at: www.gov.uk/government/publications/biodiversity-2020-simple-guide-and-progress-update-july-2013.

Stanbury, A., Eaton, M., Aebischer, N., Balmer, N., Douse, A., Lindley, P., McCulloch, N., Noble, D., and Win I. (2021). Birds of Conservation Concern 5: the status of bird populations: the fifth Birds of Conservation Concern in the United Kingdom, Channel Islands and Isle of Man. British Birds 114, pp 723-747.

Natural Environment and Rural Communities (NERC) Act (2006). HMSO London. Available at: http://www.legislation.gov.uk/ukpga/2006/16/pdfs/ukpga_20060016_en.pdf

National Planning Policy Framework (NPPF) (2021) Ministry of Housing Communities & Local Government. Available at:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

Wildlife and Countryside Act (WCA) (1981). HMSO London. Available at: http://www.legislation.gov.uk/ukpga/1981/69/contents

APPENDIX 2 - Reducing Impacts of Artificial Light

Bright external lighting can have a detrimental impact upon foraging and commuting bat flight paths, but more importantly can also cause bats to remain in their roosts for longer. Artificial lighting can also cause significant impacts to other nocturnal species, most notably moths and other nocturnal insects. It can also result in disruption of the circadian rhythms of birds, reducing their fitness.

Guidelines issued by the Bat Conservation Trust[6] should be referred to when designing the lighting scheme. Note that lighting designs in very sensitive areas should be created with consultation from an ecologist and using up-to-date bat activity data where possible. The guidance contains techniques that can be used on all sites, whether a small domestic project or larger mixed-use, commercial or infrastructure development. This includes the following measures:

Avoid lighting key habitats and features altogether

There is no legal duty requiring any place to be lit. British Standards and other policy documents allow for deviation from their own guidance where there are significant ecological/environmental reasons for doing so. It is acknowledged that in certain situations lighting is critical in maintaining safety, such as some industrial sites with 24-hour operation; however, in the public realm, while lighting can increase the perception of safety and security, measurable benefits can be subjective. Consequently, lighting design should be flexible and be able to fully consider the presence of protected species.

Apply mitigation methods to reduce lighting to agreed limits in other sensitive locations – lighting design considerations

Where bat habitats and features are considered to be of lower importance or sensitivity to illumination, the need to provide lighting may outweigh the needs of bats. Consequently, a balance between a reduced lighting level appropriate to the ecological importance of each feature and species, and the lighting objectives for that area will need to be achieved. The following are techniques which have been successfully used on projects and are often used in combination for best results:

- dark buffers, illuminance limits and zonation;
- sensitive site configuration, whereby the location, orientation and height of newly built structures and hard standing can have a considerable impact on light spill;
- consideration of the design of the light and fittings, whereby the spread of light is minimised ensuring that only the task area is lit. Flat cut-off lanterns or accessories should be used to shield or direct light to where it is required. Consideration should be given to the height of lighting columns. It should be noted that a lower mounting height is not always better. A lower mounting height can create more light-spill or require more columns. Column height should be carefully considered to balance task and mitigation measures. Consider no lighting solutions where possible such as white lining, good signage, and LED cats eyes. For example, light only high-risk stretches of roads, such as crossings and junctions, allowing headlights to provide any necessary illumination at other times;
- screening, whereby light spill can be successfully screened through soft landscaping and the installation of walls, fences and bunding;
- glazing treatments, whereby glazing should be restricted or redesigned wherever the ecologist

[6] Bat Conservation Trust and Institute for Lighting Professionals (2018) Guidance note 8. Bats and Artificial Lighting. https://www.theilp.org.uk/documents/guidance-note-8-bats-and-artificial-lighting/

and lighting professional determine there is a likely significant effect upon key bat habitat and features;

- creation of alternative valuable bat habitat on site, whereby additional or alternative bat flightpaths, commuting habitat or foraging habitat could result in appropriate compensation for any such habitat being lost to the development;
- dimming and part-night lighting. Depending on the pattern of bat activity across the key features identified on site it may be appropriate for an element of on-site lighting to be controlled either diurnally, seasonally or according to human activity. A control management system can be used to dim (typically to 25% or less) or turn off groups of lights when not in use.

Demonstrate compliance with illuminance limits and buffers

- *Design and pre-planning phase*; it may be necessary to demonstrate that the proposed lighting will comply with any agreed light-limitation or screening measures set as a result of your ecologist's recommendations and evaluation. This is especially likely to be requested if planning permission is required.
- *Baseline and post-completion light monitoring surveys*; baseline, pre-development lighting surveys may be useful where existing on or off-site lighting is suspected to be acting on key habitats and features and so may prevent the agreed or modelled illuminance limits being achieved.
- *Post-construction/operational phase compliance-checking;* as a condition of planning, post-completion lighting surveys by a suitably qualified person should be undertaken and a report produced for the local planning authority to confirm compliance. Any form of non-compliance must be clearly reported, and remedial measures outlined. Ongoing monitoring may be necessary, especially for systems with automated lighting/dimming or physical screening solutions.

Lighting Fixture Specifications

The Bat Conservation Trust recommends the following specifications for lighting on developments to prevent disturbance:

- Lighting spectra: peak wavelength >550nm
- Colour temperature: <2700K (warm)
- Reduction in light intensity
- Minimal UV emitted
- Upward light ratio of 0% and good optical control

Further reading:

Buglife (2011) A review of the impact of artificial light on invertebrates.

Royal Commission on Environmental Pollution (2009) Artificial light in the environment. HMSO, London. Available at: https://www.gov.uk/government/publications/artificial-light-in-the-environment

Rich, C., Longcore, T., Eds. (2005) Ecological Consequences of Artificial Night Lighting. Island Press. ISBN 9781559631297.

CPRE (2014) Shedding Light: A survey of local authority approaches to lighting in England. Available

at: http://www.cpre.org.uk/resources/countryside/dark-skies/item/3608-shedding-light

Planning Practice Guidance guidance (2014) When is light pollution relevant to planning? Available at: https://www.gov.uk/guidance/light-pollution

Institution of Lighting Professionals (2021) Guidance Notes for the Reduction of Obtrusive Light GN01:2011. Available at: https://www.theilp.org.uk/resources/free-resources/

Voigt, C.C., Azam, C., Dekker, J., Ferguson, J., Fritze, M., Gazaryan, S., Hölker, F., Jones, G., Leader, N., Lewanzik, D. and Limpens, H., 2018. *Guidelines for consideration of bats in lighting projects*. Unep/Eurobats. Available at: https://cdn.bats.org.uk/uploads/pdf/Resources/EUROBATSguidelines8_lightpollution.pdf?v=1542109376