

BREEAM Ecology Assessment

21 September 2010

[90944]



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If this report has been released electronically the appendices referred to herein can be found in the annexed zip folder/s as .pdf or .dwg files. If this report has been released in hard copy the appendices will be bound into the back of this report. Plans may be annexed separately as A1 or A0 copies where a bound-in A3 copy is not appropriate.

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Executive Summary

Arbtech Consulting Ltd were commissioned to undertake a BREEAM Ecology Assessment of the Marsh Farm Community Resource and Enterprise Centre, The Moakes, Luton. The assessment was based on a Phase 1 Habitat survey and further bat surveys conducted in 2009 by Arbtech Environmental. Information from these surveys was then combined with proposed design plans to check for potential to achieve credits under LE1 to LE6 (excluding LE2 – contaminated land), by a suitably qualified ecologist.

Mandatory Recommendations:

- Any trenches dug should have covers placed over them or have a rough sawn plank placed in them to act as a ramp for any wildlife that may fall in;
- Bird and bee boxes should be installed on new buildings;
- Trees and shrubs to be retained should be suitably protected from harm during construction works.

Additional Recommendations to Maximise Credits:

- Soft landscaping should include native or wildlife attracting plantings;
- Further bird and bat boxes should be installed on new buildings or retained trees;

A daylight inspection of the building and dusk emergence/dawn re-entry surveys were conducted on site revealing no bat activity. This combined with the lack of signs or evidence of any other protected or BAP species, or particularly suitable habitats for such species, it was considered highly unlikely that protected, BAP or rare species would be significantly impacted by the proposed development.

It was considered that the development (as proposed) could achieve three credits. However, if the client has a commitment to increasing plant species on site and incorporating all recommendations of the report then ecology credits potentially achieved could be up to six.

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Introduction

Background & Objectives

Arbtech Consulting Ltd were commissioned to undertake a BREEAM Ecology Assessment of the Marsh Farm Community Resource and Enterprise Centre, The Moakes, Luton. The assessment was based on a Phase 1 Habitat survey and further bat surveys conducted in 2009 by Arbtech Environmental. Information from these surveys was then combined with proposed design plans to check for potential to achieve credits under LE1 to LE6 (excluding LE2 – contaminated land), by a suitably qualified ecologist.

A suitably qualified ecologist oversaw surveys and reviewed all reports, as necessary. Their qualification details can be found in Appendix 9.

Full demolition of existing structures on the site and the construction of replacement buildings and associated landscaping is proposed.

The ecological assessment was intended to provide information on legal considerations for development, as well as further considerations necessary for a BREEAM Bespoke Assessment. It is understood that the client wishes to maximise the number of credits achievable, therefore objectives are summarised as follows:

- To provide a thorough assessment of the ecological value of the site;
- To provide Mandatory and Additional recommendations on enhancements to the ecology of the site;
- To provide recommendations on how to increase the number of native or wildlife attracting plant species on site.
- Outline credits available under LE1, LE3, LE4, LE5 and LE6.

Methodology

Habitat Survey

A Phase 1 Habitat Survey was carried out across the whole of the survey site. It was conducted using standard JNCC (2003) techniques and methodologies.

The site was visited on 4th May 2009, in overcast, cool and windy conditions.

Protected Species Survey

During the habitat survey, the potential for other protected and important species was assessed. This included European Protected Species, legally protected species and Local Biodiversity Action Plan Species (and habitats).

Results

3.1 Desk study

3.1.1 Designated sites

Statutory Sites

The study found that the application site did not lie within or adjacent to a Statutory Site of nature conservation value.

Non-Statutory Sites

The site listings supplied by Bedfordshire & Luton Biodiversity Recording & Monitoring Centre confirmed that the Community Centre was not designated or identified as an area of wildlife importance or interest.

However, there were six County Wildlife Sites within the 2 km search radius, of which four were found in, or adjoining, the residential area around Marsh Farm community Enterprise & Resource Centre; Great Bramingham Wood CWS, Leagrave Common CWS, Cowslip Meadow CWS, and Icknield School CWS.

The nearest of these sites, Great Bramingham Wood, lay approximately 500 m northeast of the Community Centre, with the other three sites 1 km and 2 km away respectively.

Brief notification details for these sites are as follows:

Bramingham Wood CWS

File code: 164

Description:

Great and Little Bramingham Woods comprise a single block of semi-natural broadleaved ancient woodland containing a clearing dominated by neutral grassland. Much of the grassland is tussocky and comprises species such as Cock's-foot, Yorkshire Fog and Meadow Foxtail. However, some of the grassland is very fine and contains species such as Common Spotted Orchid, Common Centaury, Goatsbeard, Birdsfoot Trefoil, and Black Knapweed indicating the presence of a calcareous soil. Much of the grassland is under threat from young Ash, Hazel, Grey Willow and Hawthorn scrub, which is developing along the woodland edge.

The value of the site as a linear green corridor is considerable, and forms an integral link with open countryside to the north. The grassland is also valuable as a buffer between Bramingham Wood and the housing development to the east. Evidence of dumping of garden refuse and general rubbish was noted on some areas of the grassland.

Cowslip Meadow CWS
File code: 159

Description:

The CWS comprises a single field containing a mosaic of neutral grassland, marshy grassland, ruderal vegetation and scattered scrub. The site contains a spring, at the site of which is a small well-vegetated pool, which feeds a stream that flows into the River Lea. Much of the grassland is relatively species-poor though some areas contain a good range of grassland species, including Yellow Rattle, Great Pignut, Cowslip and Lady's Bedstraw. In places the sward is dominated by finer grasses like Red Fescue. A small group of Southern Marsh Orchids are found close to the central channel in one such area.

Low-lying areas in the north-west end of the site and along the central channel support a mosaic of swamp and tall ruderal vegetation dominated by Reedmace, Reed Canary-grass, and Great Willowherb.

Thick Hawthorn-dominated hedges with mature willow and Ash surround most of the site. Other woody species present include Field Maple, Hazel, Elder and Blackthorn.

Of great importance is the presence of a large population of Great Pignut, which is near-threatened nationally, and the Southern Marsh Orchid, which is considered rare in Bedfordshire.

Leagrave Common CWS
File code: 151

Description:

The CWS comprises Leagrave Marsh, surrounding a very small area of unimproved calcareous grassland, Rotten Corner (broadleaved woodland), neutral grassland at Well Head, and the River Lea along with two of its feeder streams which flow through the site.

An area of ruderal vegetation contains a mosaic of marshy and neutral grassland, swamp and ruderal vegetation. The areas of unimproved calcareous grassland and ruderal vegetation contain locally frequent scattered scrub and trees. The adjacent stream and river contain abundant marginal vegetation. Rotten Corner has a mature canopy, a sparse understorey and, in places, a marshy ground flora. The River Lea, at its source, contains plentiful emergent vegetation.

Within the site Wauluds Bank is a large semi-willow, semicircular earthwork scheduled as an ancient monument. Previously an area of regularly mown amenity grassland, it is now managed as a hay meadow.

Areas around the edges of the existing CWS that are managed in association with the site had been surveyed for inclusion with the proposal for a Local Nature Reserve. It was agreed to include these areas within the CWS, resulting in a unified LNR/CWS boundary.

Icknield School CWS
File code: 156

Description:

An area of coarse, tussocky grassland with scattered scrub bounded to the north and south by housing, to the west by amenity grassland, and to the east by a school and playing fields consisting of amenity grassland. In places this is quite species rich and typical species include Agrimony, Black Knapweed, Greater Knapweed, Yellow Oat-grass, Field Scabious, Pignut, Great Pignut and Common Spotted Orchid. An interesting plant found here is Spring Beauty – a species usually associated with acidic soils.

This site contains an interesting range of scrub and grassland habitats and forms an important green corridor into the urban landscape.

A map showing these sites is in Appendix 3.

3.1.2 Protected species

Information on species held by Bedfordshire & Luton Biodiversity Recording & Monitoring Centre, and Bedfordshire Bat Group was requested.

This revealed a number of records of European Protected Species, Local Biodiversity Action Plan (LBAP) species, and Red Data Book species within a 2.0 km radius of the survey site.

None came from the site itself, but 200 m to the west in July 1994, on Waleys Close, there was a record of a Common Pipistrelle Bat, with both Common and Soprano Pipistrelle Bats in June 2006, approximately 1 km to the southwest at Leagrave Common. The latter also held Water Voles, the most recent of which was recorded in June 2007.

Great Crested Newts (along with other common amphibians) were recorded at Cowslip Meadow CWS 2 km to the southeast in January 2004, whilst UK BAP Species Grey Partridge and Spotted Flycatcher were both noted in January 2004 and September 2004 respectively at Great Bramingham Wood CWS, approximately 500 m to the northeast.

3.2 Habitat survey

3.2.1 Habitat descriptions

The following habitats were recorded across the site:

Scattered broadleaved trees
Amenity grassland
Introduced shrub
Buildings, roads, etc

These are shown on the Phase 1 Habitat Survey map in Appendix 1, with the target notes in Appendix 2.

Scattered broadleaved trees

A variety of trees were noted around the boundaries of the site and scattered across the open areas within it, including an impressive row of Field Maples along the southwestern side (Fig. 1).

Most of the trees were native and naturalised broadleaves, including Hornbeam, Walnut, Horse Chestnut, Sycamore, Common Lime, Hawthorn, Guelder Rose and Elder. The latter three species formed a dense understorey in the extreme southern corner

Non-native species included Norway Maple, Manna Ash, Cotoneaster, and Leyland Cypress. The latter had been planted close together along the northwestern and northeastern boundaries, and now formed a continuous, dense screen around this part of the site (Fig. 2).



Fig. 1 Row of Field Maples



Fig. 2 Screen of Leyland Cypress

Several other conifer species were noted, all planted alongside the access drive.

Amenity grassland

The whole site lay in a shallow depression on a slight slope, and this was presumably originally excavated to reduce the visual impact of the buildings. The sides of the depression had been seeded and now formed narrow grassy embankments around the boundaries (Fig. 3).

The grassland comprised typical amenity species, predominantly Perennial Ryegrass and Creeping Fescue, but with some Annual Meadow-grass, Cocksfoot and Hairy Brome (Fig. 4).



Fig. 3 Amenity grass embankment



Fig. 4 Hairy Brome

A surprising variety of wildflowers were present, although most of these only occurred in small numbers and were widely distributed. These included, Wild Mignonette, Wild Strawberry, Herb Bennett, Bush Vetch, Black Medick, Dovesfoot Cranesbill, Cut-leaved Cranesbill, St John's Wort sp., Scarlet Pimpernel, and Yarrow.

Among the commoner species there were Creeping Buttercup, Common Mouse-ear *Cerastium fontanum*, Wavy Bittercress *Cardamine flexuosa*, Red Clover *Trifolium pratense*, Cow Parsley *Anthriscus sylvestris*, Rosebay Willowherb *Epilobium angustifolium*, Common Cleavers *Galium aparine*, Ragwort *Senecio jacobaea*, and Dandelions *Taraxacum* Section *Vulgaria*.

Introduced shrub

There were a variety of ornamental shrub beds along the front (SE elevation) and southwestern side of the office block and adjacent car park (ref. Fig. 3), whilst most of the boundary with The Moakes was planted up with a dense row of non-native shrubs, this effectively forming a low cut hedgerow.

More shrub beds lined the entrance driveway, and species included Cotoneaster, Laurels Prunus spp. and roses Rosa spp.

Buildings, roads, etc

The largest structure on the site was the industrial type building with integral office block and ground floor car park (Fig. 5). Adjacent to it was a split level car park and between the two an extensive area of hard surfaced car parking.



Fig. 5 Main building



Fig. 6 Split level car park

Around the building there was a paved/tarmacadam footpath, with a wide entrance drive sweeping in at the northeast corner.

3.2.2 Flora

The botanical composition of each habitat was typical, and all species recorded were common and widespread. It should be noted however, that the formality and ornamental nature of the grounds certainly limited the number of species present.

A list of species observed is presented in Appendix 4.

3.3 Protected species survey

3.3.1 Bats

Only one of the trees supported features suitable for bat roosting and/or hibernation. This was a semi-mature Horse Chestnut (ID No. 0401) with several patches of exfoliating (peeling) bark (Figs. 7 & 8 – Target Note 1).



Figs. 7 & 8 Horse Chestnut with exfoliating bark

The crevices behind the bark were closely examined, but none revealed any evidence of bat use or occupation.

A separate bat survey was undertaken on the night of 4th May 2009, and the early morning of 11th May 2009. These surveys confirmed the absence of bats at the site.

3.3.2 Badgers

No signs of Badger activity were recorded.

3.3.3 Otters

No signs of Otter activity were recorded.

3.3.4 Water Voles

No signs of Water Vole activity were recorded.

3.3.5 Birds

A total of 9 species of birds were observed. Of these, one was a Species of High Conservation Concern (RSPB Red list); House Sparrow, whilst the rest were Species of Low Conservation Concern (RSPB Green list).

A pair of House Sparrows were nesting behind some metal cladding on the front (SE elevation) of the office block (Fig. 9 – Target Note 2), entering this through a small, unplugged hole which presumably accessed a fixing bracket (Fig. 10). At the time they were feeding young, as the chicks could be clearly heard.

A second, unoccupied House Sparrow nest was subsequently discovered in an adjacent hole in the northeast elevation (Target Note 3).



Fig. 9 Metal cladding with hole (arrowed)



Fig. 10 Close-up of nest hole

In addition, at least two pairs of Blackbirds were also nesting in the shrub beds/Leyland Cypress (Target Notes 4 and 5). Other birds recorded were just feeding around the site.

A full list of species noted is given in Appendix 5.

3.3.6 Reptiles

No reptiles were recorded during the site visit.

3.3.7 Great Crested Newts

Pieces of loose material that provided refugia were checked, but no Great Crested Newts (or other amphibians) were found.

3.3.8 Invertebrates

No important or uncommon invertebrates were observed.

3.3.9 Other species

No other protected, Local BAP, or Red Data Book species were observed during the site visit, but several fresh Brown Rat droppings were found inside the main building.

Recommendations & Conclusion

LE1- Reuse of Land

Based on design plans it was considered that at least 75% of the proposed development's footprint is on an area of land which has previously been developed for use by commercial purposes in the last 50 years and therefore one credit can be awarded for this criteria.

LE2- Contaminated Land

This criteria was not considered as part of the ecology assessment.

LE3- Ecological Value of Site and Protection of Ecological Features

Ecological Value of Site

The ecological value of a site may be summarised as its overall contribution to the ecosystem of an area.

When broken down, the following features of a site affect its contribution to the overall ecosystem of an area:

- the range of habitats and species present (diversity);
- the quantity of natural resource, in particular at the base of the food chain (i.e. plants and invertebrates);
- presence of rare/scarce habitats and species.

For the features listed above, the site scored as follows:

- low on habitat diversity;
- low plant species diversity and abundance;
- low-medium on locally or nationally rare or scarce habitats and species (some value to the priority BAP species House Sparrow).

Overall, this gives a low ecological value for the site.

Protection of Ecological Features

Although the site was considered to be of low ecological value there was still some potential for the site to support nesting birds including the priority BAP species House Sparrow. Furthermore, some mature trees and a hedgerow was present, therefore the following precautionary measures are recommended:

To avoid harm to nesting birds demolition and any tree or shrub removal should occur outside of the main bird breeding season (March until the end of August) or an ecologists should check the site for active bird nests prior to demolition or tree/shrub removal;

To ensure retention of potential House Sparrow nesting habitat on site at least three bird boxes suitable for House Sparrow (terraces) should be installed on the new buildings on site (as detailed in the Extended Phase 1 Habitat report by Arbtech Environmental). Positioning of the boxes should be conducted with the consultation of an ecologist to ensure maximum effectiveness.

Trees and shrubs proposed for retention should be suitably protected from harm following BS 5837:2005 (Trees in Relation to Construction).

If these precautionary measures are followed then it was considered that one credit would be achieved under this category.

LE4- Mitigating Ecological Impact

The total number of plant species on site, based on the ecologists observations during the site visit totaled 55, 54 of which were either native or of known value to wildlife.

This number was then used to calculate the change in ecological value of the site on BREEAM Ecology Calculator 2 (see Tables below), in accordance with BRE (Building Research Establishment, 2008).

Table 1: Calculation of Ecological Value of the Site before Development using Ecology Calculator 2

Habitat Type	Area of Habitat Type (m2)	Species	% Habitat Type on Site	Species x % Habitat Type on Site
Buildings & hardstanding	14518	0	81.8	0
Garden planting	350	3	2	.06
Amenity grassland	2284	40	12.9	5.16
Scattered trees	75	13	0.4	.052
Hedgerow/treeline	523	3	2.9	.087
Total Site Area	17750		100	5.359

Therefore, the ecological value of the existing site is 5.359

Table 2: Calculation of Ecological Value of the Site after Development using Ecology Calculator 2

Habitat Type	Area of Habitat Type (m2)	Species	% Habitat Type on Site	Species x % Habitat Type on Site
Buildings/ hardstanding	12785	0	72	0
Scattered trees	18	3	0.1	.003
Shrub planting	3371	12	19	2.28
Sensory Garden	70	16	0.4	.064
Green Roof	633	1	3.6	.036
Hedgerow/treeline	523	3	2.9	.087
Amenity grassland	350	40	2	.80
Total Site Area	17750		100	3.27

The ecological value of the proposed site calculated as shown in Table 2 is 3.27, therefore the change in ecological value between the existing site and the proposed site is -2.089 (5.359 – 3.27). Therefore one credit would be achievable for this category.

LE5- Enhancing Site Ecology

Due to the assessment being conducted by a suitably qualified ecologist and so long as the client undertakes all of the recommendations in LE3 as well as further enhancement recommendations (as outlined below), it was considered that one credit could be achieved for this category.

Trench Covering

Any trenches dug should have covers placed over them or have a rough sawn plank placed in them to act as a ramp for any wildlife that may fall in.

Bat Boxes

The addition of four bat boxes on the new development would greatly increase the potential roosting sites for bats. The boxes should be installed high on buildings or retained trees and should not face directly east or west.

Bird Boxes

The addition of three House Sparrow terraces and four general bird boxes to the buildings ideally positioned under the eaves will increase the nesting opportunities for local birds. The boxes should be positioned away from obstructions, out of direct sunlight and prevailing winds.

Bee Boxes

The addition of two bee nesting boxes would benefit local native bees by providing nesting habitat on site. The nesting boxes should be installed high on buildings or retained trees (above 2m).

Wooden bat, bird and bee boxes should not be treated with preservatives and should be purchased from well-managed sources which carry the Forest Stewardship Council (FSC) logo and can be purchased through on-line suppliers such as Alana Ecology (www.alanaecology.co.uk) or could be supplied and fitted by Arbtech Environmental.

If the client wished to achieve further credits under this category then a large number of native or wildlife attracting plant species would need to be included into the landscaping design.

The most effective way to increase the number of plant species on site would be through the sowing or planting of wildflowers. A wildflower area on site would not only increase the plant species numbers but also create habitats and food for wildlife.

Another way to increase the number of plant species on site would be through native tree and shrub plantings. Trees and shrubs on site would greatly increase the structural diversity of habitats on the site and would likely attract a greater number and diversity of animal species.

The most numerous native wildlife mixture (with over 100 species) was found to be The Educational Wildlife Mixture sold by Nicky's Seeds at <http://www.nicky's-nursery.co.uk>. A list of native trees and shrubs can be found in Table 4 in Appendix 5.

Following the present planting scheme there was found to be a decrease in ecological value of the site by -2.089, if the numbers of plant species on site can be increased so that the ecological value of the site (based on BREEAM Ecology Calculator 2) was 11.359, a positive increase of six, then two further credits could be gained (one from LE4 and one from LE5).

LE6- Long Term Impact on Biodiversity

To achieve credits within LE6: One credit can be awarded where there is a commitment to achieve the mandatory criteria and at least two of the additional criteria (listed below).

Two credits can be awarded where there is a commitment to achieve the mandatory criteria and at least four of the additional criteria (listed below).

Mandatory Criteria

- 1) A suitably qualified ecologist (SQE) has been appointed prior to commencement of activities on site.
- 2) The suitably qualified ecologist confirms that all relevant UK and EU legislation relating to protection and enhancement of ecology has been complied with during the design and construction process.
- 3) A landscape and habitat management plan, appropriate to the site, is produced covering at least the first five years after project completion. This is to be handed over to the building occupants and includes:
 - Management of any protected features on site
 - Management of any new, existing or enhanced habitats
 - A reference to the current or future site level or local Biodiversity Action Plan.

Additional Criteria

- 1) The contractor nominates a 'Biodiversity Champion' with the authority to influence site activities and ensure that detrimental impacts on site biodiversity are minimised in line with the recommendations of a suitably qualified ecologist.
- 2) The contractor trains the site workforce on how to protect site ecology during the project. Specific training should be carried out for the entire site workforce to ensure they are

aware of how to avoid damaging site ecology. Training should be based on the findings and recommendations for protection of ecological features highlighted within a report prepared by a suitably qualified ecologist.

- 3) The contractor records actions taken to protect biodiversity and monitor their effectiveness throughout key stages of construction. The requirement commits the contractor to make such records available where publicly requested.
- 4) Where a new ecologically valuable habitat, appropriate to the local area, is created. This includes habitat that supports nationally, regionally or locally important biodiversity, and/or which is nationally, regionally or locally important itself; including any habitat listed in the UK Biodiversity.

It was considered very unlikely that two credits could be achieved under this category. However, it was considered possible for the client to achieve one credit under LE6 based on the following:

Mandatory requirements 1 and 2 have been satisfied already, though the client will need to follow the habitat management plan as detailed in Table 5 in Appendix 6 with supporting evidence (e.g. photographs and timetable of works undertaken).

A “Biodiversity Champion” is nominated (could be the site manager) and the workforce is trained to protect ecological features during the works (could be in the form of a “Tool Box” talk by Arbtech Environmental).

Overall, it was considered that the site was of low ecological value and that by following precautionary measures for nesting birds the proposed development posed a negligible risk of impact to protected, BAP or rare species or local nature conservation. It was also considered that by following the recommendations in this report that the ecological value of the site could be increased and possible for the development to achieve at least three credits and maybe as many as six (see credit achievement summary below).

Table 3: Ecological Categories and Development Related Credits

Category Description	Credit Reference	Credits Achieved	Possible Credits
Reuse of Land	LE1	1	1
Ecological Value of Site & Protection of Ecological Features	LE3	1	1
Mitigating Ecological Impact	LE4	1	2
Enhancing Site Ecology	LE5		1
Long Term Impact on Biodiversity	LE6		1
Total Credits		3	6

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9. Natural England, 2007. *Badgers and Development*. Natural England, Peterborough.

Appendices

Appendix 1: Phase 1 Habitat Survey map

Appendix 2: Target Notes

Appendix 3: Statutory sites and non-statutory sites within a 2 km radius of Marsh Farm
Community Enterprise & Resource Centre

Appendix 4: Plant species list

Appendix 5: Bird species list

Appendix 6: Relevant legislation







Appendix 7: Suggested Shrubs and Trees

Appendix 8: Five Year Ecological Management Plan

Appendix 9: Details of Suitably Qualified Ecologist

Appendix 1: Phase 1 Habitat Survey map (not to scale)

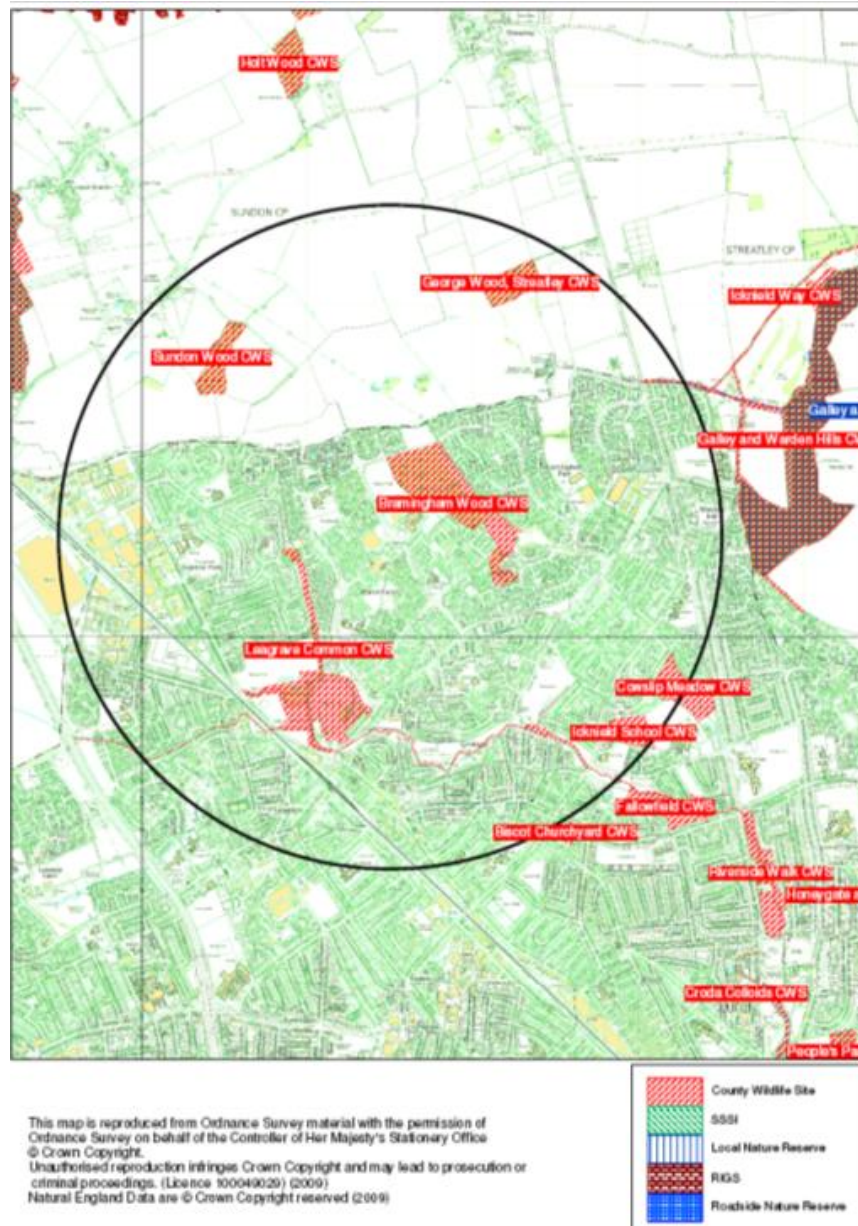


Legend		
	Survey boundary	 Amenity grassland
	Scattered broadleaved trees	 Buildings, roads
	Introduced shrub	 Target Note

Appendix 2: Target Notes

Target Number	Notes
1	Horse Chestnut
2	House Sparrow nest – occupied
3	House Sparrow nest – unoccupied
4	Probable Blackbird nesting site
5	Probable Blackbird nesting site

Appendix 3: Statutory sites and non-statutory sites within a 2 km radius of Marsh Farm Community Enterprise & Resource Centre



Appendix 4: Plant species list

Latin name	Common name
<i>X Cupressocyparis leylandii</i>	Leyland Cypress
<i>Carpinus betulus</i>	Hornbeam
<i>Juglans regia</i>	Walnut
<i>Aesculus hippocastanum</i>	Horse Chestnut
<i>Acer pseudoplatanus</i>	Sycamore
<i>Acer platanoides</i>	Norway Maple
<i>Acer campestre</i>	Field Maple
<i>Tilia x vulgaris</i>	Common Lime
<i>Fraxinus excelsior</i>	Ash
<i>Fraxinus ornus</i>	Manna Ash
<i>Malus domestica</i>	Domesticated Apple
<i>Crataegus monogyna</i>	Hawthorn
<i>Sambucus nigra</i>	Elder
<i>Viburnum opulus</i>	Guelder Rose
<i>Urtica dioica</i>	Common Nettle
<i>Stellaria media</i>	Common Chickweed
<i>Ranunculus repens</i>	Creeping Buttercup
<i>Cardamine flexuosa</i>	Wavy Bittercress
<i>Reseda lutea</i>	Wild Mignonette
<i>Rosa spp</i>	Rose species
<i>Rubus fruticosus</i>	Bramble
<i>Fragaria vesca</i>	Wild Strawberry
<i>Geum urbanum</i>	Herb Bennett
<i>Vicia sepium</i>	Bush Vetch
<i>Medicago lupulina</i>	Black Medick
<i>Tripolium pratense</i>	Red Clover
<i>Geranium robertianum</i>	Herb Robert

<i>Geranium molle</i>	Dovesfoot Cranesbill
<i>Geranium dissectum</i>	Cut-leaved Cranesbill
<i>Hypericum sp</i>	St John's Wort species
<i>Epilobium angustifolium</i>	Rosebay Willowherb
<i>Anthriscus sylvestris</i>	Cow Parsley
<i>Aegopodium podagraria</i>	Ground Elder
<i>Pastinaca sativa</i>	Wild Parsnip
<i>Anagallis arvensis</i>	Scarlet Pimpernel
<i>Galium aparine</i>	Common Cleavers
<i>Symphytum officinale</i>	Common Comfrey
<i>Hedera helix</i>	Ivy
<i>Veronica chamaedrys</i>	Germander Speedwell
<i>Euphrasia sp</i>	Eyebright species
<i>Plantago lanceolata</i>	Ribwort Plantain
<i>Dipsacus fullonum</i>	Teasel
<i>Bellis perennis</i>	Daisy
<i>Achillea millefolium</i>	Yarrow
<i>Senecio jacobaea</i>	Ragwort
<i>Cirsium vulgare</i>	Spear Thistle
<i>Tragopogon pratensis</i>	Goatsbeard
<i>Sonchus asper</i>	Prickly Sowthistle
<i>Sonchus oleraceus</i>	Smooth Sowthistle
<i>Taraxacum vulgaria</i>	Dandelion
<i>Festuca rubra</i>	Creeping Fescue
<i>Lolium perenne</i>	Perennial Ryegrass
<i>Dactylis glomerata</i>	Cocksfoot
<i>Poa annua</i>	Annual Meadow-grass
<i>Bromus ramosus</i>	Hairy Brome

Appendix 5: Bird species list

Common name	Latin name
Woodpigeon	<i>Columba palumbus</i>
Collared Dove	<i>Streptopelia decaocto</i>
Robin	<i>Erithacus rubecula</i>
Blackbird	<i>Turdus merula</i>
Blue Tit	<i>Parus caeruleus</i>
House Sparrow	<i>Passer domesticus</i>
Greenfinch	<i>Carduelis chloris</i>
Magpie	<i>Pica pica</i>
Carrion Crow	<i>Corvus corone corone</i>

Appendix 6: Relevant legislation

Birds

In Britain, all wild birds, their nests and eggs are protected under the Wildlife & Countryside Act 1981. There are penalties for:

- *Killing, injuring or capturing them, or attempting any of these*
- *Taking or damaging the nest whilst in use*
- *Taking or destroying the eggs*

Bats

Bats are protected under the Wildlife and Countryside Act 1981 as amended by the Countryside Rights of Way Act 2000 and under the Conservation of Habitats and Species Regulations 2010. Some bats are also Priority UK BAP species. A summary of the offences likely to be relevant to development are:

- *Intentionally or deliberately kill, injure or take a bat;*
- *Intentionally or recklessly damage, destroy or obstruct access to any place that a bat uses for shelter or protection, whether bats are present or not;*
- *Damage or destroy a breeding site or resting place of any bat;*
- *Intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection;*
- *Deliberately disturb a bat anywhere.*

Great Crested Newts

Great crested newts are protected under the Wildlife and Countryside Act 1981 as amended by the Countryside Rights of Way Act 2000, and the Conservation of Habitats and Species Regulations 2010. Great crested newts are also Priority UK BAP species. A summary of the offences likely to be relevant to development are:

- *Intentionally or deliberately capture or kill;*
- *Intentionally injure;*
- *Deliberately disturb, or intentionally or recklessly disturb in a place of shelter or protection;*
- *Damage or destroy a breeding site or resting place;*

-
- *Intentionally or recklessly damage, destroy or obstruct access to a place used for shelter or protection.*

Badgers

Badgers are protected in Britain by the Protection of Badgers Act 1992. The purpose of this Act is to protect the animals from deliberate cruelty and from the incidental effects of lawful activities which could cause them harm. Under this legislation it is an offence to:

- *Willfully kill, injure, take, possess or cruelly ill-treat a Badger, or attempt to do so.*
- *Interfere with a sett by damaging or destroying it.*
- *Obstruct access to, or any entrance of, a Badger sett.*
- *Disturb a Badger when it is occupying a sett.*

Note that if any of the above resulted from a person being reckless, even if they had no intention of committing the offence, their action would still be considered an offence. A person is not guilty of an offence if it can be shown that the act was 'the incidental result of a lawful operation and could not have been reasonably avoided'; only a court can decide what is 'reasonable' in any set of circumstances. Penalties for offences under this legislation can be up to six months in prison and a fine of up to £5,000 for each offence.

A Badger sett is defined in the Act as 'any structure or place which displays signs indicating current use by a Badger'. This can include culverts, pipes and holes under sheds, piles of boulders, old mines and quarries, etc. 'Current use' does not simply mean 'current occupation' and for licensing purposes it is defined as 'any sett within an occupied Badger territory regardless of when it may have last been used'. A sett therefore, in an occupied territory, is classified as in current use even if it is only used seasonally or occasionally by Badgers, and is afforded the same protection in law.

Otters

The Otter is fully protected under the Wildlife and Countryside Act 1981. It is an offence to kill, injure or knowingly disturb an Otter or to damage an Otter's resting place.

Reptiles

All reptiles are protected under part of sub-section 9(1) and all of sub-section 9(5) of the Wildlife and Countryside Act 1981. These prohibit the intentional killing and injuring and trade (i.e. sale, barter, exchange, transporting for sale and advertising to sell or to buy). It is not an offence to possess these animals. This level of protection applies to the four widespread species of reptile, namely Common Lizard, Slow-worm, Grass Snake and Adder.

Appendix 7: Suggested shrubs and trees

Table 4: Selected UK Native Trees and Shrubs

Common Name	Scientific Name
Trees:	
Silver Birch	<i>Betula pendula</i>
Beech (H)	<i>Fagus sylvatica</i>
Wild Apple	<i>Malus sylvestris</i>
Wild Cherry (H)	<i>Prunus avium</i>
Bird Cherry	<i>Prunus padus</i>
Whitebeam	<i>Sorbus aria</i>
Wild Service-tree	<i>Sorbus torminalis</i>
Small-leaved Lime	<i>Tilia cordata</i>
Large-leaved Lime	<i>Tilia platyphyllos</i>
Shrubs	
Field Maple (H)	<i>Acer campestre</i>
Box (H)	<i>Buxus sempervirens</i>
Dogwood (H)	<i>Cornus sanguinea</i>
Hazel (H)	<i>Corylus avellana</i>
Hawthorn (H)	<i>Crataegus monogyna</i>
Spurge Laurel	<i>Daphne laureola</i>
Spindle (H)	<i>Euonymus europaeus</i>
Holly (H)	<i>Ilex aquifolium</i>
Juniper	<i>Juniperus communis</i>
Privet (H)	<i>Ligustrum vulgare</i>
Elder (H)	<i>Sambucus nigra</i>
Yew (H)	<i>Taxus baccata</i>
Wayfaring Tree	<i>Viburnum lantana</i>
Guelder Rose (H)	<i>Viburnum opulus</i>

(H) Common native hedging plants.

Appendix 8: Five Year Ecological Management Plan

Table 5: Five Year Ecological Management Plan for BREEAM Development at Marsh Farm, The Moakes, Luton.

Actions	Season for works to occur	Years to be undertaken
Avoid the use of artificial fertilisers or other chemicals in any soft landscaping		1-5
Removal/pruning of any newly planted trees and shrubs	September to February (outside of bird breeding season).	1 to 5
Planting of native shrubs and trees	Ideally late autumn through winter, although planting in spring and early summer is acceptable.	1
Creation and planting/sowing of any wildflower area	Ideally autumn through winter, although spring and early summer is acceptable.	1
Weeding of any soft landscaping	Spring and summer.	1-5
Trimming of any wildflower area	Once annually at the end of summer.	1-5
Installing bat, bird and bee boxes	All year round	1

Appendix 9: Details of Suitably Qualified Ecologist

Name: Andrew Warren

Qualifications: BSc Hons, MA (LM), MIEEM, NE Licence Holder Bats & Newts

Years of Experience: 25+