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Dear Gemma,

Re: Advice Note for Pond Creation and Management Recommendations on land at Home Farm, Lymington

A site visit was carried out by Carmen Green ACIEEM of Arcadian Ecology and Consulting Ltd on the 21st January 2022. The aims of the visit were to conduct an assessment of the species and habitats present on land at Home Farm in Lymington, Hampshire, in relation to proposals to create a new pond. This document provides recommendations to create a new pond and enhance the surrounding areas for wildlife long-term.

The site comprises a field of improved grassland with a line of black poplar *Populus nigra* trees and a stream to the south. It is on a slope and is damper at the southern end with a noticeably different species composition. The grassland has previously been grazed by horses and the sward is dominated by Yorkshire-fog *Holcus lanatus* with smaller amounts of creeping bent *Agrostis stolonifera*. There are few herbs within the grassland with the exception of some patches of creeping buttercup *Ranunculus repens* and low levels of bedstraw *Galium* species as well as ruderals including docks *Rumex* species and nettle *Urtica dioica*. Where the grassland becomes wetter, there is a greater abundance of hemlock water-dropwort *Oenanthe crocata* and soft rush *Juncus effusus* and a small patch of brooklime *Veronica beccabunga* and reed canary grass *Phalaris arundinacea* towards the stream. Along the western edge of the field by the fence line, there is a strip of tall ruderal vegetation including docks, creeping thistle *Cirsium arvense* and nettle.

The habitat types on site are common and widespread in the national and local context, and as such, are considered to be of low ecological value at the local level. However, the habitats present are suitable for a range of wildlife including amphibians, birds, foraging bats, reptiles, invertebrates and small mammals. Proposals to create a pond would significantly increase the ecological value of the site, providing additional habitats for wildlife that offer additional foraging, breeding and sheltering resources for a range of species including amphibians and aquatic invertebrates. A number of measures are suggested to create and manage these habitats to maintain existing species on site while encouraging more wildlife.

Pond Creation

It is proposed that a pond approximately 27 x 30m in size will be created at the southern end of the field and will be designed and maintained with wildlife in mind, providing suitable habitat for a range of aquatic invertebrates and amphibians. The proposed location of the pond would be suitable given the fact that it is at the bottom of a sloping field that is naturally wet all year round and retains water, due to runoff of rainwater across the fields towards the stream to the south of the site. There is a visible flow of water down the fields towards the area where the pond is proposed (Photograph 1).



Photograph 1. Flow of water down the grassland towards the bottom of the field.

It is expected that the pond will be partially in the shade due to the presence of a line of tall trees to the south of the site. However, there should be no more than 60% shade to the pond. Ponds that are too shady create a cooler environment as little sunlight is able to reach the water and therefore warm the pond. Allowing sunlight to reach the pond will encourage the growth and colonisation of aquatic plants that will help oxygenate the water.

It is advisable to line the pond for water retention and then put a layer of children's play sand or washed gravel to provide a substrate for plants and burrowing invertebrates. There are a number of options for lining the pond including having no liner (this would depend on the existing soils, and it is recommended that small holes are dug initially to test whether it can hold water), to having natural or synthetic liners. A natural liner would be recommended to create a more natural, wildlife friendly pond, however, a suitable option should be chosen based on the site conditions and would likely require experienced professionals and/or machinery to install. Further information on the advantages and disadvantages of each type of liner can be found here: https://freshwaterhabitats.org.uk/wp-content/uploads/2013/09/FHT-advice-on-pond-liners_Oct14.pdf.

Ponds do not need to be deep to attract wildlife; those with gently sloping sides and a depth of around 30cm are suitable for a range of invertebrates and amphibians and will also keep the pond well oxygenated and lit. However, it is good to have at least one deeper area as this will prevent it from freezing over in winter. The depths within the pond should be varied, ranging from shallow areas (0-10cm deep) to deeper water (>30cm deeper), as shown in Figure 1.

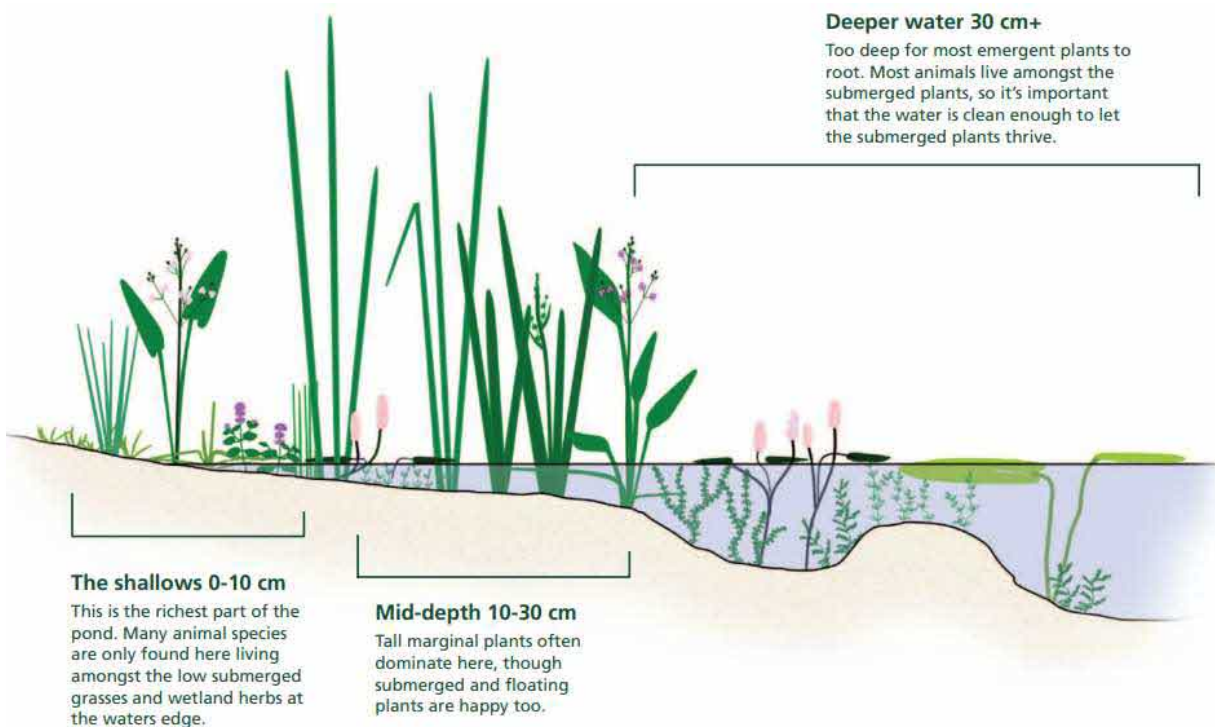


Figure 1. Different areas of the pond for wildlife. Taken from 'Million Ponds Project: Pond Design' Freshwater Habitats Trust, 2021.

It is expected that the pond would naturally be colonised by native aquatic vegetation. However, to supplement the natural colonisation of aquatic plants, there should be planting of a mix of native aquatic vegetation, of local provenance, around the pond. This should include a mixture of bankside vegetation, marginal plants, tall emergents, floating and submerged plants. This would provide well-connected foraging, sheltering and egg-laying opportunities for a number of aquatic invertebrate species and amphibians within the pond. A list of suitable plants to encourage wildlife to the new pond can be found in Appendix 1.

Having a mix of plants occupying different areas and depths in the pond will provide structural diversity to the pond and a greater variety of habitats that can be used by wildlife (Figure 1). Floating vegetation provides suitable places for amphibians and invertebrates to rest on while tall emergent vegetation offers opportunities for dragonflies and damselflies to perch on. Planting will not only create foraging and sheltering habitats for a range of wildlife but will also assist in maintaining water and oxygen levels in the pond as well as providing shade. Carrying out planting at the edges will provide cover for wildlife moving to and from the pond. This should include a mix of native wildflower species and shrub such as elder *Sambucus nigra*, guelder-rose *Viburnum opulus*, heather *Calluna* species, meadowsweet *Filipendula ulmaria*, purple loosestrife *Lythrum salicaria* and teasel *Dipsacus fullonum*.

Wetland plants can spread rapidly; it is recommended that planting densities of 2-5 plants per square metre should give good cover within a year and will allow plants to naturally spread and colonise. Ideally, there should be about 25% cover of dense vegetation with some areas of open water and no more than about 60% shade. Planting can be carried out any time. However, spring is the optimum time for planting.

A small reed bed area could be created around the edge of the pond. These habitats act as natural sponges, soaking up rainwater and filtering out harmful pollutants. Reed beds can easily be established on most soil types and where there is reliable natural water supply. It can be created through the planting of common reed *Phragmites australis* seedlings of local provenance. The planting of reed is most successful when the water level is 5cm above the surface level. Bear in mind that reeds can rapidly colonise areas so it is not necessary to plant up the whole reed bed. While the reeds are establishing, the vegetation in the area should be monitored to ensure other species do not outcompete the reed and become dominant. Fencing may be necessary to prevent animals from feeding on it while it is young and establishing

Where possible, plants should be native, locally sourced species, for example sourcing from local garden ponds (with landowner permission). Using locally sourced species reduces the risk of introducing disease or non-native species to the pond which can negatively impact wildlife.

In addition, a shallow pebble edge could be created at the edge of the pond. This would provide a shallow area enabling wildlife to easily get in and out of the pond, offer an easy means of access for birds as well as insects such as bees to drink from the pond, and provide a safe means of escape if animals fall in. The rocks and pebbles could also provide additional crevices for invertebrates to shelter in. Figure 2 gives an idea of roughly where plants and rocks could be positioned around the pond and proportions of plants to open water.



Figure 2. Example of suitable vegetation cover and structure of an established garden pond. Taken from 'How to Build a Garden Pond' BBC Wildlife Magazine, 2020.

Pond Management

There should be regular maintenance of the aquatic vegetation including removing any dead plants or excessive weeds/vegetation growth to allow a mix of species to flourish without any becoming dominant. Dead heading can be carried out to promote the production of flowers. All cuttings should be removed from the pond and could be added to a nearby compost heap.

It is recommended that cutting and removing areas of reeds is carried out on a 4 to 7-year rotation to prevent the build-up of nutrients and dead plant material or the drying up of the area. All cuttings should be removed and can be added to a compost heap.

There is a line of tall trees to the south of the site and therefore there is the potential for the build-up of leaf litter within the pond. Any excessive leaf litter can be removed using a handheld net when necessary. When doing so, check the net for any animals that may have been collected. Leaves to be added to a nearby compost heap. Any animals missed can then escape and move back to the pond.

Other Habitats for Wildlife

Wildflower meadow creation

It is proposed that some areas of the surrounding fields will be developed into a flower-rich meadow habitat that provides shelter and a food resource for a range of invertebrates and other wildlife. These can be planted using selected plug plants, a wildflower seed mix (for example using Emorsgate seed mix EM1 General Purpose Meadow Mixture - <https://wildseed.co.uk/mixtures/category/meadow-and-grassland>) or by using wildflower turfs (<https://www.wildflowerturf.co.uk/>). Native wildflower species that could be planted within the meadow include common bird's-foot trefoil *Lotus corniculatus*, common knapweed *Centaurea nigra*, oxeye daisy *Leucanthemum vulgare*, red campion *Silene dioica* and selfheal *Prunella vulgaris*.

Wildflowers grow best on unproductive soil so it might be necessary to reduce soil fertility first. It should be noted that seed mixes sown into an existing sward may not establish well as they will be outcompeted by the more vigorous grass species. Therefore, it is recommended that the top three to six inches of topsoil are removed before any seeds are planted to increase the chances of them germinating. Further details on how to create a wildflower meadow can be found here: <https://www.rspb.org.uk/get-involved/activities/nature-on-your-doorstep/garden-activities/create-a-wildflower-meadow/>

Mowing/low-intensity grazing of the meadow should be undertaken annually, usually late summer/autumn and again in spring, if needed. The frequency will vary depending on flower source (seed, plug-plant or turf) and time following establishment but generally should not be done until flower seeds have set. Varying the time of year will ensure some species do not become dominant. All cuttings can be put into a compost heap.

It is important to maintain both species and structural diversity, creating a mosaic of microhabitats for wildlife. Therefore, it is best not to graze/cut all grassland areas at once but to stagger it. This will also ensure wildlife living in the grassland will have a safe refuge.

Hedgerow creation

It has intended that the adjacent fields would be grazed by sheep in the future. The existing fence line on site would therefore need to be replaced prior to this. In addition to a new fence or as an alternative, a new hedge could be planted. Species planted here should include a mixture of native species such as blackthorn *Prunus spinosa*, dogwood *Cornus sanguinea*, field maple *Acer campestre*, hawthorn *Crataegus monogyna*, hazel *Corylus avellana* and holly *Ilex aquifolium*. To supplement this, the hedges could be undersown with Emorsgate seed mix EH1 Hedgerow mixture (<https://wildseed.co.uk/mixtures/view/12>), or equivalent. This will help create a thicker base to the hedge and provide cover for wildlife as well as an attractive feature while the hedge becomes established.

The hedgerow should then be cut on a 2 to 3-year rotation. Cutting should take place in late December or January to avoid bird nesting season (February to August) and ensure berries are still available for wintering birds (September to December).

Bird boxes

Boxes for a range of common species of bird could be installed around the site and include a mix of box types to attract different species, including standard boxes for blue tits and great tits and open fronted boxes for robins and wrens. Further details can be found in Appendix 2.

Log piles

Any wood from the tree works could be used to create a log pile to attract additional wildlife. Log piles attract a number of invertebrates, small mammals and fungi as well as providing hibernation habitat for amphibians and reptiles. Logs from broad-leaved trees of varying sizes should be used and partially buried in the ground in a semi-shaded area (i.e. somewhere warm enough for insects but not exposed to prolonged sunlight which can dry out the wood).

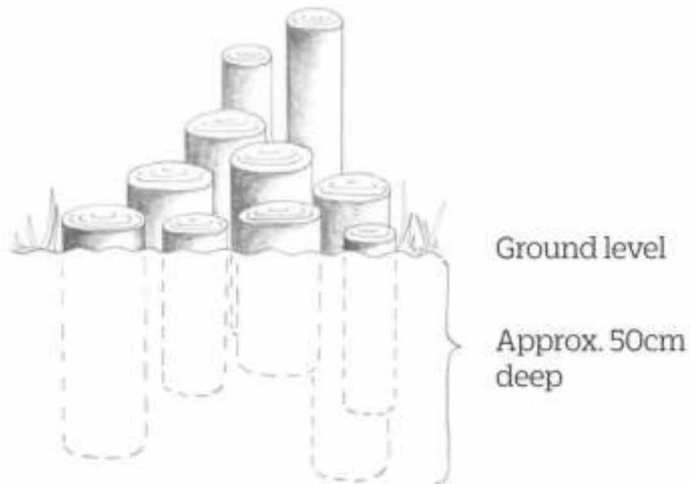


Figure 3. Example of a stag beetle loggery (Taken from ‘Build a Log Pile for Stag Beetles’ by People’s Trust for Endangered Species, 2016)

Some logs should be positioned vertically as this is suitable for stag beetles which lay their eggs into deadwood and the rotten wood provides a food source for stag beetle larvae (Figure 3). The logs should be from broad-leaved trees at least 10cm in diameter and can be of varying lengths to create a varied height structure, providing different microclimates and rates of decay. They should be partially buried (about 50cm deep) in partial shade to prevent drying out. Further information can be found at <https://ptes.org/wp-content/uploads/2016/11/Build-a-log-pile-for-stag-beetles.pdf>

Insect hotels

Additional sheltering resources could be provided for invertebrates through the installation of insect hotels. Insect hotels vary in shape and size and provide opportunities for a wide range of species. The majority incorporate several different sections that provide sheltering or refuge opportunities, particularly during winter, for many types of insects. Insect hotels should be positioned in a sunny location on a fence or wall near to bee-friendly vegetation, such as the wildflower meadows. The front should be accessible with no vegetation blocking the entrance. Further details can be found in Appendix 2.

When building or buying an insect hotel, ensure it is easy to maintain, is not treated with chemicals, does not contain non-breathable materials like plastic, and does not concentrate one species type in one place that could lead to large numbers of individuals lost to parasites. Helpful advice can be found on The Pollinator Garden website: <https://www.foxleas.com/make-a-bee-hotel.asp>.

Yours sincerely,

[Redacted signature]

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Appendix 1. Suitable Plants for Ponds (Taken from 'Creating garden ponds for wildlife' by Pond Conservation & World of Water, 2011)




Type of Plant	Species	Comments
Plants next to the pond (for use in wildflower areas adjacent to pond)	Cow parsley Devil's-bit scabious Hemp agrimony Teasel Purple loosestrife Red valerian Yarrow	Provision of food and cover next to the pond Links to other habitats e.g. hedgerows
Low-growing wetland grasses (planted on dry ground or in a few cm of water)	Creeping bent Small sweet-grasses	
Marginal herbs & rushes (2-10cm depth of water)	Lesser spearwort Marsh pennywort Water forget-me-not Water mint watercress	
Marginal plants with attractive flowers & architecture (2-10cm depth of water)	Marsh cinquefoil Marsh woundwort Marsh-marigold Pendulous sedge Purple loosestrife Ragged-robin Water dock Yellow iris	
Tall emergents (2-10cm depth of water)	Branched bur-reed Bulrush Greater pond-sedge Hard rush Lesser reedmace Reed sweet-grass Soft rush	Can become dominant in small ponds so regular cutting back necessary
Floating-leaved plants (15-30cm of water)	Amphibious bistort Broad-leaved pondweed Fringed water-lily Yellow water-lily	
Submerged plants (Float in deep water)	Common water-starwort Curled pondweed Rigid hornwort Spike water-milfoil Water-crowfoot	

Further advice on pond creation is available from:

<https://freshwaterhabitats.org.uk/projects/million-ponds/pond-creation-toolkit/>

<https://www.hiwwt.org.uk/sites/default/files/2018-04/150318%20Wildlife%20gardening%20Create%20a%20pond%20NB.pdf>

Appendix 2. Information on bird boxes and insect hotels

Type	Typical species	Height	Additional information
Standard bird box e.g. Schwegler 1B 	Blue tits, great tits	2-4m	Position on a building or tree, angled north and east (away from prevailing winds) and tilt forward slightly. Chances of occupation can be increased by positioning boxes near vegetation.
Open-fronted bird box e.g. Schwegler 2H 	Robins, wrens	≤ 2m	Mount on a tree or shrub Conceal amongst foliage to keep well hidden from predators.
Insect hotel 	Invertebrates	≥ 1m	Position in sunny location on a fence or wall near to bee-friendly vegetation Ensure it is accessible with no vegetation blocking the entrance