Ecological Update Report

Lake Farm Country Park, Botwell, Common Road, Hayes.

On Behalf of:

Hillingdon Borough Council

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1.0 Introduction and Aims

1.1 Southern Ecological Solutions Ltd (SES) was commissioned by Hillingdon Borough Council produce an ecological update report to support a planning application for a new educational facility to be sited at the eastern extent of Lake Farm Country Park (see appendix 1 for location plan). The construction of this facility is due to be constructed in two phases with construction within the northern section of the site due to commence in May 2013. Phase 2 of development will commence within the southern section of the site late into 2013.

1.2 The aim of this ecological update report is to:

- identify any legal and planning policy constraints relevant to nature conservation which may affect the development;
- determine any potential further ecological issues;
- provide an update to ecological surveys carried out to date;
- assess and predicate any impacts on ecological receptors caused by the proposed development;
- make recommendations for mitigation and compensation/enhancement to reduce potential harmful impacts as a result of the proposed development;
- provide recommendations for minimising impacts on biodiversity and providing net gains in biodiversity where possible in accordance with chapter 11 of the National Planning Policy Framework (NPPF) (2012) and Hillingdon Local Plan (2012).

2.0 Constraints

2.1 This reports findings and recommendations have been made using the survey information to date and the author's professional experience due to some of the proposed surveys being left incomplete.

3.0 Site Description

3.1 The whole of Lake Farm Country Park is classified as a Site of Interest for Nature Conservation (SINC) Borough Grade I. The site is the 'red-line' area (see appendix 1) defined for the provision of a much needed educational facility and comprises of land found to the eastern extent of the park bounded by Botwell Common Road to the north, Botwell Lane to the east, housing and playing fields to the south and the rest of the country park to the west. The northeast section of the site is managed as amenity grassland with a sward of low diversity and scattered young and semi-mature ornamental trees. A hedgerow with some semi-mature native trees forms the south and west boundaries and divides this area from the rest of the site. The remaining area is divided into rough tussocky grassland and grassland that is cut in a more formal manner. Patches of scrub and tall ruderals can also be found within the tussocky grassland with several mown pathways forming 'trim' trails regularly cross this informal grassland. To the west of the site the rest of Lake Farm Country Park is characterised by tussocky and formalgrassland, with thicker areas of scrub and a patch of broad-leaved woodland along the southern boundary. A wide (c.40m) canal runs along the southern boundary of the Country Park.

4.0 Lake Farm Country Park Planning Policy Overview

4.1 Lake Farm Country Park is designated as a SINC Borough Grade I. SNIC designations are made from three distinct categories, those sites ranked as of metropolitan, borough and local importance. SINC sites are afforded non statutory protection.

4.2 Sites are ranked on their importance to a particular location/ community and the abundance of flora and fauna. As a borough site Lake Farm Country Park is important on a borough perspective, damage to this site would mean a significant loss to the borough as only sites that provide an important contribution to the area are designated. Since 1988 borough sites have been listed into two separate categories (grade I and II) Lake Farm Country Park moved from a grade II to grade I in its last assessment.

4.3 The NPPF (2012) places the onus on local planning authorities to identify and distinguish between international, national and locally designated sites, so that protection is afforded within local plans that are commensurate with their status (section 113).

4.4 The Hillingdon Local Plan: Part 1 – Strategic policies (adopted November 2012) Policy EM7: Biodiversity and geological conservation contains that Borough grade Sites of Important Nature Conservation (SINC) will be reviewed by the council and deletions, amendments and new designations will be made within the Hillingdon Local Plan: part 2 -site specific allocations: Local development document (to be scheduled). Hillingdon's biodiversity and geological conservation will be preserved and enhanced with particular attention given to:

- The protection and enhancement of all Sites of Importance for Nature Conservation. Sites with Metropolitan and Borough Grade 1 importance will be protected from any adverse impacts and loss. Borough Grade 2 and Sites of Local Importance will be protected from loss with harmful impacts mitigated through appropriate compensation.

- Appropriate contributions from developers to help enhance Sites of Importance for Nature Conservation (SINCs) in close proximity to development and to deliver/ assist in the delivery of actions within the Biodiversity Action Plan.

5.0 Ecological Update and Baseline Conditions

5.1 An extended phase 1 habitat survey was undertaken by SES in 2011. This survey recommended a number of phase 2 ecological surveys to inform an ecological constraints plan. Following this initial survey, phase 2 surveys were commissioned in October 2012, listed below are the baseline conditions of each ecological receptor within the zone of influence.

Site

5.2 The site is a ‘bottle necked’ parcel of land that forms the eastern extent of Lake Farm Country Park. The site is partially encapsulated by Botwell Common Road to the north, Botwell Lane to the east, and housing/ sport fields to the south. Trim trails dissect the site at a high density because of entrances within the eastern pinch point of the site, as well as one at its northwest extent. A formal play ground set within

amenity grassland can be found to the north of the site which contains habitats considered to be generally of low ecological value. This value is also adversely effected due to its location where disturbance to wildlife is likely to be significantly higher than more discreet sections of the park. It can be reasonable concluded that because of the sites position and structure it is likely to form a part of the park that is of lower value to wildlife in comparison to other areas of the park. Notwithstanding, habitats of ecological value are present (tussocky grassland and hedgerow/ scrub) and should be evaluated to assess the impact of their loss to the parks integrity.

Reptiles

5.3 The initial extended phase 1 survey (SES, 2011) identified sections of habitat suitable to support a viable population assemblage of 'common' reptile species. Such as adder *Vipera berus*, grass snake *Natrix natrix*, slow worm *Anguis fragilis* and common lizard *Zootoca vivipara*. These species are primarily protected under the Wildlife and Countryside Act 1981 (as amended) underS9(1) S9(5) which describe offences being committed when reptiles are:

- Intentionally, or recklessly, kill or injure any of the above species, and/or;
- Sell, or attempt to sell, any part of the species, alive or dead.

Survey Methodology

5.4 To detect presence or likely absence a seven visit survey is recommended (Froglife, 1999). Seven survey visits should be undertaken at each transect during 'suitable' days for reptile activity; a 'suitable' survey day is determined by the weather, with temperature being the pre-eminent factor.

5.5 After suitable habitat has been located, ambient air temperature is an essential factor for reptile surveys. Reptile surveys conducted between 10 and 17 degrees centigrade have the most chance of success. The key months for reptile surveys are April, May and September with April and May being advantageous because it is reptile mating season, which means they will be more obvious and less wary of observers. Also, the temperatures are generally lower during these months and as such it will take longer for the reptiles to warm up so they must spend more time basking. During the warmer summer months animals will have to spend less time basking due to the increase in ambient temperature, thus reptile survey visits should be conducted earlier in the day during the hotter summer months. However, the temperature on the day of the visit will ultimately determine what time the survey takes place.

Survey Schedule

5.6 An ecological walkover was undertaken in October 2012 to assess areas of the site that are suitable topotentially support an assemblage of reptiles. From this walkover survey a map (see figure 1 on page 5) was produced grading habitat range from optimal/ sub optimal and unsuitable.

Figure 1: Reptile Habitat Classification and Transect Location Plan.

5.7 The proposed educational facility is due to be constructed in phases. With phase 1 due to commence within the northern sections of the site in May 2013 and phase 2 in the southern section, in late 2013.

Phase 1

5.8 Much of the northern section of the site contains sub optimal reptile habitat, consisting of amenity grassland or grassland that is managed in a more formal manner. The 'L' shaped hedgerow encapsulating the playground area to the north is also considered to provide sub optimal reptile habitat due to the sparse ground flora and the 'leggy' (not vegetated to base and therefore bare) nature of the hedgerow. This hedgerow is not considered to provide the structural / thermal diversity that reptiles require. An area of semi-improved grassland to the north west (see figure 1 on page 4), containing recently planted trees does contain more structural diversity but is considered to suffer from isolation from other suitable habitats and does not display the same maturity of habitat that the semi improved grassland to the south of site displays. The 'L' shaped hedgerow is due to undergo maintenance works within the winter months. Despite the hedgerow being classified as sub optimal (due to its structure) a reptile presence and likely absence survey was undertaken during October 2012 with a total of four visits being completed.

Phase 2

5.9 Suitable potential reptile habitat (tussocky grassland and connected scrubby habitats) can be found almost exclusively within southerly areas of the site, is due to be lost through development in late 2014. It is recommended that a seven visit presence or likely absence survey is undertaken in 2013 between March- May. These timings will allow appropriate mitigation to be planned and implemented before phase 2 construction operations commence.

Results of Reptile Survey within Phase 1

5.10 A total of four visits were undertaken within the northern section of the site (see figure 1 on page 4 for transect location plan). Much of this section displayed no potential to support a reptile assemblage but habitats do exist that are traditionally associated with reptiles such as hedgerow and semi-improved grassland, it was therefore deemed prudent to carryout precautionary surveys of these areas before planned maintenance works. Although outside of the optimal survey season (March-September), the more temperate climate of the south of England often allows reptile surveys to be conducted later in the survey season. All survey visits were conducted in October within a period of consistent prevailing weather conditions allowing reptiles to still be active. High densities of refugia were laid a week prior to surveys commencing, high densities were used to increase detection chances and allow refugia to settle within their environment. The surveys were stopped after four visits were completed due to a decrease in temperatures and worsening reptile survey conditions. The data collected is considered relevant to provide further context to likely reptile presence/ absence within these areas and allow working methodologies to be established that comply with UK wildlife legislation. Table 1 over the page highlights the top line results of the reptile survey.

Table 1: Top line reptile survey results.

Date	Weather	Temp °C			Results
		local high	Local low	on site	
17.10.12	light breeze, 75% cloud cover	12.5	10	11.8	clear
24.10.12	light breeze, 60% cloud cover	16.5	12.4	13.3	clear
25.10.12	light rain intervals, overcast	13.8	11.7	12.3	clear
26.10.12	still, 80% cloud cover	12	10	12	clear

5.11 No reptiles were recorded during any of the survey visits within any construction phase 1 habitats.

Birds

5.12 Due to the habitats found on site and the management of Lake Farm Country Park as a whole, breeding and wintering bird surveys were recommended within the initial SES extended phase 1 (2011). A wintering/ migrant bird visit has been completed in October 2012. The purpose of the visit was to record any birds using the site, particularly as a migratory staging post, and to assess the potential of the site to support breeding and non-breeding birds. During the visit the following notable species were recorded on the site: skylark *Alauda arvensis*, meadow pipit *Anthus pratensis*, song thrush *Turdus philomelos*, mistle thrush *Turdus viscivorus*, reed bunting *Emberiza schoeniclus*, house sparrow *Passer domesticus* and dunnock *Prunella modularis*. The following additional species were recorded in the adjacent area of Lake Farm Country Park: bullfinch *Pyrrhula pyrrhula*, whinchat *Saxicola rubetra*, siskin *Carduelis spinus*, whitethroat *Sylvia communis* and chiffchaff *Phylloscopus collybita*.

5.13 The amenity grassland habitat is considered to be of low value for birds. The 'L' shaped hedgerow forms a wide scrub and tree belt. The hedgerow and rough grassland to the west and south is likely to be of importance for breeding, migrating and wintering birds. The majority of nesting meadow pipits and skylarks using the Lake Farm Country Park are likely to nest outside the proposed development site due to its structure and location. The tussocky grassland to the south appeared to support a strong invertebrate population with orthoptera species heard during the site visit. This is likely to provide a prey resource for birds.

Bats

5.14 No potential bat roosting features were identified during the extended phase 1 survey (2011) and subsequent walkover survey in October 2012. The north of site is dominated by amenity grassland and formal grassland which are predicated to be of negligible value to foraging bats. The sites boundary features including the 'L' shaped hedgerow and tussocky grassland to the south of the site are predicated to provide foraging and commuting resources.

6.0 Predicated Impacts and Mitigation

6.1 Policy EM7 within the adopted local plan (2012) provides that particular attention be given to SINC's. The policy goes on to state that Borough Grade 1 sites should be protected from any adverse impacts and loss. This section will assess the impact on the baseline ecological receptors, including the impacts of habitat loss to the parks integrity. All significant impacts upon these ecological receptors will be listed below and tested against wildlife legislation and planning policy. If impacts are predicated to an extent to contravene wildlife legislation or policy- mitigation, compensation and enhancement recommendations have been made within section 7 to offset these effects and ensure statutory and policy compliance where possible. .

Reptiles

Phase 1

6.2 Planned activities such as the 'L' shaped hedgerow maintenance and phase 1 construction works in the absence ofmitigation havethe potential to have adverse impacts upon reptiles. Impacts include the potential to injure/ kill of individual animals and the permanent loss of habitat (although sub optimal).

Mitigation

6.3 The reptile presence and likely absence survey indicates the likely absence of reptiles within hedgerow (and ground flora) habitat that is considered sub optimal. Therefore any adverse effects associated with the planned hedgerow maintenance works will be wholly mitigated. All maintenance work will also be completed under ecological method statement ensuring no direct harm will come to any animals potentially within the tussocky grassland north of the site within phase 1. Reptile surveys will be completed March/ April 2013 shown in figure 1 page 5 (sub optimal). In the unlikely event that reptiles are recorded within this sub optimal habitat, mitigation against impacts will be provided via capture and translocation of animals into a Lake Farm Country Park receptor site. This receptor site and subsequent management will provide new habitat to ensure there is no net loss of in quantity and the provision of improved quality reptile habitat. The provision of better quality habitat with no net loss and continued habitat management will provide an improvement in conservation status for this species in the long term

Phase 2

6.4 Phase 2 construction also have in the absence ofmitigation the potential to adversely impact upon reptiles via the injuring / killing of individuals and the permanent loss of habitat.

Mitigation

6.5 Construction is not due to commence until late 2013. Therefore, a seven visit reptile presence or likely absence survey will be undertaken in March- May 2013. If required a capture and translocation programme to a receptor site within Lake Farm Country Park will be undertaken prior to construction. Enhanced reptile habitats will replace that which will be lost with the end result being no net loss in quantity of reptile habitat but an improvement in quality through the creation of habitat features and on-going management and monitoring.

6.6 Potential adverse impacts caused by the proposed development can be reduced to an insignificant level through the proposed mitigated. Mitigation proposals implemented with the compensation/ enhancement plan will likely result in a positive residual impact upon reptiles.

Bats

6.7 Adverse impacts upon foraging/ commuting bats may result from the development of the site. These adverse impacts relate to the permanent loss of habitat and potential fragmentation from light pollution.

Mitigation

6.8 The 'L' shaped hedgerow provides a potential commuting route and foraging resource. Tussocky grassland and the scrubby boundary habitats also provide potential commuting/ foraging resources. Much of these habitats will be lost through the proposed development. A new native species rich hedgerow running the width of Lake Farm Country Park across the sites western extent and the retention/ strengthening of boundary habitat will provide a net positive in terms of quantity and quality foraging/ commuting habitat. This hedgerow will be planted during the bats inactive season as the existing hedgerow is lost, it will be planted using native species (including night scented species) and multi-stemmed 2-3 yr old plants to enable this hedgerow to mature faster.. Tussocky grassland will be created within Lake Farm Country Park ensuring no net loss of this resource. Bat sensitive lighting will be installed to mitigate against potential light pollution.

6.9 It is predicated that the proposed mitigation will reduce adverse impacts on any commuting/ foraging bats within the medium/ long term. Compensation/ enhancement through the provision of bat friendly management practices within the site and Lake Farm Country Park will further reduce this impact to an insignificant level.

Birds

6.10 The redevelopment of the site in the absence of mitigation is likely to result in potential adverse impacts to Lake Farm Country Park bird assemblage. Adverse effects predicated include disturbance during the construction stage, permanent loss of habitat (breeding and foraging) and the destruction of active nests.

Mitigation

6.11 The site is located to eastern extent of the park and is partially encapsulated by busy roads. a 'bottle neck' of paths used by dog walkers/ walkers and the northern section of the site which is a formal play area. Therefore it is thought that disturbance is currently high within these areas and construction activities are not thought to constitute a significant adverse impact with any adverse impacts being of low magnitude in the short term as abundant nesting habitat is available in the vicinity of the proposed development site. The creation of new hedgerows and tussocky grassland will result in a predicated net increase in valuable breeding/ foraging habitat. Any loss of breeding bird habitat should be cleared outside nesting bird season (March- August) or after an ecologist has confirmed that any breeding habitat is clear of active nests.

6.12 Replacing valuable/ foraging breeding habitats and timing of works will reduce potential adverse impacts caused by the proposed development. The management of habitats offsite to boost populations of red listed birds and birds in general will further

reduce adverse impacts but residual adverse impacts of low significance on a borough/ district level are predicted in the short to medium term.

Invertebrates

6.13 The redevelopment of the site in the absence of mitigation is likely to result in adverse impacts to Lake Farm Country Park invertebrate assemblage. These adverse impacts may be caused through loss of habitat and site lighting.

Mitigation

6.14 Hedgerows/ scrub and tussocky grassland managed for biodiversity with particular regard to invertebrates will be created which will result in no net loss of this habitat type. Management and habitat structure will provide enhanced habitats to that which is being lost. Artificial lighting should be minimised as far as possible, with careful orientation to avoid illuminating any areas of habitat potential of value to invertebrates and also baffles to limit glare. Lighting should have a low UV component to avoid attracting insects.

6.15 These mitigation proposals will reduce adverse impacts to an insignificant level. Compensation/ enhancement recommendations for planting and features on site and within Lake Farm Country Park will result in a residual positive impact for invertebrates.

Hedgerow

6.16 In the absence of mitigation the development of the site will result in the permanent loss of hedgerow (UK BAP habitat)

Mitigation

6.17 A species rich hedgerow will be planted running across the width of Lake Farm Country Park along the sites western extent. This hedgerow will create an enhanced habitat in terms of quality and quantity, managed with respect to biodiversity. This will result in a positive effect on UK BAP hedgerows Boundary habitats around the site will also be retained / reinforced to create UK BAP hedgerows (where possible).

Lake Farm Country Park

6.18 Adverse impacts on Lake Farm Country Park are predicated through the permanent loss of habitats and c.15% of the parks total area potentially affecting Lake Farm Country Parks structural integrity.

Mitigation

6.19 The site has been positioned within the eastern extent of the park, an area which suffers from high levels of human disturbance and contains habitats of relative low ecological value (amenity grassland). However, some habitats of value do exist which will be lost to the development. These habitats will be created within the park to ensure that there is no net loss in quality or quantity. An off site management plan to enhance biodiversity will be prepared as well as on site plans to make the proposed educational facility a biodiverse, ecological permeable development.

6.20 Mitigation and enhancement / compensation proposals will result in insignificant impacts upon biodiversity at Lake Farm Country Park. Therefore, it is concluded that the proposed development will not affect the functional integrity of SINC.

7.0 Ecological Mitigation and Enhancement Programme

Lake Farm Country Park is currently managed by the Councils Green Spaces Team. A comprehensive, successful plan already exists and is documented within Lake Farm Country Park Management Plan 2011-2015(2011).It is therefore not considered necessary to draw up a new management plan in its entirety but add recommendations that can be adopted to mitigate and compensate against predicated adverse impacts and increase general biodiversity interest. Therefore mitigation/ compensation recommendations have been made to satisfy EM7 that the proposed development will have not have any adverse impacts and that the development and will also enhance the site to assist in the delivery of its BAP targets.

Habitats

Within Lake Farm Country Park

Hedgerow Creation

7.1 Hedgerows are the most significant wildlife habitat over large stretches of lowland UK and are essential refuge for a great many woodland and farmland plants and animals. Over 600 plant, 1500 insects, 65 birds and 20 mammals have been recorded at some time living or feeding in hedgerows.

7.2 A new species rich hedgerow will be planted across the western extent of the site. This hedgerow will run north to south across the width of the park and provide a net gain in terms of both quantity and quality of a UK BAP priority habitat

7.3 This species rich hedgerow will contain 5 or more native woody species (see appendix 6 for planting suggestions) and be planted with a buffer of grasses/tall herbs. This grassland buffer will provide the hedgerows flora protection from 'edge effect', while also providing additional transitional habitat. This hedgerow should be managed through rotational cutting in a non intensive manner and established as soon as possible.

Tussocky Grassland

7.4 There should be no net loss in tussocky grassland as a result of the proposed development. To achieve this goal grassland more formal in nature should fall under the current management regime for tussocky grassland. Strips of tussocky grassland can be added to the northern extent of the parks existing tussocky grassland found in the southerly section of the park. This grassland will provide suitable habitat for mammals, bird, invertebrates, amphibians and reptiles. This will result in a decrease of more formally managed grassland area and an increase in a more biodiverse grassland habitat. Both types of habitat may fall within the UK BAP Priority habitat definition of Lowland Meadow due to its board definition.

Wildflower Strips/meadows

7.5 The sward diversity within Lake Farm Country Park is reportedto be species poor (Hillingdon Borough Council, 2011) and it is therefore recommended that wildflower

strips/ meadows are added within the park to add floral diversity. Seed mix will dependant on soil type and location (e.g.. base of hedgerow – therefore likely to be shaded so a specific seed mix will be required). The seed mix should be of local provenance and it is advisable to seek green hay from local areas.

7.6 Herbicide should be sprayed within chosen areas (that are free from ecological constraints) and the nutrient rich topsoil should be removed to quell rank growth of competitive perennial species. A second application of herbicide should be applied to any weed re growth (2/4 weeks). Green hay containing a wildflower seed mix of local provenance should be spread randomly. The meadow will develop over a number of growing seasons, plug planting of species can be used to speed up this process and add instant impact. The use of perennial species within the seed mix will add permanence to the meadow, during the next 6- 8 weeks cut growth to 15cm to keep competitive species in check and allow wildflowers to develop their root structure (dependant on flowering of seed mix for cutting regime –spring / summer). In time the meadow will be rotational cut enabling a more varied sward to develop, cutting should be carried out in high summer (subject to seed mix) with arisings removed after a few days (enable seed to spread and invertebrates to escape).

7.7 Wildflower meadows provide a UK BAP priority habitat (lowland meadow) invaluable for invertebrates and species which feed upon them, with the rotational cutting allowing invertebrate life stages to be completed via a varied sward length. These meadows will provide terrestrial habitat for amphibians, reptiles, birds, mammals (including bats).

Pond Creation

7.8 A pond should be created in areas of the park that are wet all year round. The banks would benefit from a shallow profile (1:3 gradient would be sufficient and planted with species of local provenance. This bank gradient can provide excellent habitat for birds to bathe and insects to flourish. An increase in invertebrate numbers will also provide foraging opportunities for bats and birds. The planting scheme for the pond may include the following species:

- Submerged plants that have most of their structure under water; these are excellent for oxygenating the pond and include species such as Curled Pondweed *Potamogeton crispus*, Rigid Hornwort *Ceratophyllum demursum*, Water Milfoil *Myriophyllum spicatum* and Water Crowfoot *Ranunculus aquatilis*.

- Floating leaf plants that have leaves on the waters surface, Broad-leaved Pondweed *potamogeton natans*, Frogbit *Hydrocharis morsus-range*, Yellow Water-lily *Nuphar lutea* and Floating Sweet-grass *Glyceria fluitans* are all excellent examples.

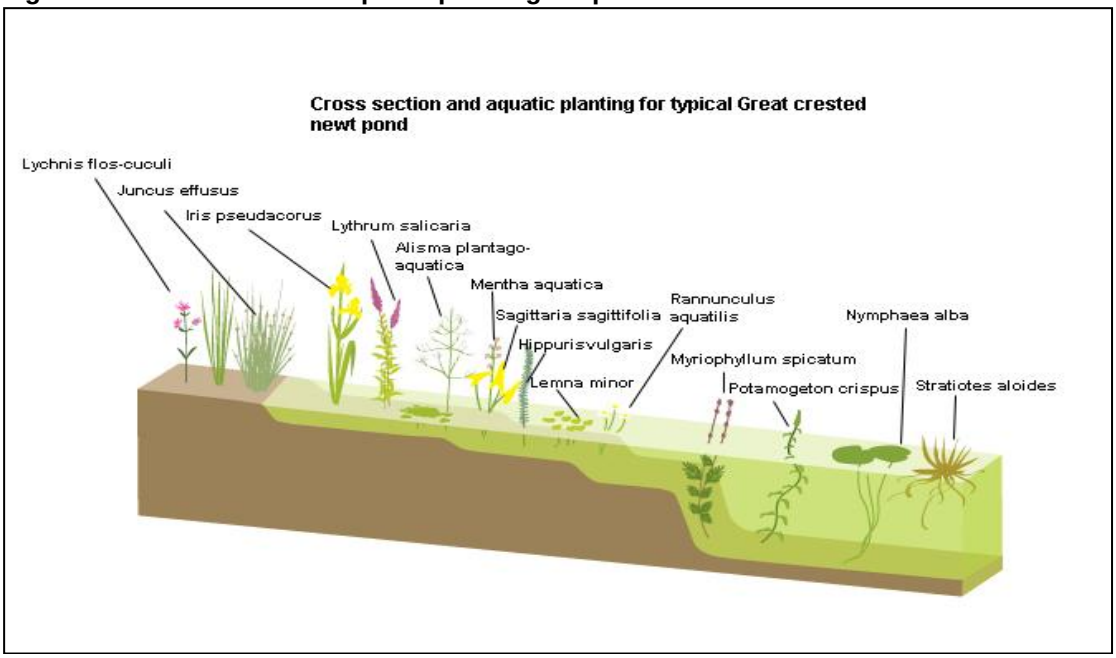
- Emergent plants which have most of there structure out of the water can prefer shallow water like Spearwort *Ranunculus lingua*, Amphibious Bistort *Persicaria amphibia* or Brooklime *Veronica beccabunga* or like deep areas such as Common Reed *Phragmites Australis,* Flowering Rush *Butomus umbellatus* or Water Mint *Mentha aquatica*.

- Marginal or bog plants that live at the waters edge or within damp soil; Yellow Flag and Purple Loosestrife *Lythrum salicaria* are colourful examples with

Great Willowherb *Epilobium hirsutum* and Royal Fern *Osmunda regalis* also being desirable.

7.9 Any wood/ brash from site maintenance should be used to create brash/ logged habitat piles within the immediate proximity of the pond.

Figure 2: Cross section of aquatic planting for pond.



Picture reproduced from Froglife's Great Crested Newt Conservation Handbook (2001).

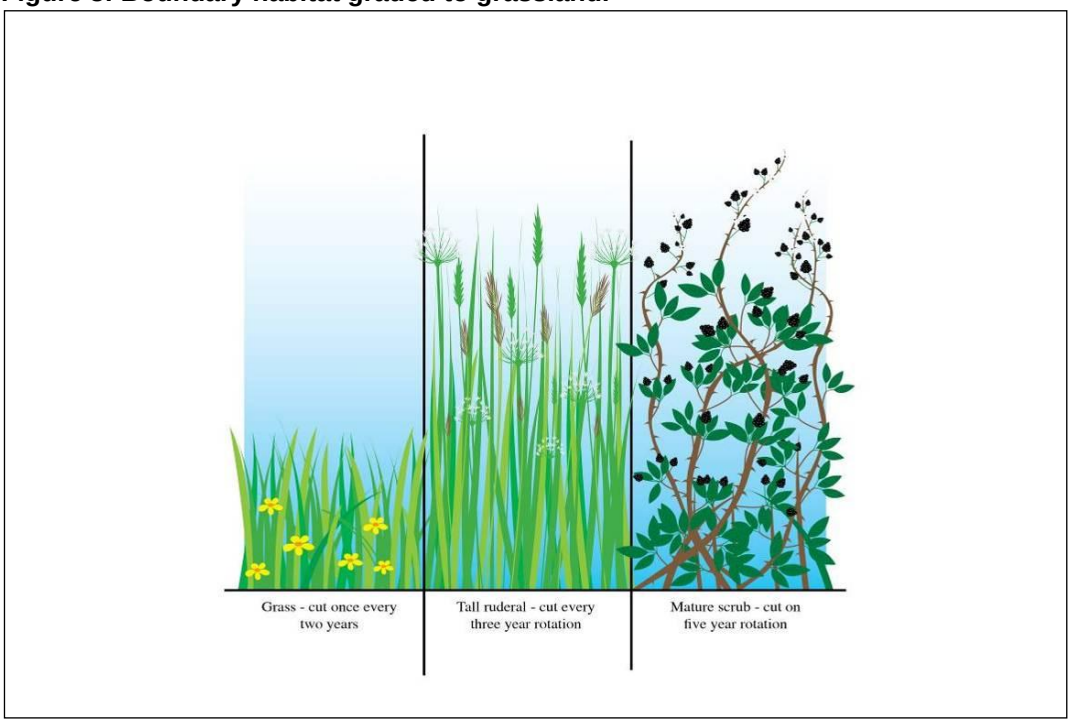
7.10 Habitats immediately surrounding the ponds should be wildflower/ tussocky grassland which inturn should be ecologically connected to informal habitats. The wildflower/ grass planting around the pond should be top cut using hand tools during high summer to varying length to encourage a varied biodiverse sward. This cut should take place in high summer (June –July) a maximum of 2 per year. If tall ruderal/tall herb colonisation becomes a problem (outcompeting all other ground flora and affecting biodiversity) these areas can be cut with a more aggressive cutting regime so the seed bank below is exposed to sunlight. This pond should not be over shaded and size should be driven by health and safety requirements. This pond should be kept free from fish and water fowl should not be encouraged (through activities like feeding).

Boundary Habitat

7.11 Boundary habitats will provide a number of species with habitat including amphibians, reptiles, invertebrates, birds and mammals (such ascommuting/ foraging bats). These areas will also provide ecological connectivity throughout the site. Providing successional growth will create a habitat mosaic for a variety of species, it is recommended that transitory habitats are managed between the scrub boundaries and grassland.

7.12 Management is essential due to the transitional nature of this habitat. It is recommended that habitat grades from scrub/hedgerow to tall herbs finally grading into grassland meadow (Figure 3 below illustrates this ideal). This structure will not be practical in all parts of the site and grassland cutting should reflect where the successional habitat is situated i.e. formal grassland will be cut on different rotation than tussocky grassland.

Figure 3: Boundary habitat graded to grassland.



Within the Proposed Development

Planting

7.13 Planting within the development should undertaken using native species of known wildlife benefit. A table of such species is shown within appendix 3. Care should be taken to avoid invasive non native species that have traditionally been used for soft landscaping purposes; species to be avoided include non native Cotoneaster and False Acacia *Robinia pseudoacacia*. Ornamental planting should include species of value to invertebrates such as bees as well as night scented plants which attract prey species for bats (appendix 3).

Boundary Habitat

7.14 In addition to the new hedgerow, boundary habitats around the proposed development will, where possible, be retained and reinforced with native woody species. This will create a wildlife corridor around the sites south, east and northern extent. The structure of this habitat should be transitional as described within section 7.11-7.12.

Spring Bulbs

7.15 Spring bulbs should be planted as they provide amenity value to semi natural areas and can provide an important source of early spring nectar for invertebrates such as the Bumblebee *Bombus sp.*.

Invertebrates

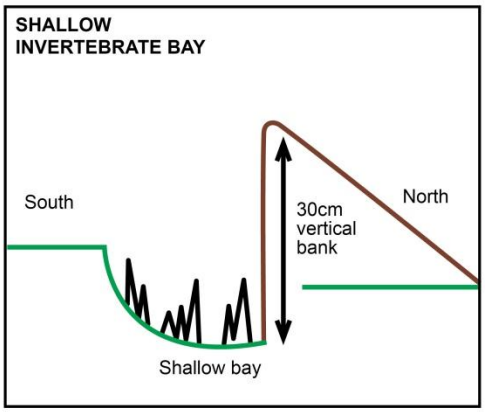
7.16 The provision and on-going management of the habitats listed above will benefit invertebrate density and diversity. Additional habitat features outlined below will add further value and could be adopted within the current Green Space Teams management plan.

Within Lake Farm Country Park

Shallow invertebrate bays

7.17 Three shallow bays, each c.15m², with a rear south facing vertical face 30 cm high will be dug. One bay should be dug a year with vegetation left to naturally colonise each bay. On the third year the vegetation within the first bay should be cut to ensure long continuality of successional habitats. These bays attract solitary bees and wasps as well as other invertebrate species and have been known to provide basking habitat for common lizards (see figure 4 below).

Figure 4: Shallow invertebrate bays



Log Piles

7.18 Log piles should be created in proximity to boundary habitat in both sun and shaded positions to create a variety of conditions; theses piles should be c.1m high and c.2m wide with deciduous logs being preferred (see plate 1 over the page). These log piles will create habitat to benefit invertebrates, birds, reptiles, mammals (bats) and amphibians.

Plate 1: Log pile

Within the Proposed Development

Lacewing/ Ladybird Habitat

7.19 The 'bug box' below (plate 2) provides habitat for these declining native species of invertebrates. These species predate on garden pests such as Aphids providing a biological control and re-establishing natural eco systems often lost within habitats subjected to intense management. The box should be sited in a sheltered area with straw and bark placed within the internal chamber to encourage the insects to use the box.

Plate 2: lady bird/ lacewing box.

Reptiles

7.20 The site contains habitat that is suitable to support an assemblage of reptiles. If reptile presence is recorded during the 2013 survey work a mitigation/ compensation scheme should be implemented.

Reptile Translocation

7.21 An area of Lake Farm Country Park will provide an insitu solution which is preferred to moving animals out of their natural range (JNCC 2003). Area's of suitable habitat with connectivity to potential offsite habitats will be identified and surveyed to detect if

reptiles are present within this area. The results of this survey will provide information as to suitability of each receptor area.

7.22 A mature receptor habitat will then identified and enhanced through the provision of log piles and hibernacula. These refuges contain split logs, dead wood, rocks and bricks and are loosely filled with top soil. Dimensions vary but hibernacula with an area of c.9m², dug c.1m below and finishing c.1m above ground should be used as a guide. Grassland within these habitats should be topped (not cut to ground level min 30cm) on rotation to varying sward lengths to allow a thermally diverse habitat mosaic.

7.23 The donor habitat (areas of reptile habitat to be lost) should be isolated as well as the construction zone via reptile exclusion fencing, installed to Natural England standards. A concerted trapping regime should then be undertaken following current best practise guidelines (HGBI, 1998). Using professional judgement capture could potentially cease after seven consecutive clear capture visits.

7.24 Captured animals should be moved, using best practise welfare techniques, to the receptor site and placed within 'soft' release areas such as brash piles/ hibernacula to ensure that animals do not suffer undue stress and have immediate cover. Once trapping effort draws to a close, a destructive search should be used to capture any residual animals still sheltering within the donor site; once the destructive search is complete the donor site can be considered clear of reptiles and reptile exclusion fencing can be removed from the cleared habitat but remain around the construction zone to prevent animals entering the site.

Bats

7.25 The provision of wildflower meadow/ tussocky grassland and an increase in the quality and quantity of boundary/ hedgerow, the creation of a wildlife pond and targeted species planting will benefit foraging and commuting bats.

Within Lake Farm Country Park

7.26 Bat boxes should be sited on mature trees, south facing if possible out of prevailing weather conditions. If wasp nests become a problem within these boxes they can be scrapped out in May or early June; during cold mornings or evenings although please note this should be undertaken by a licensed bat worker as bat roosts are legally protected.

Within the Proposed Development

7.27 The provision of bat boxes and other bat roost features the new school buildingsis recommended. Purpose designed features such as bat bricks and enclosed bat boxes catering for bats are commercially available and can be incorporated into the new educational facility. These discrete features provide bat roosting opportunities without allowing bats internal access to the building and with no impact on its structural integrity.

Birds

7.28 The provision of habitats and ecological features listed above will provide enhanced habitat for non-breeding and breeding birds.
Within the Proposed Development

7.29 There is almost no habitat where bird boxes are not of benefit, these come in a variety of sizes and should be of solid construction made from wood, woodcrete (wood concrete mix) or thick plastic with the hole if there is one being 12cm from the floor of the box. Boxes can be fixed in many ways and the method must be chosen to suit the location and design; a horizontal or vertical batten will keep a box away from the mounting surface and running water and is ideal for fixing to trees; nails must be checked yearly due to the danger of the box falling as the tree grows. Alternately boxes can be hung from branches or fixed under the eaves of buildings.

7.30 If wooden boxes are used a non-toxic preservative should be applied to the outside and not the inside. Minor repairs to the boxes can be carried out in-situ with major work requiring the nest box being removed from its fixing being carried out when the box is not in use. Chicken wire can be applied to the outside of the box if repeated squirrel damage is experienced.

7.31 The direction the boxes are mounted makes little difference as long as they are out of the prevailing wind and not exposed to long hours of sunshine as this may stress the nestlings. The boxes should be kept away from any naturally wet areas on trees and small boxes should be angled slightly forward off the tree. Bird box's should not be placed in the close proximity to feeding stations as most birds are territorial and this may put birds off from nesting and also should be at a suitable height to reduce the risk of predation.

7.32 Given the nature of the site it is considered that the following nest boxes would be appropriate:

- Traditional nest boxes can be placed on trees or buildings around the site at a variety of heights from 2m to 5m off the ground. Different birds can be encouraged to use them by varying the diameter of the entrance hole. A hole between 25mm and 28mm will enable tits to use the box whilst a hole of 32mm and more can be used by species such as the Starling *Sturnus vulgaris subsp. Vulgaris* (UK BAP species), House Sparrow *Passer domesticus* (UK BAP species) or Tree Sparrow *Passer montanus* (UK BAP species) although the latter can use the 28mm entrance.

- Sparrow terraces can be placed on walls on buildings; installation at 2m or above from ground level. House and Tree sparrow commonly use terrace other species such as Tits and Spotted Flycatchers *Muscicapa striata* (UK BAP species) have also been recorded nesting within terrace. Sparrow terraces come in a variety of designs but terraces constructed from wood-concrete with dimensions of around H24.5X W43X D20 cm would seem to be appropriate for the proposed development.

8.0 Conclusions

8.1 The structural integrity of Lake Farm Country Park SINC is not predicated to be adversely effected by the proposed development. Recommendations for mitigation and compensation/ enhancement will reduce any predicated adverse impacts upon ecological receptors to an insignificant level. Therefore it is predicated that adverse impacts caused through the proposed development can be fully mitigated.

8.2 This reports findings and recommendations have been made using the survey information to date and the author's professional experience due to some of the proposed surveys being left incomplete.

9.0 References

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Appendix 1: Site Location Map

HILLINGDON
LONDON

Site check Location Plan
Botwell Common Road
Botwell Lane
Hayes

N

Scale 1:2,500

Plan Date 22/9/2011

Appendix 2: Species of Known Wildlife Benefit

Common name	Scientific name	Benefits
Shrubs		
Barberry*	*Berberis spp.*	Nectar, fruit, nesting cover
Blackthorn	*Prunus spinosa*	Nectar, fruit, larval foodplant, nesting cover
Broom	*Cytisus scoparius*	Nectar, larval foodplant
Buckthorn#	*Rhamnus cathartica*	Nectar, berries, larval foodplant, nesting cover
Butterfly bush*	*Buddleja davidii,*	Nectar, nesting cover
Butterfly bush*	*Buddleja globosa*	Nectar
Californian lilac*	*Ceonothus spp.*	Nectar, nesting cover
Cherry laurel*#	*Prunus laurocerasus*	Nectar (including extra-floral nectaries)
Dog rose	*Rosa canina agg.*	Nectar, fruit, larval foodplant, nesting cover
Dogwood	*Cornus sanguinea*	Nectar, fruit, larval foodplant
Elder	*Sambucus nigra*	Nectar, fruit, larval foodplant, nesting cover
Field rose	*Rosa arvensis*	Nectar, larval foodplant, fruit
Firethorn*	*Pyracantha spp.*	Nectar, fruit, nesting cover
Flowering currant*	*Ribes sanguineum*	Nectar, larval foodplant
Garden lavender*	*Lavandula x intermedia*	Nectar
Gorse	*Ulex europaeus*	Nectar, larval foodplant, nesting cover
Guelder rose	*Viburnum opulus*	Nectar, fruit, larval foodplant
Hawthorn	*Crataegus monogyna*	Nectar, fruit, larval foodplant, nesting cover
Hazel	*Corylus avellana*	Nuts, larval foodplant
Hebe*	*Hebe spp.*	Nectar
Holly	*Ilex aquifolium*	Nectar, fruit, larval foodplant, nesting cover
Laurustinus*	*Viburnum tinus*	Nectar, nesting cover
Mexican orange*	*Choisya ternata*	Nectar
Portuguese laurel*	*Prunus lusitanica*	Nectar, fruit, nesting cover
Rosemary*	*Rosmarinus officinalis*	Nectar
Spindle#	*Euonymus europaeus*	Nectar, fruits
Tutsan	*Hypericum androsaemum*	Nectar, fruit, larval foodplant
Wayfaring tree	*Viburnum lantana*	Nectar, fruit, larval foodplant
Yew#	*Taxus baccata*	Berries, nesting cover
Climbers		
Clematis*	*Clematis tangutica*	Nectar, seeds
Honeysuckle	*Lonicera periclymenum*	Nectar, fruit, larval foodplant, nesting cover
Ivy	*Hedera helix*	Nectar, fruit, larval foodplant, nesting cover
Traveller's joy	*Clematis vitalba*	Nectar, seeds, larval foodplant
Virginia creeper*	*Parthenocissus quinquefolia*	Nectar, seeds, nesting cover

* Non-native species
# Poisonous
** Native woody species

Appendix 3: Night scented & Wildflower Species for Bees

Night Scented Species

Climbers
Lonicera periclymenum
Lonicera caprifolium
Lonicera etrusca
Lonicera japonica halliana
Jasminium officinale
Rosa canina
Rosa rubiginosa
Rosa arvensis
Hedera helix
Rubus sp.

Bedding plants
Silene nutans
Silene noctiflora
Silene vulgaris
Matthiola bicornis
Oenothera biennis
Nicotiana affinis
Heliotropun x hybridum
Saponaria officinalis

Wildflower Species for Bees

Wild Flower Species for Bees	
Common Name	**Latin**
Black Horehound	*Ballota nigra*
Columbine	*Aquilegia vulgaris*
Common Bird's-Foot Trefoil	*Lotus corniculatus*
Common Comfrey	*Symphytum officinale*
Greater Knapweed	*Centaurea scabiosa*
Kidney Vetch	*Anthyllis vulneraria*
Red Bartsia	*Odontites vernes*
Red Clover	*Trifolium pratense*
Sainfoin	*Onobrychis viciifolia*
Tufted Vetch	*Vicia cracca*
Viper's-Bugloss	*Echium vulagare*
White Clover	*Trifolium repens*
White Dead-Nettle	*Lamium album*

Appendix 4: Legislation Relating to Reptiles

The legal information below is an interpretation of relevant legal statutes and has not been prepared by a legal professional and should not be treated as a definitive review but as a guide

Common lizards, slow worms, grass snakes and adders are protected under the Wildlife and Countryside Act 1981 (as amended) they are listed as a schedule 5 species therefore part of Section 9(1) and section 9(5) apply; the Countryside and Rights of Way Act 2000 (CROW) also strengthens their protection.

It is offence to:

- Intentionally, or recklessly, kill or injure any of the above species, and/or;
- Sell, or attempt to sell, any part of the species, alive or dead.

The maximum fine per offence is £5000 and if more than one animal is involved, the fine is £5000 per animal (Wildlife and Countryside Act 1981 Section 21) The Countryside and Rights of Way Act 2000 (CROW) amendment contains a provision for a custodial sentence of up to 6 months instead of, or in addition to, a fine. Along with a lengthy development delay until appropriate mitigation has been agreed and completed.

Natural Environment and Rural Communities Act 2006 (NERC) lists all reptile species as species of principle importance under Section 41. Section 40 requires every public body in the exercising of its functions 'to have regard, so far as is consistent with the proper exercise of those functions, for the conservation of biodiversity' (all biodiversity and not just section 41 species and habitats); therefore making reptiles a material consideration in the planning process and requiring a detailed ecological survey before planning permission can be granted.

Appendix 5: Legislation Relating to Bats

The legal information below is an interpretation of relevant legal statutes and has not been prepared by a legal professional and should not be treated as a definitive review but as a guide

All bat species are legally protected under section 9 of the Wildlife and Countryside Act 1981 and regulation 41 of The Conservation of Habitats and Species Regulations 2010. Taken together it is illegal to:

- Deliberately kill, injure or capture any wild animal of European protected species;
- Deliberately disturb wild animals of any European protected species in such a way to be likely to significantly affect:
    - The ability of any significant groups of animals of that species to survive, breed, rear or nurture their young; or
    - The local distribution of that species.
- Recklessly disturb a European protected species;
- Damage or destroys breed sites or resting places of such animals;
- Deliberately takes or destroys the pups of such an animal;
- Possess or transport or any part of a European protected species, unless acquired legally;
- Sell, barter or exchange any part of a European protected species.

The maximum fine per offence is £5000 the Countryside and the Rights of Way Act 2000 (CROW) amendment contains a provision for a custodial sentence of up to 6 months instead of, or in addition to, a fine. Along with a lengthy development delay until an appropriate mitigation programme has been agreed and completed.

Natural Environment and Rural Communities Act 2006 (NERC) also lists bats as a species of principle importance under Section 41 and Section 40 requires every public body in the exercising of its functions (in relation Section 41 species) 'have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity'; therefore making bats a material consideration in the planning process and requiring a detailed ecological survey before planning permission can be granted.

Appendix 6: Native Woody Species

List of Native Woody Species	
Common Name	**Scientific**
Alder	Alnus glutinosa
Apple, crab	Malus sylvestris
Aspen	Populus tremula
Beech	Fragus sylvatica
Birch Downy	Betula pubescens
Birch, silver	Betula pendula
Blackthorn	Prunus spinosa
Box	Buxus sempervirens
Broom	Cytisus scoparius
Buckthorn	Rhamnus cathartica
Buckthorn, alder	Frangula alnus
Butcher's-broom	Ruscus aculeatus
Cherry, bird	Prunus padus
Cherry, wild	Prunus avium
Cotoneaster, wild	Cotoneaster integerrimus/cambricus
Currant, downy	Ribes spicatum
Currant, mountain	Ribes alpinum
Dogwood	Cornus sanguinea
Elder	Sambucus nigra
Elm	Ulmus species
Gooseberry	Ribes uva-crispa
Gorse	Ulex europaeus
Gorse, dwarf	Ulex minor
Gorse, western	Ulex gallii
Guelder rose	Viburnum opulus
Hawthorn	Crataegus monogyna
Hawthorn, midland	Crataegus laevigata
Hazel	Corylus avellana
Holly	Ilex aquilfolium
Hornbeam	Carpinus betulus
Juniper, common	Juniperus communis
Lime, large-leaved	Tilia platyphyllos
Lime, small-leaved	Tilia cordata
Maple, field	Acer campestre
Mezereon	Daphne mezereum
Oak, pedunculate	Quercus robur
Oak, sessile	Quercus petraea
Osier	Salix viminalis
Pear, Plymouth	Pyrus cordata
Pear, wild	Pyrus pyraster
Poplar, grey	Populus x canescens
Poplar, white	Populus alba
Privet, wild	Ligustrum vulgare
Rose	Rosa species
Rowan	Sorbus aucuparia
Sea-buckthorn	Hippophae rhamnnoides
Service-tree, wild	Sorbus torminalis
Spindle	Euonymus europaeus
Spurge-laurel	Daphne laureola
Walnut	Juglans regia
Wayfaring-tree	Viburnum lantana
Whitebeam	Sorbus species
Willow	Salix species
Yew	Taxus baccata