

Annex A: Ecological Constraints Maps

Constraints Plan ES CRT – Figure A1

Constraints Plan ES CRT – Figure A2

Constraints Plan ES CRT – Figure A3

Annex B: Phase 1 Habitat Survey

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**Environmental
Statement**

**Ecology and Nature
Conservation Chapter**

**Annex B: Phase 1
Habitat Survey**

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Environmental Statement

Phase 1 Habitat Survey

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List of Contents		Page
Summary		1
Chapters and Appendices		
1	Introduction	2
1.1	Background to the Scheme	2
1.2	Introduction to the Survey Area	2
2	Scope of the Survey	3
3	Methodology	4
3.1	Desk Survey Methods	4
3.2	Phase 1 Habitat Survey Methods	4
3.2.1	Target Notes	5
4	Results	6
4.1	Desk Survey Results	6
4.2	Phase 1 Habitat Survey Results	6
4.2.1	Woodland and Scrub	6
4.2.2	Grassland and Marsh	7
4.2.3	Aquatic Habitats	8
4.2.4	Hedgerows and Other Boundaries	8
4.2.5	Other Habitats	9
4.2.6	Adjacent Habitats of Conservation Value	10
4.3	Plant Species Summary	10
4.4	Protected Species Summary	10
4.4.1	Breeding and Wintering Birds	10
4.4.2	Bats	10
4.4.3	Badgers	10
4.4.4	Reptiles	11
4.4.5	Amphibians	11
4.4.6	Water Voles	11
4.4.7	Otters	11
4.4.8	Aquatic Invertebrates	11
4.4.9	Other Mammals	11
5	Ecological Assessment	12
5.1	Habitat Assessment	12
5.2	Hedgerow Assessment	13
5.3	Woodland Assessment	13
5.4	Grassland	14

5.5	Drainage Ditch Assessment	14
5.6	Protected Species Assessment	14
6	Conclusions	14
7	Recommendations for Further Survey	15
8	References	15
Appendix A:	Location Map	A-1
Appendix B:	Habitat Maps and Target Notes	B-1
Appendix C:	Botanical Species List	C-1
Appendix D:	Ecological Records	D-1

Figures

Figure A.1: Location Map

Figure B.1 -B.5: Phase 1 Habitat Survey

Tables

Table 3.1: Table 3.1: DAFOR Rating Scale

5

Table B.2: Target Notes

B-2

Summary

As part of the ecological survey programme for the Cambridge Sport Lakes , an Extended Phase 1 Habitat Survey was undertaken in 2004. A desk study on designated sites and protected species was carried out prior to the survey with consultation from statutory and non-statutory organisations.

National or regional designated sites or ecological importance were not identified within the study area. The field survey area was found to be mainly arable and improved fields: together these comprised approximately 75% of the area surveyed. Drainage ditches represented the main habitat separating agricultural fields. Drainage ditches were identified as important local habitat recognised in the Local Biodiversity Habitat Action Plan. A number of other (UK and Local Biodiversity) habitat types were also identified on site, providing potential habitat for a range of protected species.

1 Introduction

Mott MacDonald was commissioned to undertake an Extended Phase 1 Habitat Survey for the development of a rowing lake between Milton and Waterbeach to the north of Cambridge.

The aim of this study is to identify the main habitat types and features of potential value to protected species which may be directly affected by the scheme. The Phase 1 Habitat Survey will provide baseline information for the Environment Impact Assessment Process. All features of conservation value were assessed and areas requiring further study were target noted. Further surveys of linear features and fauna were carried out concurrently in order to provide a more detailed assessment of hedgerows, ditches and protected species.

1.1 Background to the Scheme

Cambridge Rowing Trust (CRT) have applied for planning permission to construct a rowing lake and country park on approximately 100 hectares of land between Milton and Waterbeach. The proposed development consists of an international standard rowing lake, 2300m long and 100m wide, connected to the Upper Cam to the south by a 1000m long, 40m wide cut and a 250m long canal. The lake will be excavated out of existing farmland between Milton and Waterbeach, and the soil from the excavation will be used to create a country park surrounding the lake.

1.2 Introduction to the Survey Area

The study area is situated five miles north of the city of Cambridge between Waterbeach to the north and Milton and the A14 dual carriageway to the south. To the west is the A10 and to the east is the Cambridge to King's Lynn railway line. Beyond the railway lies the meandering River Cam.

The southern habitats comprise small meadows and pastures and a network of connecting hedgerows and small wooded blocks. The southern-most parcel of land surveyed close to the River Cam and comprises varied riparian vegetation with a prominent bankside distribution of ancient and often pollarded willow (*Salix*). Milton Country Park to the south-west (previous gravel extractions site) contains a number of important habitats of woodland dominated by willow carr and varied aquatic features that include a number of gravel lakes.

Within central areas field size increases and the lack of woodland vegetation and the arable nature of the fields give the landscape a more open character. The size of fields further increases to the north, where the largest arable fields exist. In this area there are few hedgerows and even isolated trees are scarce apart from at the north-eastern corner supporting Carr Dyke (Scheduled Ancient Monument). A large section of the dyke has been encroached by willow scrub and contains a large number of planted and native trees.

The majority of the study area is typical open fenland habitat with a regimented pattern of ditches which represent the main wildlife corridors and habitats of value in central areas. Other valued habitats are the pockets of fragmented woodland and scrub in northern and southern areas.

2 Scope of the Survey

The field survey corridor extended over the entire proposed footprint for the scheme and for the majority of the scheme up to 100m from the boundary, with the exception of the Cambridge to King's Lynn railway which marked the eastern boundary of the surveyed area, see **Appendix A** of the Phase 1 Habitat Survey, **Figure 1** Location Map. A 250m corridor outside of the main scheme boundary was also assessed to identify adjacent habitat of conservation value.

This report includes:

- Maps and summary descriptions of all habitat types surveyed. **Appendix B** of the Phase 1 Habitat Survey
- Botanical data with distribution information. **Appendix C** of the Phase 1 Habitat Survey
- Targeted faunal information and a summary of potential habitats of importance to protected species.
- Targeted specific information on ditches and other features of conservation value.
- Desk survey information on designated sites and protected species. **Appendix D** of the Phase 1 Habitat Survey

Detailed information on fauna taxa has not been included within this report as detailed specific faunal studies were ongoing during Phase 1 surveying. However, a brief summary of potential habitats of value to protected species is included in **Section 4**

The survey was not conducted at the optimal time of year for some flowering species therefore certain plants of importance may have been missed. Areas where important plant communities may exist, but which were not surveyed in detail, were targeted for further study. The majority of ditches targeted on the initial Phase 1 walkover visit were revisited in July for further assessment in order to provide more information than initially gathered during sub-optimal surveying in April. This report incorporates all botanical data collected.

3 Methodology

3.1 Desk Survey Methods

The following organisations were contacted and asked to provide details for designated and protected sites of International, National, Regional and Local importance within 2 km of the site, including the presence of protected species within the survey area **Appendix D**.

- Environment Agency
- English Nature
- Cambridgeshire Wildlife Trust
- Suffolk Bat Group
- South Cambridgeshire District Council
- British Trust for Ornithology

International designations include: Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites – Wetlands of International Importance.

National designations include: National Nature Reserves (NNR) and Sites of Special Scientific Interest (SSSI).

Regional and local sites include: areas of high ecological value and County Wildlife Sites (CWS). Local Nature Reserves (LNR)

3.2 Phase 1 Habitat Survey Methods

A Phase 1 Habitat Survey was conducted in April/May 2004. A further search of the drainage ditches occurred in July. The survey was undertaken according to guidelines outlined in the 'Handbook for Phase 1 Habitat Survey – a Technique for Environmental Audit', Joint Nature Conservancy Council 1993 as modified by the Institute of Environmental Assessment.

All habitats within the study area were classified, notable species of flora, fauna and areas of conservation value were targeted. Where possible, botanical species were identified to species level, species lists were compiled and dominance noted according to the DAFOR scale – a simple qualitative plant abundance/cover classification system **see Table 3.1**.

Where sufficient information was gathered on a community of plants, an attempt was made to broadly categorise the community type according to the National Vegetation Classification (NVC). The NVC system is used to identify the main vegetation communities and various sub-communities according to composition, frequency and abundance of species, together with climatic, topographical and management variations from collected data of random samples from each homogeneous stand.

The geology is of low-lying agricultural land comprising of level clay lowlands, underlain by Gault and Jurassic clays.

Table 3.1: DAFOR Rating Scale

Code	Description	Meaning
D	Dominant	Comprises most of the community
A	Abundant	Very frequent in the community but not dominant
F	Frequent	Frequently seen in the community
O	Occasional	Seen but not frequently occurring
R	Rare	Hardly ever found

The following survey constraints were noted during the survey:

- The initial survey was conducted outside the optimal time of year for certain families of flowering plants, therefore certain species may not have been fully visible during the survey. A number of aquatic flowering plants could not be surveyed in detail due to the initial timing of the survey, therefore a further July visit was undertaken to assess later flowering macrophytes.
- Where land was not accessible due to private ownership, a broad evaluation of the habitat type, ecological features and quality was made from distance with the assistance of binoculars.

3.2.1 Target Notes

Appendix B presents the Phase 1 Habitat Maps and accompanying target notes. Target notes are an important component of Phase 1 habitat mapping and provide additional detailed information on habitats and species of conservation value, focusing on areas too small to map or highlighting important ecological features requiring further survey. All hedgerows, woodlands and drainage ditches were target noted during this survey. Target notes in **Appendix B Figures B2-B5** were colour coded for easier recognition of habitat types:

Blue - Aquatic habitat

Green – Hedgerow/Woodland habitat

Yellow – Grassland habitat

Red – Other habitat feature

4 Results

4.1 Desk Survey Results

The following designated sites information.

International Sites

There are no international sites of importance.

National Sites

There are no NNRs or SSSIs within the study area. To the north (2 km outside the study area) are a series of low lying pastures which are subject to seasonal flooding, comprising grassland wet meadow pools, ditches and river margins, designated as the Cam Washes SSSI due to the important diversity of wintering and breeding wildfowl, waders and the botanical diversity of neutral grassland.

Regional Sites

There are no regional sites of importance.

Local Sites

There are no Local Nature Reserves (LNR) within the study area. However to the north are two County Wildlife Sites approximately 1 km from the area; Cambridge Road Pollard Willows and Clayhithe Pollard Willows. Adjacent to the west of the site is Milton Country Park and outside the study area The City of Cambridge has eight LNR

4.2 Phase 1 Habitat Survey Results

The following Phase 1 habitats were recorded within the study area and are shown in **Appendix B** Target Maps and Notes Maps. Each habitat is described with reference to dominant plant species, conservation value and general distribution within the survey area.

4.2.1 Woodland and Scrub

Less than 20% of the survey area can be defined as comprising woodland and scrub habitat. Central site areas are covered by trees and scrub associated with hedgerows and occasional scattered trees along ditches.

The northern part of the study area comprises open arable fields, intensively farmed and almost completely devoid of woody vegetation.

Broadleaved Semi-natural Woodland

Broadleaved woodland was defined as vegetation dominated by trees more than 5m high when mature, forming a distinct though sometimes open canopy containing less than 10 percent conifers. Woodland was classified as semi-natural if planted trees were present and accounted for less than 30 percent of the canopy composition, but as a plantation if more than 30 percent was obviously planted.

Overall woodland cover within the survey area is confined to the northern area (Carr Dyke) and the southern area (surrounding the north-east edge of Milton). Within this locality are two small wooded blocks containing a varied mix of broadleaved species including pedunculate oak (*Quercus robur*),

horse chestnut (*Aesculus hippocastanum*), whitebeam (*Sorbus aria*), silver birch (*Betula pendula*), beech (*Fagus sylvatica*) with understorey trees of elder (*Sambucus nigra*), hawthorn (*Crataegus monogyna*) and field maple (*Acer campestre*). The first block runs to the western edge of a series of small paddocks used for horse grazing and stabling, forming a wooded block that appears partially moated. The second block forms a belt of mature woodland associated with Milton Hall and includes some ancient planting of parkland trees of mature oak and ash (*Fraxinus excelsior*). To the north-east Carr Dyke is dominated by willow carr approximately 5-8m in height.

Broadleaved Plantation Woodland

All obviously planted woodland of any age was included in this category; there were a number of small planted stands dominated by few species. The largest of these stands includes a block dominated by whitebeam. No broadleaved plantation blocks were identified within northern or central areas.

Coniferous Plantation Woodland

All obviously planted woodlands with 10 percent or less broadleaved trees in the canopy are included within this habitat type. There was only one notable block, alongside the western edge of the survey boundary, dominated by Norway spruce (*Picea abies*).

Scattered Broadleaved Trees

Scattered trees within the survey area were few, existing in isolation rather than in groups. Willow represented the dominant scattered tree mainly associated with ditch banks. Hawthorn and oak also occurred singly or in groups, A number of large oak were identified in the fields surrounding Milton Church once part of the Milton Hall parkland. The northern ditch (Target Note 1) supported a number of mature willow and oak over 10 m tall.

Dense/Continuous Scrub

Scrub is defined as seral or climax vegetation dominated by locally native shrubs less than 5m in height and occasionally with a few scattered trees. Scrub within the survey area was mainly associated with southern small wooded belts existing as a component of the wood. No large continuous scrub areas were identified. Where scrub exists it resembles small scattered areas that best fit the scattered scrub habitat type.

Scattered Scrub

This category includes the same species associated with dense scrub but scattered along boundary features of the edges of other habitats. Scrub of this habitat type comprises bramble (*Rubus fruticosus* agg.), small willow and hawthorn trees, identified along ditches or field margins.

4.2.2 Grassland and Marsh

Improved Grassland

Improved grasslands were those meadows and pastures that have been significantly affected by heavy grazing, drainage, over seeding with edible species, or the application of herbicides or fertilisers.

Semi-improved Grassland

This is a transition category that includes grasslands that have been modified by artificial fertilisers, slurry, intensive grazing, herbicides or drainage. Grasslands of this type are generally less botanically

diverse than unimproved grasslands, however semi-improved grasslands are still of conservation value. Grassland of a semi-improved quality was restricted to the northern and southern boundaries.

Poor Semi-improved Grassland

Poor Semi-improved grassland is less diverse than semi-improved and accounts for a small percentage of arable margins and fields to the north a south.

4.2.3 Aquatic Habitats

Standing water

The interconnecting drainage ditches distributed throughout the study, comprising wet eutrophic channels (Where no flow was recorded) are included in this category. Where a noticeable flow (even when very slow) was recorded the habitat was mapped as running water.

A small pond in the western wooded block and pools of standing water within Carr Dyke are also included within this category.

Running water

There are two main river types in the area: the River Cam and a number of drainage ditches that flow directly into the River Cam. Drainage ditches without a flow have been included in the standing water category.

Marginal Vegetation

This habitat category encompasses all strips of emergent vegetation. Marginal vegetation was present in all ditches with a varied distribution. However, this habitat type was too small to map, therefore marginal emergents were listed under the appropriate target note. Common Reed was the most abundant emergent found with the majority of ditches.

4.2.4 Hedgerows and Other Boundaries

Hedgerows as an important habitat feature of the survey area were generally few. Of the 13 hedgerows surveyed four hedges meet the criteria of the Hedgerow Regulations and can therefore be considered ecologically important, species-rich hedges with trees.

Species rich hedgerows are known to support a diverse range of flora and fauna including species of conservation concern, whilst acting as wildlife corridors for many species, including reptiles and amphibians, allowing dispersal and movement between other habitats. Species rich hedgerows are valued as priority habitats within the UK and local Biodiversity Action Plans.

Intact Hedge

All intact hedges that were stock-proof were included in this category and accounted for a small number of northern and southern hedges that contained few woody species or were newly planted.

Defunct Hedge

Defunct hedges can be described as hedges which have become degraded and therefore contain large gaps. Isolated shrubs and trees within the northern fields appear to have marked potentially defunct hedges that have been recently grubbed in order to amalgamate fields in to single large cereal crop fields.

Hedgerow with trees

Intact hedges that included occasional trees rather than low shrubs but not considered particularly species rich accounted for over a third of the hedges on site. The main central hedge and dry ditch to the west of Hepworth Farm were included in this category as were short southern hedges.

Species-rich hedges

Hedges with a composition of diverse woody species and varied field layer were identified as the double hedge either side of the drove track at the southern end of the site, the densely wooded hedge along the northern side of Fen Road and the central hedge with ditch comprising a dominant ash and wych elm (*Ulmus glabra*).

Ditch

Ditches considered to be dry for the majority of the year were included within this category. The only truly dry ditch during the survey was located along the central western field edge.

Boundaries Removed

Although a number of boundaries have potentially been removed, the areas were not clearly defined and were therefore left as large arable fields with fencing mapped where appropriate.

Earth bank

Earth banks on site included shallow ditches that have been filled in.

Fence

All fencing clearly visible and not part of a hedgerow system was mapped. This included wire and wooden post fencing.

4.2.5 Other Habitats

Arable

Arable habitat included all cereal fields, horticultural land, freshly ploughed land and recently reseeded grassland such as rye grass and rye-clover ley, often managed for silage. Arable land within the survey area consisted mainly of cereal crops and represented the largest habitat type. Although arable cereal crops dominate the area, a small number of southern fields are grazed by horses and pigs.

Buildings

All buildings, including all agricultural, industrial and domestic structures were mapped. Few structures were identified within the survey area as the majority of the land is of open agricultural character. Between the village fringes of Milton and Waterbeach, a number of residential properties and farm dwellings bordered the edge of the study area to the west of the site along the A10. There are only occasional stable blocks and isolated residential properties or farm buildings within the survey area.

Tall Ruderals

This category comprised all stands of perennial or biennial dicotyledons, usually more than 25cm high. This habitat type often identified along the bank top of ditches was characterised by abundant, Creeping Thistle, Common Nettle, Hogweed and Cleavers.

4.2.6 Adjacent Habitats of Conservation Value

Milton Country Park is of important local biodiversity value comprising a mosaic of woodland scrub, grassland and large expanse of open water (former gravel workings), providing an important habitat for a number of protected species especially breeding and wintering birds.

To the east of the site The River Cam is an important aquatic habitat with a number of valuable riparian trees, wet meadows, ditches and associated protected species.

4.3 Plant Species Summary

A complete species list of all identified plants is given in **Appendix C** of the Phase 1 Habitat Survey report. No nationally scarce or rare species were identified during the survey.

4.4 Protected Species Summary

Surveys for a number of protected species were ongoing during the mapping of the Phase 1 Habitat Survey. The summary of each species below refers to the potential for the species to exist within the study area based upon observation of habitat, field signs or direct sighting of a species during the Phase 1 mapping.

4.4.1 Breeding and Wintering Birds

The mature hedgerows, woodland, scrub, drainage ditches and reed beds offer good breeding and nesting habitats, especially to the north-east along Carr Dyke and along the southern wooded blocks and hedgerows. Arable and woodland birds were sighted during the survey and target noted. The survey area has the potential to support BAP Red and Amber listed species of conservation value.

4.4.2 Bats

A number of features were identified during the survey that may be of potential habitat value to bats. These include trees of woodlands and hedgerows that could provide roosting sites and semi-improved fields and marginal ditch vegetation that could provide foraging areas.

English Nature records **Appendix D** of the Phase 1 Habitat Survey report shows a number of records for bats in locations close to the boundary. It is therefore possible that bats may be commuting along hedgerows to foraging sites within the study location. The activity surveys later in the summer (2004) will confirm bat utilisation of the site.

4.4.3 Badgers

Badgers (*Meles meles*) are protected under the Protection of Badgers Act 1992. There were two areas targeted for potential badger activity during the survey period of Phase 1; the wooded block to the south and along the central eastern hedgerow, where potential droppings and a foraging track were located. No known badger sets exist within the study area. English Nature records **Appendix D** of the Phase 1 Habitat Survey report shows Badger sightings at Waterbeach barracks to the north and along the A10 to the west. Milton Country Park has records of occasional visits by badger. A specialist badger assessment will be carried out in spring, early summer 2004.

4.4.4 Reptiles

Reptiles are protected under the Wildlife and Countryside Act 1981 (as amended). Suitable potential habitat for a range of British reptiles was target noted. This included margins of grassland and marginal ditch vegetation. Good potential exists for Grass Snakes (*Natrix natrix*) within the mosaic of tall ditch bank grasses. During the initial Phase 1 walkover a number of areas were marked as suitable for deployment of appropriate artificial refuges, in particular a small semi-improved field close to Hepworth Farm.

4.4.5 Amphibians

Great Crested Newts (*Triturus cristatus*) and their breeding sites, resting places and areas used for shelter or protection are protected under the Wildlife and Countryside Act 1981 (as amended) and the Habitat Regulations (1984). Suitable sites for Great Crested Newts and other amphibians include one pond, located within woodland at target note 38. All ditches and pools of water (Carr Dyke) are considered to be potential habitat, requiring further investigation. An amphibian survey will be carried out in late spring, early summer 2004. English Nature and Environment Agency records in **Appendix D** of the Phase 1 Habitat Survey report shows sightings of Great Crested Newts within the area but not within the study site.

4.4.6 Water Voles

There is good potential for Water Voles (*Arvicola terrestris*) to inhabit a number of drainage ditches on site, especially ditches that provide a slow flow with a mosaic of rich riparian vegetation. Droppings were sighted along the central ditch (target note 5) that flows in to the Cam. Water vole habitat is protected under Schedule 5 of the Wildlife and Countryside Act 1981. The act protects the water voles' place of shelter or protection but does not protect the species itself. A specialist survey of water voles along drainage ditches was ongoing during the Phase 1 Habitat Survey.

4.4.7 Otters

Otters (*Lutra lutra*) are protected under the Wildlife and Countryside Act. No signs of otter holts or spraints were identified within the study area. A detailed assessment of the suitability of the area for otters will take place in summer 2004.

4.4.8 Aquatic Invertebrates

Five of the drainage ditches surveyed were targeted as potential sampling points for a spring aquatic invertebrate survey. All of the sites comprised slow flowing drainage ditches with varied simple bankside and varied marginal, emergent and free-floating macrophytes.

4.4.9 Other Mammals

Foxes (*Vulpes vulpes*) and Muntjac (*Muntiacus reevesi*) deer were observed during the Phase 1 survey. Mature parkland and scattered Oaks may have potential for supporting important terrestrial invertebrates.

5 Ecological Assessment

5.1 Habitat Assessment

The following habitats have been assigned a value depending on the type, quality and distribution of each habitat. Habitat types relate to their conservation importance largely defined in national and local Biodiversity Action Plans.

Phase 1 Habitat Type	Value	Value Assessment
Broadleaved Semi-natural woodland	Local	Potential importance to protected species
Broadleaved Plantation Woodland	Local	Potential importance to protected species
Coniferous Plantation Woodland	Local	Potential importance to protected species
Scattered Broadleaved Trees	Local	Potential importance to protected species
Dense/Continuous Scrub	Negligible	Potential breeding bird habitat
Scattered Scrub	Negligible	Potential breeding bird habitat
Improved Grassland	Negligible	Potential importance to protected species
Semi-improved Neutral Grassland	Regional/Local	UK and Local BAP Priority Habitat
Poor semi improved Grassland	Local	Potential importance to protected species
Drainage Ditch	Regional/Local	LHAP Priority Habitat. May contain rare macrophytes and provide habitat to protected species
Species Rich Hedge	Local	UKBAP. Potential value as a wildlife corridor. May be classified important under the Hedgerow Regulations 1997.
Species Poor Hedge	Local	Potential value as a wildlife corridor.
Species Rich Hedge with Trees	Local	UKBAP. Potential value as a wildlife corridor. May be classified important under the Hedgerow Regulations 1997.
Species Poor Hedge with Trees	Negligible	Potential value as a wildlife corridor.
Arable	Local	UKBAP Priority Habitat. potential arable weed margins of rare communities may support BAP birds

5.2 Hedgerow Assessment

The following table summarises hedgerows identified on site and highlights those of importance under the Hedgerow Regulations 1997. (Assessment considered the ecological importance in terms of botanical species and associated features. Historical and archaeology importance did not contribute to the assessment at this stage).

Target Note Ref.	Phase 1 Description	Classified Important under the Hedgerow Regulations
23	Native species rich with trees	Important
25	Native species rich with trees	Important
26	Native species rich with trees	Important
30	Species poor with trees	Not important
31	Species poor with trees	Not important
32	Species poor with trees	Not important
42	Native species rich with trees	Important
43	Species poor with trees	Not important
45	Species poor defunct	Not important
49	Species poor with trees	Not important
50	Species poor	Not important
51	Species poor with trees	Not important
62	Species poor	Not important

The scheme would result in complete loss of two species poor hedgerows associated with drainage ditches. Hedgerow target note 49 is the only intact hedgerow running east/west of the site in an open agricultural area and has conservation value as a wildlife corridor. Hedgerow Target note 43 has a similar corridor value and also connects to a species rich hedgerow.

The study area comprises of both native species rich and species poor hedgerows the majority are generally represented by species poor hedges. There provide an important wildlife corridor in an area of intensive agricultural use. Loss and general fragmentation through land take will reduce the conservation value of the remaining hedgerows.

5.3 Woodland Assessment

Woodland habitats of value are located to the north and south of the scheme. Two small semi-improved broadleaved blocks of woodland may potentially be lost to the scheme development at the eastern edge of potential value to breeding birds and bats. There would also be a loss of scattered bankside trees associated with ditches.

5.4 Grassland

The majority of grassland within the site area can be considered improved and of low ecological value. A southern meadow to the west of the River Cam and a small field adjacent to Carr Dyke comprises semi-improved grassland of a neutral quality of higher ecological value. Other areas contain small pockets of poor semi-improved mesotrophic grassland. The NVC type MG1 has a frequent distribution along all drainage ditches.

The UK and Local BAP recognises neutral grassland as habitats of important conservation value.

5.5 Drainage Ditch Assessment

Drainage ditches are an important wetland habitat and can have a high conservation value. Ditches can support water voles, as well as fish, invertebrates and a diverse mosaic of riparian plant communities often harbouring nationally scarce and rare species. Ditches may also provide important shelter, breeding, nesting, roosting and feeding sites for birds of international importance.

The study area contains approximately 16 interconnecting ditches that vary in water levels and botanical structure. Overall the ditches are not of an exceptional quality in comparison to the more diverse fenland ditches. However, all have good potential for supporting a number of protected species, in particular breeding and wintering birds associated with reed beds, ditches which have a slow flow tended to support a greater diversity of macrophytes. The LHBAP recognises drainage ditches as habitats of important conservation value.

5.6 Protected Species Assessment

Flora

No nationally or regionally rare plants were identified during the survey. A number of drainage ditches contained a diverse assemblage of plants that may support important macrophyte communities.

Fauna

A number of potential protected species habitats exist within the study area. The on-going specialist surveys will confirm presence / absence of protected species and investigate how habitat features are utilised in terms of shelter, breeding, nesting, roosting, resting, hibernating or feeding.

6 Conclusions

A range of habitats and features were identified within the study area. The largest habitat types identified were arable and improved fields. Boundaries between these fields comprised a series of interconnecting drainage ditches with blocks of reed beds and diverse macrophyte communities, in ditches that flowed into the River Cam. Hedgerows within the area are generally species poor intact hedges often with mature trees, only four were found to be species rich. The main importance of both ditches and hedgerows is of a wildlife corridor in a largely open agricultural landscape. The overall woodland vegetation habitat was restricted to northern (Carr Dyke) and southern (semi-natural broadleaved blocks) compartments of the site with only scattered and hedgerow trees in some central locations.

Designated sites of importance were not identified within the site area. The main areas of non statutory conservation value adjacent to the site are Milton Country Park and the River Cam.

7 Recommendations for Further Survey

Prior to any development works it is recommended that a further Phase 2 level study is carried out on drainage ditch aquatic plants prior to any clearance works.

8 References

Joint Nature Conservation Council 1993 'Handbook for Phase 1 Habitat survey – a Technique for Environmental Audit'

Haslam S, Sinker C and Wolseley P (1982) *British Water Plants*. Field Studies Council

Rodwell JS (Ed.) (1991). *British Plant Communities vol. 1: Woodlands and Scrub*. Cambridge University Press.

Stace CS (1999). *Field Flora of The British Isles*. Cambridge University Press.

Appendix A: Location Map

Appendix B: Habitat Maps and Target Notes

Table B.1: Target Notes

Target Note No.	Description of Feature
1	<p>A narrow ditch less than 1m wide, height varied. Damp ditch channel obscured throughout the majority of its length by simple bankside vegetation and occasional dense blocks of common reed.</p> <p>Upper sections of the ditch comprise mature willow close to Carr Dyke road. Occasional Large oak (one of the oaks has split branches of potential bat importance), hawthorn and small sycamore are scattered along lower sections of the ditch.</p> <p>Potential habitat for breeding birds, bats and reptiles.</p> <p>Water voles may also be present although no field signs were identified.</p>
2	<p>Similar features to ditch 1, damp ditch, channel obscured by simple bankside vegetation. Occasional low scattered trees and tall mesotrophic grass banks. Arable margins support a number of tall grass and rosette species.</p>
3	<p>Parallel ditch to Target Ditch 9 separating arable fields. Sloping grass bank, ditch approximately 0.5-1m wide. Damp ditch obscured by simple bankside vegetation. Scattered mature oaks alongside arable field. Strip of marginal tall ruderals and arable flora.</p> <p>Potential habitat for bats within mature oaks</p>
4	<p>Damp Ditch, sloping bank sides 1.5m, approximately 1m wide. Ditch obscured by simple bankside vegetation and occasional Willow. Ditch Channel comprises occasional blocks of Common Reed.</p>
5	<p>Water vole droppings</p>
6	<p>Long central ditch associated with hedge target note 43. Central ditch channel is approximately 0.5-1m wide, with a very slow flow into ditch 5 ditch. The ditch is partially overshadowed by trees and vegetation from the far bank. Over shading in some areas has restricted plant growth and the shallow water field channel is blocked with dense leaf litter. Lower sections are open, obscured only by tall bankside grasses.</p> <p>Good potential for bats in mature hedgerow trees</p>
7	<p>Meandering ditch flowing in to Drain Target Note 9. Narrow channel approximately 0.5m, completely obstructed by bankside vegetation of common nettle, cleavers,</p>

	<p>creeping thistle and hogweed.</p> <p>Potential suitable habitat for water voles and grass snakes.</p> <p>The Drain also flows into a narrow damp ditch along the species rich parallel hedges along the paddocks.</p>
8	<p>Ditch 8 is fairly impoverished and eutrophic, situated adjacent to the southern wooded blocks (heavily over-shaded by trees), although no flow was observed it appears to drain into ditch target note 7.</p>
9	<p>Longest Ditch within the study area runs either side of the railway embankment (only species within the western side of drain were recorded). Central areas of the drain are dominated by blocks of common reed.</p> <p>Target 59 maps scrub in ditch but does not account for the good floristic diversity of macrophytes in the upper pools (close to Carr Dyke).</p> <p>Common reedbeds provide good habitat for birds of potential conservation value.</p>
10	<p>13th Public Drain (flows through MCP). The slope and width of the channel varies with an average of approximately 2m. Slow flow, over sandy /shingle substrate. A number of mature pollarded Salix on far bank (overhanging)</p> <p>Good potential to support water vole.</p>
11	<p>Steep ditch with approximately 3m, bank slopes colonised by semi- improved grassland. Central channel is open 1m wide, depth 0.5m with marginal emergent along lower bank edges. The ditch connects to the 13th Public Drain and dry ditch 13 parallel to the Cam.</p> <p>Northern section of the ditch run parallel to the railway crossing track and comprise of abundant foals water-cress.</p>
12	<p>Network of narrow interconnecting ditches east of Milton Country Park flowing in to ditch target notes 9/14.</p>
13	<p>Partially dry ditch by River Cam footpath, few macrophytes.</p>
14	<p>Eastern railway ditch parallel to ditch target note 9 and of a similar structure and slightly less diverse along the lower southern section.</p>
15	<p>Partially dry drainage ditch associated with hedge target note 49. Western sections of the ditch are completely dry. Eastern sections close to the railway are damp with occasional pools of water comprising blocks of common Reed and other macrophytes.</p>
16	<p>Small damp ditch next to A14. Drains in to ditch 13.</p>
17	<p>Semi improved grass field comprising frequent meadow foxtail and field horsetail.</p>
18	<p>Yellowhammer sighted.</p>
19	<p>On the left bank of the River Cam is a line of potentially ancient pollarded white willow <i>Salix alba</i>.</p>

20	Improved field close to edge of Milton country park, some flooded areas. Canadian geese in the area.
21	Improved field similar in composition to 20
22	Tall Copse of mixed broadleaved trees by drainage ditch with Moat.
23	<p>This densely wooded strip forms a screen between the road to the south and the improved fields to the north. There are a number of woody species present within this strip, with Hawthorn being the most dominant. The field layer is rather thin (around 0.5 m) and dominated by a mix of common nettle, bramble and cow parsley. The hedgerow runs along a road used as a public path, has 4 woody species in an average 30m length, connects to a woodland has standard trees every 50 m and has less than 10% gaps making it important under the Hedgerow Regulations.</p> <p>Good potential for mature tree roosts and badger habitat.</p>
24	Improved field close to site entrance railway crossing.
25	Forming part of a double hedgerow, this hedge is slightly species richer than the parallel hedge to the east. Common nettle and cow parsley are dominant in the field layer, with ash and hawthorn s the most dominant canopy trees, however, there are substantial amounts of willow, in particular white willow, although some almond willow is also present. A water-filled ditch runs along the length of this hedge, supports a population of sedge including frequent lesser pond sedge. The hedgerow has a number of connections to other hedges and woodland. The hedgerow is important as it runs along a footpath, connects to other wooded features, has a ditch along its length, has standard trees every 50 m and has a parallel hedge within 15 m.
26	Forming part of a double hedgerow, this hedge has improved grassland to the east and an overgrown grassy path in between the parallel hedge to the west. The trees in the hedge are largely standard and rise to around 8 m. Along the course of the hedge, ash is the dominant tree in the canopy with hawthorn, the dominant shrub. A mix of common nettle, cow parsley and bramble are dominant in the ground layer. The hedgerow connects in the north to woodland. The hedgerow is important as it contains an average of 4 woody species with a number of features; running along a footpath, connections to another wooded feature, standard trees every 50 m and a parallel hedge within 15 m.
27	Series of semi-improved improved fields.
28	Muntjac deer sighted, emerging from southern wooded block.
29	Small pocket of woodland scrub some mature beech and sycamore connecting to hedge target note 42
30	<p>Low species poor hedge with frequent Hawthorn and Elder, floristically poor field layer not considered an important hedge under the Hedgerow Regulations despite having good connection to surrounding woody features.</p> <p>Potential for breeding birds</p>
31	The hedge has improved grassland to the north and south, with a stable also present to the south. The stable is largely rundown although still in use and may have potential as

	<p>a bat roosting site. The canopy is largely dominated by white willow, with frequent ash. Other trees present include sycamore and horse chestnut. There also some hawthorn shrubs. The ground layer is largely dominated by a common nettle/ cleavers mosaic. The hedgerow is not important under the Hedgerow Regulations, despite connections to woodland, an important hedge and having a ditch run along its length.</p> <p>Potential for breeding birds</p>
32	<p>Furthest north of connecting hedgerows in this area. This hedge can be described as species poor with trees that comprise hawthorn, ash, White willow and elder. Tall hogweed, bramble nettle and ivy are frequent within the field layer. The hedgerow is not important under the Hedgerow Regulations 1997 despite connections to woodland, an important hedge and having a ditch run along its length.</p> <p>Potential for breeding Birds</p>
33	<p>Filled in ditch now slightly raised earth ridge between improved fields.</p>
34	<p>This small pocket of woodland contains tall (up to 12 m) trees but these are fairly thin and all around a similar age. Whitebeam is the overwhelmingly dominant species in the canopy. The only other species noted were occasional field maple and rare ash. The field layer is dominated by a mix of ground ivy and cleavers. The wood is bordered to the east and north by deep water-filled drainage ditches and to the south and west by improved/ poor semi-improved grassland.</p>
35	<p>This linear strip is heavily wooded and impassable in places. There is a varied mix of broadleaved trees plus rare Western Hemlock, Whitebeam and Horse Chestnut are present in the canopy throughout the wood, with, Elm and Beech also present in patches. The shrub layer is dominated by Hawthorn, with Elder present throughout in frequent quantities. The Field layer is mostly Ivy with Common Nettle being present in frequent to abundant quantities. The ancient woodland indicator species, cuckoopint is present, sometimes frequently. This classification does not fit at all well into the National Vegetation Classification (NVC). The nearest NVC community is probably W21 (<i>Crataegus monogyna</i> – <i>Hedera helix</i>) scrub, however, this fails to account for the high canopy trees.</p>
36	<p>Fox sighted emerging from woodland target note 35.</p>
37	<p>Tall mesotrophic grass strip resemble an MG1 NVC community type potential reptile habitat between arable field and moat.</p>
38	<p>This area is more accurately described as a pond surrounded by woodland. Sycamore is the dominant tree within the very tall canopy (around 10 m), although pedunculate oak is also present in quantity. Hawthorn is dominant within the shrub layer with elder constant and frequent. Ivy is overwhelmingly dominant in the ground layer. Common nettle is also fairly extensive, particularly around the edge and in areas of disturbance or clearings. The pond itself contains Iris (<i>Iris sp.</i>) around the edge, although this was not identified to species level. Again, this classification does not fit into the National Vegetation Classification. The nearest NVC community is W21 (<i>Crataegus monogyna</i> – <i>Hedera helix</i>) scrub but this fails to account for the high canopy trees.</p> <p>Potential habitat for great crested newts.</p>

39	The improved field has been recently cleared, leaving only marginal tall ruderals.
40	Scattered mature oak trees part of Milton Hall parkland. Good potential for invertebrates.
41	Field grazed by pigs, a lot of bare ground and mud few floristic features
42	The hedgerow stands around 4 to 6 m tall and contains a dominant mix of ash, wych elm, hawthorn and Elder. The field layer is very much dominated by Common Nettle. As a footpath runs along its length, the hedgerow is considered important due to it containing an average of 4 woody species in a 30 m length, plus a water-filled ditch, less than 10% gaps and the requisite average of standard trees.
43	The southern area of this hedge contains very sparse mature tree cover which proceeds to become overgrown in the north. The hedge eventually gives way to frequent ash and occasional oak. Despite a deep water-filled ditch running along its length, the hedgerow cannot be classed as important and can be regarded as defunct along central sections
44	In close proximity – though not actually meeting hedge target note 43. The hedge contains much the same species as the close-by hedgerow. Dominated by wych elm, the ground flora is a mix of barren brome and cock's-foot The hedgerow does not contain enough species or features to be considered important.
45	Small defunct hedge comprising two large oaks, scattered hawthorn and bramble.
46	Ditch target note 9 comprises dense common reed beds within this section, of importance to birds of conservation value.
47	Very large arable field central hedge potentially grubbed Arable flora. This field is one of a number of northern arable fields that contain pockets of arable flora.
48	Badger droppings identified close to hedge.
49	Although a relatively long hedgerow for the area, large gaps in the structure do not contain tree/ shrub species. Instead, large groupings of tall bramble take the place of the canopy layer. Frequent trees do exist, with Elder being the most prominent, although hawthorn and elm are present in quantities at various portions within the hedge.
50	Species poor hedge with occasional hawthorn connects to Milton Country Park.
51	Species poor hedge with trees connects to a small wooded copse.
52	Skylark observed on edge of arable field.
53	Wren and long-tailed tit observed.
55	A small stand of Norway Spruce (<i>Picea abies</i>) conifers with straight edged sides, this pocket contains no ground flora beneath the canopy. This community does not correspond to any listed in the National Vegetation Classification.
56	Dry shallow ditch with MG1 grassland species.

57	Small field comprising semi-improved tall mosaic of mesotrophic grasses and tall ruderals to the north of the conifer woodland block target note 55. The tall mosaic of grassland
58	A small number of bankside scattered trees provide the only woody element in the majority of large northern open arable fields. Varied willow, hawthorn and occasional large oak were identified as the most frequent trees.
59	This section of Ditch 9 contains a large quantity of willow and hawthorn scrub within the central section and along the bankside good potential habitat for breeding birds
60	Wood pigeon sighted
61	Pools of water in Carr Dyke of potential macrophyte importance.
62	This fairly small (around 2 m) hedge has been planted, possibly within the last 10 years. Hawthorn is the most dominant woody species over the course of the hedge. The ground flora is largely a mix of grasses no different to that of the surrounding fields, once again emphasising the youth of the hedge. The hedgerow is not important.
63	This small semi-improved field, adjacent to Carr Dyke, has a slightly richer grassland mosaic than the surrounding improved fields. The sward has been left to grow to approximately 0.75m and is of potential conservation value to invertebrates and reptiles. The field may also have potential to bats as a foraging area.
64	Blocks of continuous scrub are associated with Carr dyke. Mature trees and scrub provide breeding bird habitat and the larger trees have the potential to support bat roosts.
65	Water vole droppings.
66	Tall ruderals and dominant great willowherb to the north of Carr Dyke.
67	Trees and scattered scrub in central ditch possible bat potential and breeding bird habitat.
68	Tall mixed planted broadleaved trees adjacent to Carr Dyke Road.
69	Large pool of water north of Carr Dyke. Potential amphibian interest.

Appendix C: Botanical Species List

Common Name	Scientific Name
Alder	<i>Alnus glutinosa</i>
Annual Meadow-grass	<i>Poa anna</i>
Ash	<i>Fraxinus excelsior</i>
Barren Brome	<i>Bromus sterilis</i>
Beech	<i>Fagus sylvatica</i>
Bittersweet	<i>Solanum dulcamara</i>
Bramble	<i>Rubus fruticosus agg.</i>
Broad-Leaved Dock	<i>Rumex obtusifolius</i>
Bulrush	<i>Typha latifolia</i>
Cleavers	<i>Galium aparine</i>
Cock's-foot	<i>Dactylis glomerata</i>
Cocksfoot	<i>Dactylis glomerata</i>
Common Mallow	<i>Malva sylvestris</i>
Common Bent	<i>Agrostis capillaris</i>
Common Chickweed	<i>Stellaria media</i>
Common Duckweed	<i>Lemna minor</i>
Common Fumitory	<i>Fumaria officinalis</i>
Common Horsetail	<i>Equisetum arvens</i>
Common Michaelmas-daisy	<i>Aster xsalignes</i>
Common Nettle	<i>Urtica dioica</i>
Common Poppy	<i>Papaver rhoeas</i>
Common Ragwort	<i>Senecio jacobaea</i>
Common Reed	<i>Phragmites australis</i>
Common Startwort	<i>Callitriche stagnalis</i>
Common Water-Starwort	<i>Callitriche stagnalis</i>
Common Whitebeam	<i>Sorbus aria</i>
Cow Parsley	<i>Anthriscus sylvestris</i>
Crack Willow	<i>Salix fragilis</i>
Creeping Bent	<i>Agrostis stolonifera</i>
Creeping Buttercup	<i>Ranunculus repens</i>
Creeping Clinquefoil	<i>Potentilla reptans</i>
Crested Dog's Tail	<i>Cynosurus cristatus</i>
Crowfoot	<i>Ranunculus sp</i>
Cuckoo Pint	<i>Arum maculatum</i>
Curled Dock	<i>Rumex crispus</i>
Cut-leaved Cranesbill	<i>Geranium molle</i>
Dog Rose	<i>Rosa canina</i>
Duckweed	<i>Lemna sp.</i>
Duckweed	<i>Lemna sp.</i>
Elder	<i>Sambucus nigra</i>
English Elm	<i>Ulmus procera</i>
Fat-hen	<i>Chenopodium album</i>
Field Bindweed	<i>Convolvulus arvensis</i>
Field Brome	<i>Bromus arvensis</i>
Field Maple	<i>Acer campestre</i>
Field Rose	<i>Rosa arvensis</i>
Floating Sweet-grass	<i>Glyceria fluitans</i>
Fools Water-cress	<i>Apium nodiflorum</i>
Garlic Mustard	<i>Alliaria petiolata</i>

Annex B - C-2

Germander Speedwell	<i>Veronica chamaedrys</i>
Goat Willow	<i>Salix caprea</i>
Great Willowherb	<i>Epilobium hirsutum</i>
Greater Plantain	<i>Plantago major</i>
Ground Ivy	<i>Glechoma hederacea</i>
Groundsel	<i>Senecio vulgaris</i>
Hawthorn	<i>Crataegus monogyna</i>
Hazel	<i>Corylus avellana</i>
Hedge Bindweed	<i>Calystegia speium</i>
Hemlock	<i>Conium maculatum</i>
Henbit Dead-nettle	<i>Lamium amphlexicaule</i>
Herb Robert	<i>Geranium robertianum</i>
Hogweed	<i>Heracleum sphondylium</i>
Holly	<i>Ilex aquifolium</i>
Honeysuckle	<i>Lonicera periclymenum</i>
Horse Chestnut	<i>Aesculus hippocastanum</i>
Horse Raddish	<i>Armoracia rusticana</i>
Horse-radish	<i>Armoracia rusticana</i>
Ivy	<i>Hedera helix</i>
Knotgrass	<i>Polygonum arviculare</i>
Lesser Burdock	<i>Actium minus</i>
Lesser Celandine	<i>Ranunculus ficaria</i>
Lesser Reedmace	<i>Typha angustifolia</i>
Lesser Water Parsnip	<i>Berula erecta</i>
Lords and Ladies	<i>Arum maculatum</i>
Mash Marigold	<i>Caltha palustris</i>
Meadow Buttercup	<i>Ranunculus acris</i>
Meadow Foxtail	<i>Alopecurus pratensis</i>
Nipplewort	<i>Lapsana communis</i>
Oxeye Daisy	<i>Leucanthemum arvense</i>
Pendulous Sedge	<i>Carex pendula</i>
Pendunculate Oak	<i>Quercus robur</i>
Perennial Rye-grass	<i>Lolium perenne</i>
Perennial Sow-thistle	<i>Sonchus arvensis</i>
Pineappleweed	<i>Martricaia discoidea</i>
Pondweed	<i>Potamogeton sp.</i>
Prickly Sow-thistle	<i>Sonchus asper</i>
Purple Loosestrife	<i>Lythrum salicaria</i>
Rape	<i>Brassica napius</i>
Red Campion	<i>Silene dioica</i>
Red Clover	<i>Trifolium repens</i>
Red Dead-nettle	<i>Lamium purpureum</i>
Redshank	<i>Persicaria maculosa</i>
Reed Sweet-grass	<i>Glyceria maxima</i>
Rosebay Willowherb	<i>Chamerion angustifolium</i>
Rough Meadow-grass	<i>Poa trivalis</i>
Rush	<i>Juncus sp.</i>
Scarlet Pimpernel	<i>Anagallis arvensis</i>
Sedge	<i>Carex sp.</i>
Shepherd's-purse	<i>Capsella bursa-pastoris</i>
Silver Birch	<i>Betula pendula</i>
Silverweed	<i>Potentilla anserine</i>

Annex B - C-3

Sun Spurge	<i>Euphorbia helioscopia</i>
Sycamore	<i>Acer pseudoplatanus</i>
Traveller's -joy	<i>Clematis vitalba</i>
Tufted Hair Grass	<i>Deschampsia caespitosa</i>
Wall Barley	<i>Hordeum murinum</i>
Water Forget-me-not	<i>Myosotis scorpioides</i>
Water Mint	<i>Mentha aquatica</i>
Water-plantain	<i>Alisma plantago-aquatica</i>
Water-Starwort	<i>Callitiche sp.</i>
White Bryony	<i>Bryonia dioica</i>
White Campion	<i>Silene alba</i>
White Clover	<i>Trifolium pra</i>
White Willow	<i>Salix alba</i>
Wild Asparagus	<i>Asparagus officinalis</i>
Wild Teasel	<i>Dipsacus fullonum</i>
Wych Elm	<i>Ulmus glabra</i>
Yellow Iris	<i>IrisPseudacorus</i>
Yellow Oat-grass	<i>Tristeum flavescens</i>
Yorkshire Fog	<i>Holcus lanatus</i>

Appendix D: Ecological Records

Annex C: Breeding and Wintering Bird Survey



Proposed development of Cambridgeshire Sports Lake; Site impact assessment for birds, 2004

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CONTENTS

	Page No.
1. Introduction	C-2
1.1 Site and Location	C-2
1.2 Landscape and Terrain	C-2
2. Methods	C-2
3. Baseline Ecological Conditions	C-3
3.1 Species composition	C-3
3.2 Species distribution	C-3
3.3 Literature review.....	C-4
4. Assessment of Impacts and Effects of the Scheme	C-4
5. Mitigation	C-5
6. References	C-6
Appendix I Summary Tables	C-7
Table 1	C-7
Table 2	C-8
Appendix II Data Tables	C-9

1. Introduction

1.1 Site and Location

The site of the current study is situated approximately 5 km north east of Cambridge between the settlements of Waterbeach (to the north) and Milton (to the south). The site is also bordered on two sides by major transport routes; the A10 road on the west and the Cambridge to Ely railway line on the east and covers an area of approximately 200 hectares. The landscape is characteristic of lowland agriculture in eastern England and encompasses clay and loam based soils of between 0 to 10 metres altitude.

1.2 Landscape and Terrain

The area of the proposed development consists of mixed farmland with fields delimited by ditches, hedgerows and tree lines. This is typical of agricultural land in the region where arable farming constitutes the major land use (c. 60%). Cultivate land on the site is dominated by winter and spring sown cereals and brassica crops. Grassland, both grazed and ungrazed, was also present during the fieldwork period. This represented approximately 40% of the agricultural land within the study site and was restricted to the southern half of the site.

2. Methods

- i) A mapping census, based on the Common Bird Census (CBC) techniques (Marchant *et al.* 1990), was undertaken during spring and summer 2004. To catalogue bird activity at the site a total of fourteen visits, separated by a minimum of seven-day intervals, were made from the beginning of March to mid-July. These were separated into ten early visits, from 5 March to 7 May, and four late visits, from 18 June to 16 July. Each visit was started within one hour of first light and lasted for approximately three and a half hours. During each visit the location of every bird that was positively identified was marked on a 1:8000 map of the site and whenever possible a birds' sex and any singing or nesting activity were recorded.

To determine the numbers of breeding pairs the ten early period visit maps were analysed. The location of each bird over the ten week period was identified and where a species was present for at least three of four consecutive visits, or was singing on at least two from three consecutive visits, a territory was assumed. Furthermore, any single observation of nesting activity, such as collection of nesting material or food, which was associated with a positive presence record of that species in the preceding or consecutive visit, was also assumed as a territory. By using this technique the potential number of breeding pairs was determined for four species, Grey Partridge, Skylark, Yellowhammer and Reed Bunting.

The additional later visits provided further information of species composition and on breeding evidence. Weather conditions (precipitation, wind and temperature) were also logged; these were taken at the start of each visit.

- ii) A literature review of local bird reports was conducted to identify any historical information pertaining to the site. Reports published from the past five years were examined, these provided site names for areas in which specific species had been reported. The nearest sites to the study area that were mentioned in the reports were Milton Country Park, which was situated 200 m south west of the study area, and Waterbeach Fen situated 3 km north of the site.
- iii) The survey techniques used were selected so as to provide the most representative results for the majority of expected species; therefore, the results provide an account of the species characteristic of the site. The mapping technique used during this study is widely recognised as the most accurate method to census breeding birds in a given area (Marchant *et al.* 1990). Despite this, not every individual breeding bird will be identified, particularly given that the

peak period of the breeding season, from mid May to mid June was not be covered. Hence the numbers of breeding birds recorded should be regarded as a minimum figure and not a precise total of abundance. This bias was likely to have affected the recording of summer migrants, as fewer hirundines were recorded at the site than would have been expected in mid summer. Important, late-arriving species, such as Turtle Dove and Spotted Flycatcher, may also have been under recorded. The census work also covers diurnal bird species and is not representative of crepuscular and nocturnal species, such as the Barn Owl, that could typically occur in similar lowland agricultural areas. Winter birds are under-represented by the survey as the visits were only requested from early March 2004.

3. Baseline Ecological Conditions

3.1 *Species composition*

Species composition and density was typical for open lowland farmland with inter-connecting ditches and tree-lined hedgerows, potentially (probably traditionally) in fenland habitat. Forty-seven bird species were recorded at the site during the early period (Table 1.), and 35 species were recorded during the later period including seven additional species (Table 2.). In total, 54 species were recorded at the site of which 11 were species high conservation concern (Red Listed) and 12 species of medium concern (Amber Listed) (Gregory *et al.* 2002). Skylark is also highlighted in the 1994 Government biodiversity action plan (BAP) (Joint Nature Conservancy Committee 2004). The minimum numbers of breeding pairs were determined for four of the species with a high conservation concern status (Table 3.). This indicated that at least eight Skylark territories, five pairs of Yellowhammer and one pair of Reed Bunting were present on the site. For the fourth species, Grey Partridge, the occurrence of five birds during three visits suggested that at least one pair may have bred in the area (based upon the presence of two birds at the same location across two consecutive weeks and additional single records). The presence of a recently fledged Meadow Pipit, an Amber Listed species, suggested that this species had also bred locally. Notable species such as Kestrel, Turtle Dove, Nightingale, Song Thrush, Linnet and Bullfinch were all recorded during the field visits, at low frequencies. Their breeding status is unknown but most might be expected to breed on the site in small numbers. There were no records of Sedge, Reed Warblers along drainage ditches that were largely dry.

There was, no specific reference to Barn or Short-eared Owls for this site within the local bird literature, relating to their use of the ditches or field margins for foraging in winter or summer. However, this is possible, albeit with birds occurring at very low frequency. Among other species, Fieldfares (Amber listed) were recorded in relatively low numbers in March and would be expected to be more abundant in mid winter. A flock of 60 Skylarks was recorded on the site in March and this indicates that the site is potentially more important for this species in winter than is signified by the breeding population alone. No large flocks of Yellowhammer, Reed Buntings or Corn Buntings were recorded during the survey but their aggregative and mobile behaviour in winter would make them difficult to observe and significant flocks of Corn Buntings have been recorded in nearby fenland habitats (see Literature Review).

Two rookeries were present near the site. These were situated approximately 500m north of Milton Hall and to the south of Waterbeach. Birds from these were frequently seen feeding within the site boundaries. Up to 15 Rooks were recorded at any one time on the site and these were most frequently observed in the area nearest to the Milton rookery. These birds were observed feeding in both the arable and pastoral areas between Penfold Farm and Milton Hall.

3.2 *Species distribution*

The field boundaries in the northern half of the site were characterised by dry ditches, most of which were lined with hedgerows and trees. With the exception of Skylark (the most abundant breeding species), nearly all of the bird species were observed along these margins. The hedgerows and trees, as well as the ground vegetation and bare-ground present along these ditch margins provides suitable

nesting and feeding areas for most of the species recorded. Skylarks were also most frequently observed in arable fields at the northern end of the site. Only two of the eight identified territories were located in the southern half of the site, also on arable fields. All five Yellowhammer territories were linked to the boundaries of arable fields in the northern half of the site.

More specifically, the highest *densities* of birds were in the north eastern and south western extremes of the site associated with the smaller fields and a higher concentration of hedgerows and ditches. An area including an historic canal along the north-east fringe of the site (Car Dyke) was particularly rich in bird species and abundance using both the fields and their associated hedgerows and the habitat adjacent to the canal. A Nightingale was recorded singing from within the rough areas just south of the southern end of this canal, an area likely to be susceptible to development operations and secondary factors such as disturbance or a reduction in habitat connectivity. For similar reasons a singing Grasshopper Warbler, another Red Listed species, was noted along the eastern margin of the site.

In the southern half of the site, most species were recorded along the 600m tree-lined track west of the Fen Road railway crossing, but with territories of two Red Listed species, Grey Partridge and Reed Bunting, located on the adjoining arable land.

3.3 Literature Review

A number of species, in particular both Red and Amber listed species, that were not recorded during the present study had been recorded near the site within the past five years; examples of which follow. Approximately 100 Corn Bunting (BAP species) were recorded at Waterbeach Fen during winter 2001, and breeding records of Yellow Wagtail were recorded for this site (Clark 2001, 2002; Scott 2003). These species occur in habitats that were identified within the study area. Records pertaining to the actual study site included breeding records for Spotted Flycatcher (BAP species). Furthermore, these reports also provided evidence that species recorded during the current study have frequently been recorded in the area and are not unusual.

4. Assessment of Impacts and Effects of the Scheme

On the basis of this survey, in general the site is representative rather than remarkable in terms of its bird species composition and its provision of bird habitats. Some habitats, such as the ditches were mainly dry during the bird survey and rather degraded (from a bird perspective). The proposed development would result in a loss of lowland agricultural habitat, types of which have been identified as important for certain BAP species (Gummer *et al.* 1994). However, with the exception of Skylarks and possibly Grey Partridge, most of the species encountered are not farmland specialists *per se*. They would respond to appropriate levels of habitat restoration during the mitigation process.

Only the interconnecting woodland and scrubland areas were of special note. Three areas, all on the fringe of the development area are potentially threatened by construction, access routes or future increases in disturbance. Mainly, these areas support mature trees or hedges, and older pastures, the loss of which would be difficult to mitigate against in the short or medium term.

- i) The 600m tree-lined track west of the Fen Road railway and running perpendicular to Fen Road, contains mature trees with relatively high bird densities and species richness. This track will form the boundary of the southern section of the proposed development area ("The Alan Burrough Training") but should be protected and retained.
- ii) The hedges running south east from Hepworth Farm are relatively mature, relatively rich in bird species and would warrant protection. They may not be threatened by the proposed development unless direct access routes are required from the A10 (Ely Road).
- iii) Habitats along the edge of Car Dyke are important for several bird species including Nightingale (in the very corner by the railway line). Increased access and disturbance is likely to impact on these habitats and reduce their value for birds.

5. Mitigation

To mitigate for the reduction in area available for these habitats it would be necessary to identify the most important habitats for the species concerned. Key habitats identified in the site include the areas of woodland, scrub, hedgerows, wet and dry ditches and associated vegetation. Areas of mature trees, early succession woodland and scrub are important for Red and Amber Listed species such as Turtle Dove, Song Thrush, Willow Warbler and Nightingale. Provided that the mitigation for loss of habitats is thorough, the impact of the development on the majority of the site could largely be restored and indeed improved on conditions that already exist. The grass embankments would be of little value to birds but the addition of water bodies, and especially the storage lake, would have the potential to increase habitat availability for some important bird species that currently occur on the farmland. Though woodland is proposed, an important provision for mitigation (i.e. loss of existing habitats) would be an interface or profile including native shrubs, rough grassland and water that would attract Song Thrushes*, various warbler species (Sedge Warbler, Blackcap, Garden Warbler & Whitethroat), various finch species (Linnet*, Lesser Redpoll, Goldfinch and Greenfinch) and Reed Buntings*. The lake fringe would benefit water birds (Moorhen and Water Rail) if given a shallow profile, perhaps along the eastern fringe. Wet areas, in combination with drier scrub and thickets would attract improve conditions of Dunnock, Bullfinch*, Tree Sparrow* and possibly Nightingale*. The development should also consider shallow open areas to the lake, again perhaps associated with the quieter south eastern edge, between the storage lake and railway line. Exposed mud could attract waders, waterfowl and wagtails, or a reed (Phragmites) fringe would benefit reed bed species such as, Reed Warbler and Reed Bunting. Open rough grassland behind this would replace that lost along field ditches and boundaries, and provide habitat for Meadow Pipits, Grey Partridge*, and foraging Barn Owls* or Short-eared Owls in winter. Especially valuable would be the encouragement of trees, scrub and thickets between the proposed boat trailer park, Car Dyke and the railway embankment. This would both encourage and protect species such as Nightingale and Turtle Dove from excessive long-term disturbance. Mitigation could be developed inline with Government objectives for BAP species and habitats. The site development should strive to avoid the removal of mature trees or hedges or cause damage to those existing along edge of the site during the period of construction.

*BAP species (Government biodiversity action plan: Joint Nature Conservancy Committee 2004).

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Appendix I. Summary tables

Table 1. Species recorded at the site of proposed rowing lake between 5 March and 7 May 2004 showing species categorised as high conservation concern (**) and medium conservation concern (*) by Gregory *et al.* (2002).

Species	Number of visits recorded	A.1	Maximum count	Total across all visits
Greylag Goose	1		2	2
Canada Goose	1		2	2
Mallard	4		6	12
Sparrowhawk	1		1	1
Red-legged Partridge	1		2	2
Grey Partridge **	3		2	5
Pheasant	5		5	13
Moorhen	2		2	3
Black-headed Gull	1		3	3
Stock Dove *	1		6	6
Woodpigeon	9		16	81
Collared Dove	2		1	2
Swift	1		3	3
Green Woodpecker *	3		1	3
Great Spotted Woodpecker	1		1	1
Skylark **	9		60	102
Pied Wagtail	5		2	7
Wren	10		5	33
Dunnock *	8		3	17
Robin	6		2	8
Nightingale *	1		1	1
Blackbird	10		13	58
Fieldfare *	1		11	11
Song Thrush **	5		3	10
Mistle Thrush *	4		9	12
Grasshopper Warbler **	1		1	1
Whitethroat	3		8	18
Blackcap	2		3	4
Chiffchaff	4		3	9
Willow Warbler *	2		2	3
Long-tailed Tit	1		1	1
Blue Tit	6		4	17
Great Tit	6		5	13
Jay	1		1	1
Magpie	7		4	18
Jackdaw	1		1	1
Rook	9		15	66
Carrion Crow	3		7	10
Starling **	4		100	137
House Sparrow **	1		1	1
Chaffinch	3		4	6
Greenfinch	8		5	15
Goldfinch	3		20	25
Linnet **	1		6	6
Bullfinch **	1		2	2
Yellowhammer **	6		8	28
Reed Bunting **	7		5	13

Appendix I. Summary tables (continued).

Table 2. Estimated minimum number of breeding pairs for four species of high conservation concern.

Species	Minimum number of breeding pairs	Maximum count
Grey Partridge	1	2
Skylark	8	60
Yellowhammer	5	8
Reed Bunting	1	2

Appendix II. Count summary for birds recorded between 5 March and 7 May 2004.

Species	5-Mar-04	12-Mar-04	19-Mar-04	26-Mar-04	2-Apr-04	8-Apr-04	16-Apr-04	23-Apr-04	30-Apr-04	7-May-04	Total
Greylag Goose						2					2
Canada Goose						2					2
Mallard	6	2	2	2							12
Sparrowhawk		1									1
Red-legged Partridge				2							2
Grey Partridge	2				2			1			5
Pheasant	5			3	3	1		1			13
Moorhen						1		2			3
Black-headed Gull	3										3
Stock Dove		6									6
Woodpigeon	14	5	12	13	13	3	16	1		4	81
Collared Dove		1		1							2
Swift								3			3
Green Woodpecker	1			1	1						3
Great Spotted Woodpecker				1							1
Skylark		60	3	1	8	6	7	11	2	4	102
Pied Wagtail	1	1	1	2	2						7
Wren	5	2	2	3	3	5	5	3	2	3	33
Dunnock	2	2	3	1			3	3	2	1	17
Robin	2	1	1		2					1	8
Nightingale								1			1
Blackbird	13	12	4	8	5	2	4	3	2	5	58
Fieldfare		11									11
Song Thrush	3	3		2		1		1			10
Mistle Thrush	1	1		9		1					12
Grasshopper Warbler								1			1
Whitethroat								8	2	8	18
Blackcap							3	1			4
Chiffchaff					3	3	2			1	9
Willow Warbler								2		1	3

Continued...

Appendix II. Count summary for birds recorded between 5 March and 7 May 2004 continued.

Long-tailed Tit	1										1
Blue Tit	2	1	2	4			4	4			17
Great Tit	3	1		2			1	5		1	13
Jay				1							1
Magpie	3		4	2		4	3	1	1		18
Jackdaw								1			1
Rook	9	10	15	5	1	4	7	13		2	66
Carrion Crow	7				2		1				10
Starling		100	20	1		16					137
House Sparrow			1								1
Chaffinch	4			1				1			6
Greenfinch			2	1	1	2	2	1	5	1	15
Goldfinch						1		4		20	25
Linnet									6		6
Bullfinch				2							2
Yellowhammer			3		8	3	3	7		4	28
Reed Bunting				5	1	1	2	2	1	1	13
Total	87	220	75	73	55	58	67	78	23	57	793

Appendix II. Count summary for birds recorded between 18 June and 16 July 2004 continued.

Species	18-Jun-04	02-Jul-04	09-Jul-04	16-Jul-04	Total
Kestrel	1	1	1		3
Pheasant	1	1			2
Lesser Black-backed Gull	4				4
Stock Dove	1				1
Woodpigeon	28	3	8	3	42
Collared Dove		1	2		3
Turtle Dove	1		1		2
Swift	4				4
Skylark	7	2	5	7	21
Swallow	4				4
House Martin	1	1			2
Meadow Pipit	1				1
Wren	3	1	7	4	15
Dunnock	1	1	1	1	4
Robin			2		2
Blackbird		2	2	1	5
Song Thrush		1	3	1	5
Whitethroat	8	9	2	12	31
Garden Warbler	1				1
Blackcap				1	1
Long-tailed Tit			5		5
Blue Tit			4	12	16
Great Tit			1		1
Jay			1		1
Magpie	4	2	3		9
Rook	1	6			7
Carrion Crow	3	1			4
House Sparrow				4	4
Chaffinch		1	2		3
Greenfinch	1	2			3
Goldfinch	1		3		4
Linnet	1			3	4
Yellowhammer	8	4	3	8	23
Reed Bunting	1	1	1	8	11
Total	86	40	57	65	248

Annex D: Bat Survey

Annex D: Site of proposed Cambridge Sport Lakes Milton / Waterbeach Cambridge

BAT SURVEY

May / June 2004

Report for

Mott MacDonald

By



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Contents

1.	Disclaimer	D-3
2.	Summary	D-4
3.	Introduction and objectives	D-5
3.1	Introduction	D-5
3.2	Aim of survey	D-5
3.3	Legal status	D-5
4.	Site description	D-6
5.	Methodology	D-6
6.	Results	D-6
7.	Conclusions	D-8
8.	Recommendations	D-9

1. Disclaimer

This survey was carried out and an assessment was made of the site at a particular time. The evidence this report contains can be used to draw conclusions as to the likely presence or absence of bats and the impacts of any proposed development works. The survey should not be regarded as a complete study, rather a snapshot in time. Every effort has been taken to provide an accurate assessment of the situation pertaining to this site at the time of the survey but no liability can be assumed for omissions, or changes after the survey has taken place.

2. Summary

A bat survey was carried out at the site of the proposed Cambridge Sport Lakes, between Milton and Waterbeach, approximately 5 Km north of Cambridge, during May and June 2004. The survey included both daytime and evening assessments as well as a search of existing records of bats in the area.

During the daytime assessment, likely bat foraging areas were identified as well as potential bat roosting sites in a small number of trees located mainly at the south of the site. During night time surveys no emerging bats were recorded and no bat roosts were positively identified. No existing records of bats were found for the site. Low numbers of bats were recorded during the surveys - Common Pipistrelles (*Pipistrellus pipistrellus*), Soprano Pipistrelles (*Pipistrellus pygmaeus*) a noctule (*Nyctalus noctula*) and a Myotis bat (*Myotis* sp.) were observed at the site.

The results of the survey show that the site is of limited use to bats – this use appeared to be restricted to hedges and woodland in the south of the site and the Car Dyke in the north east. Recommendations are given to maintain existing areas used by bats within the proposed development and to further investigate potential bat roosting sites in trees if they are affected by development works.

The creation of new water bodies and the planting of hedges and trees within the proposed scheme is likely to improve the site in terms of its bat fauna and help to provide continuity of bat commuting and foraging habitat, linking areas along the river Cam in the north with existing bat foraging areas in the south of the site.

3. Introduction and objectives

3.1 Introduction

Cambridge Rowing Trust propose to construct a 220-acre lake and country park close to Cambridge. The presence of bats, of which all species are legally protected, is a material consideration when local authorities consider development proposals - information is given in Planning Policy Guidance 9: Nature Conservation (October 1994). An outline planning application was submitted and accepted by South Cambridgeshire District Council in 1996. The bat survey of the site forms part of a revised environmental statement being prepared to update the previous one produced in 1991. Surveys were carried out during May and June 2004, by Chris Vine BSc., MIEEM, M.I.Biol.

3.2 Aim of survey

To assess the site for its value for foraging and roosting bats, species protected under the Wildlife and Countryside Act 1981 (amended by the Environmental Protection Act 1990) and The Conservation (Natural habitats & C.) Regulations 1994, with respect to the proposed development.

3.3 Legal status

All British bats are protected under Section 9 Schedule 5 of the Wildlife and Countryside Act 1981 and amendments. In addition they are protected under the Berne Convention, they are given migratory species protection within the Bonn Convention Agreement, and are protected under Schedule 2 of the EC Council Directive on the Conservation of Natural Habitats and Wild Fauna and Flora (Habitats Directive).

Regulation 39 of the Conservation (Natural Habitats, & c) Regulations 1994 makes it an offence to deliberately capture or kill bats, to deliberately disturb a bat, damage or destroy a breeding site or resting site of any bat. They are species requiring management and regulation of exploitation, and have additional migratory species protection. It is an offence to disturb a summer or winter roost. Presence of bats does not necessarily mean that development cannot go ahead, but that with suitable, approved mitigation, exemptions can be granted from the protection afforded to bats under regulation 39 by means of a licence. The Department for Environment, Food and Rural Affairs (DEFRA) is the appropriate authority for determining licence applications for works associated with developments affecting bats, including demolition of their roost sites. In cases where licences are required, certain conditions have to be met to satisfy DEFRA and English Nature. Before DEFRA can issue a licence to permit otherwise prohibited acts three tests have to be satisfied. These are:

1. Regulation 44(2)(e) states that licences may be granted by DEFRA to *'preserve public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment.*
2. Regulation 43(2)(a) states that a licence may not be granted unless DEFRA is satisfied *'that there is no satisfactory alternative'*.
3. Regulation 44(3)(b) states that a licence cannot be issued unless DEFRA is satisfied that the action proposed *'will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range'*.

In order to meet the tests, DEFRA usually expects the planning position to be fully resolved as this is necessary to satisfy tests 1 and 2. For test 3, DEFRA seek advice from English Nature.

4. Site description

The site is a narrow triangle located close to the A14 and Milton Country Park, approximately 5 Km to the north of Cambridge. It is joined to the river Cam at the south end and runs immediately north easterly, widening towards Waterbeach. The site runs parallel and adjacent to the Cambridge / Ely railway line on the south east side and Car Dyke on the east, and is about a field's depth away from the A10 trunk road on the north west side.

5. Methodology

5.1 Desk study

A search of records held by Cambridgeshire Bat Group was made to establish if any existing information on bats at the site and surrounding areas is known.

5.2 Daytime assessment

A daytime walkover survey of the whole site was carried out noting features that may be used by commuting or foraging bats as well as buildings and trees that may be used by bats as roosting sites. Individual trees that were surveyed were examined from the ground, looking for features that may be used by bats – holes, splits, crevices and loose bark. Binoculars and a high powered lamp were used to assist in the survey. Trees were recorded as having low, medium or high potential for roosting bats.

5.3 Night time survey

Two evening bat activity surveys were carried out on the 19th May and the 2nd June 2004 during suitable weather conditions when bats would be expected to be active. These aimed to record bats emerging from possible roosting sites (determined by the results of the day time survey) as well as commuting and foraging across the site. Observations were made throughout the site along features likely to be used by bats. Because of the lack of suitable footpaths and the presence of drainage ditches, it was not possible to walk a continuous route through the whole site. Instead, two halves of the site were surveyed over the two evenings. A bat detector was used to detect bat echolocation calls and identify bat activity. Observations commenced shortly after sunset and each bat contact was recorded. A mini time-expansion bat detector (Pettersson D 240x) was used to record bat echolocation calls, and identify species where possible. Time-expanded (x10) recordings were made using a portable minidisc recorder (Sony MZ-N710) which were later analysed using the computer software 'BatSound'.

6. Results

6.1 Desk study

The results of the data search of records held by Cambridgeshire Bat Group revealed no previous records of bats at the site (see Table 1.). Records from the surrounding areas of Fen Ditton, Milton and Waterbeach included roost sites of Pipistrelle, Serotine (*Eptesicus serotinus*) and brown long-eared bats (*Plecotus auritus*) as well as field sightings of noctule (*Nyctalus noctula*) and Daubenton's bats (*Myotis daubentonii*) at the nearby Milton Country Park.

6.2 Daytime assessment

The majority of the land occupying the site is arable farmland made up of large open fields, some of which were bordered by hedgerow and narrow drainage ditches which may offer bats features along which to forage and commute. The most notable as likely to be used by bats were:

A hedgerow containing several mature trees in the south of the site running northeast along a track from Fen Road, Milton, from grid reference TL 484 624 to TL 487 629. This hedgerow is close to pasture and mature woodland to the east.

A hedgerow containing several mature trees running east – west across the centre of the site, from grid reference TL 493 639 to TL 487 641.

A hedgerow just outside the northeast boundary of the site along Car Dyke from TL 493 649 to TL 495 642.

6.2.1 Buildings

No buildings were surveyed – the only building noted was a small timber stable located at the south of the site which looked very unlikely to be used by bats.

6.2.2 Trees

A comprehensive survey of many trees on the site was not possible, mainly due to the presence of foliage which may have obscured potential bat roosting sites. No trees were positively identified as bat roosting sites but a number of trees were noted as having potential for roosting bats (see Table 2.). These were:

A large ivy-covered ash near Fen Road, Milton in the south of the site at TL 48460 62453. No likely roosting sites were visible from the ground and the tree was considered to have low potential for roosting bats.

Two ivy-covered ash trees along track from Fen Road, Milton in the south of the site at TL 48472 62487. Some damage / splits were noted as well as a hole on the east side of one of the trees. These trees were considered to have a high potential for roosting bats.

Ash tree, at TL 48511 62549 along track from Fen Road, Milton, with a hole at the elbow of limb on east side of tree where branch had broken off. This tree was considered to have a high potential for roosting bats.

Multi-stemmed willow with two holes considered to have a high potential as bat roosting sites. Tree located at TL 48515 62581 along track from Fen Road, Milton.

Willow at TL 48526 62617 along track from Fen Road, Milton. Hole on east side considered to be of high potential for roosting bats.

Pollarded willow at TL 48621 62759 along track from Fen Road, Milton. Had holes which may be used by bats, considered to be of medium bat roosting potential.

Ash tree at TL 48647 62783 along track from Fen Road, Milton. Hole on east side. Medium bat roosting potential.

A large horse chestnut and an ivy-covered oak, approximately 15 metres apart, along the hedgerow at the centre of the site at TL 49043 63893. No obvious defects on the trees were noted but much of both trees could not be examined due the presence of the trees foliage. These trees were considered to have medium potential as bat roosting sites due to their size.

6.3 Night time surveys

6.3.1 19th May 2004

Weather conditions were: still, dry, patchy cloud, mild (15.1° C @ 21:45). Sunset = 20:51

The survey commenced near to some of the trees, considered to have bat roosting potential, along the track from Fen Road, Milton. No bats were seen to emerge from any of the trees and none were seen or heard on the bat detector close to expected bat emergence times. The first bat contact recorded was of a Soprano Pipistrelle (*Pipistrellus pygmaeus*) 52 minutes after sunset. Further recordings of this species were made along with a Myotis bat (*Myotis* sp.) and a Common Pipistrelle (*Pipistrellus pipistrellus*). All bats were recorded along the hedgerow along the track from Fen Road, Milton. No bats were recorded further north in the more open areas along the low hedges and drainage ditches. Six bats were recorded (see Table 3.).

6.3.2 2nd June 2004

Weather conditions were: still, dry, some high cloud, cool (10.3° C @ 21:50). Sunset = 20:10

The survey commenced along the hedgerow along Car Dyke, just outside the northeast boundary of the site. A noctule (*Nyctalus noctula*) was recorded feeding over Car Dyke, 40 minutes after sunset. Soprano Pipistrelles (*Pipistrellus pygmaeus*) and Common Pipistrelles (*Pipistrellus pipistrellus*) were also recorded feeding over Car Dyke and over a hedgerow and grassland near the southern end of Car Dyke. 12 bats were recorded during the survey, all over 20 minutes after expected bat emergence times (see Table 4.).

7. Conclusions

The site of the proposed development appears to be of limited use to bats. Much of the site is arable farmland and lacks features favoured by bats for roosting and foraging. Four bat species were recorded in low numbers in two areas of hedgerow and trees identified as having the most potential for bat foraging – these were the hedgerow in the south of the site along the track off Fen Road, Milton and the north of the site adjacent to Car Dyke, Waterbeach. No bats were recorded in the more open areas of the site, showing that bats prefer to forage near to larger trees and hedgerow, pasture, woodland and the open water of Car Dyke.

The survey has not positively identified any bat roosts within the site but potential roost sites have been identified within some of the trees. During activity surveys bats were recorded well after their expected emergence times indicating that they were most likely roosting away from the site. Bats are highly mobile animals which frequently change roost sites and can move into potential roosting sites at any time.

Records obtained from Cambridgeshire Bat Group include those of six bat species in the areas immediately surrounding the proposed development site. These areas are further from the arable farmland of the site and closer to buildings used as roosting sites and areas around the river Cam used

for foraging. The development site therefore has the potential for attracting bats from these surrounding areas.

From the results of the survey, it is considered that the proposed development is unlikely to have any long term negative impacts on bat species on the site or surrounding areas. It is likely that the proposed Sports Lake can improve the site for bats if it includes the planting of hedges and trees to link areas around Car Dyke in the north to existing bat foraging areas adjacent to Fen Road in the south and Milton Country Park.

8. Recommendations

- 8.1** The proposed development should take into consideration the areas identified as preferred bat foraging habitat in the north and south of the site. These areas should be retained and can be further improved for bats by planting trees and shrubs to provide foraging areas and flight lines to connect these two areas.
- 8.2** The felling of any mature trees, particularly those identified as having bat roosting potential, should only be carried out in the absence of bats. Further surveys to confirm the absence of bats should be carried out prior to any felling operations. It is likely that the felling of any trees identified as having bat roosting potential will need to be carried out carefully, to avoid damaging any unseen bats present. Any trees confirmed as bat roosting sites are likely to require a licence from the Department of Environment Food and Rural Affairs before they can be felled legally.
- 8.3** Attention should be given to artificial lighting in the development proposals. Where possible, trees and hedges should be left unlit at night. Where lighting is used for reasons of public safety, for example along access roads and footpaths, its design should be so as to direct the light only where needed i.e.: downwards. The installation of certain types of white lighting, such as mercury vapour lamps, may benefit foraging bats as these attract night flying insects.

Table 1. Previous records of bats held by Cambridgeshire Bat Group.

Species	Grid ref.	Location	Date	Details
Serotine (<i>Eptesicus serotinus</i>)	TL 483603	Fen Ditton church	17 Oct 96	Roost. Droppings found inside church. C. Vine
noctule (<i>Nyctalus noctula</i>)	TL 479622	Milton Country park	1 May 02	Bat detector record. D. Seilly
Daubenton's bat (<i>Myotis daubentonii</i>)	TL 479622	Milton Country park		Field sighting over Lakes. C. Vine
brown long-eared (<i>Plecotus auritus</i>)	TL 478630	Milton, footpath by play area nr. Butt lane	23 Jul 03	Found by owners of 4 Bulteel Close, Milton.

brown long-eared (<i>Plecotus auritus</i>)	TL 479626	Milton, Milton House, 28 Fen Road	16 Jul 03	Roost. Droppings and dead bat confirmed previously by C. Vine. No bats when R. Barrett visited.
Pipistrelle (<i>Pipistrellus</i> sp.)	TL 482603	Fen Ditton, 39 High St	31 Aug 86	Dead bat. Female pip found in garden (cat damage). Body sent to Henry Arnold ITE.
Pipistrelle (<i>Pipistrellus</i> sp.)	TL 501659	Waterbeach, 27 Bannold Road	7 Jul 85	Roost – seen emerging previous evening. Droppings on sill and floor. Entry at apex of W gable.
Pipistrelle (<i>Pipistrellus</i> sp.)	TL 499658	Waterbeach, 23 Spurgeons Avenue	25 Oct 85	Single female pip in bathroom. Flew away outside.
Pipistrelle (<i>Pipistrellus</i> sp.)	TL 493658	Waterbeach, 10 Clare Close	31 May 87	Single male pip left for dead by cat, but later recovered and released.
Pipistrelle (<i>Pipistrellus</i> sp.)	TL 499651	Waterbeach, 4 Lode Avenue	3 Jun 88	Roost- 40 count. Access between soffit and wall next to chimney. Droppings on wall and in loft.
Soprano.Pipistrelle (<i>P. pygmaeus</i>)	TL 480625	Milton, 24 Pearson Close	23 Jul 00	Roost. Bats seen in roofspace - roosting on top of west gable wall. C. Vine.
Soprano.Pipistrelle (<i>P. pygmaeus</i>)	TL 479626	Milton, Parkside, 1 Pearson Court	2 Mar 03	Two soprano pips (55 kHz) flying at 6.20pm. S. Siggs.
Soprano.Pipistrelle (<i>P. pygmaeus</i>)	TL 479622	Milton Country park	24 Sept. 00	Regularly recorded in bat boxes, 2000 – 2003. C. Vine

Annex D-10

Table 2. Summary of trees identified as having potential for roosting bats.

Species	Location	Notes	Bat roost potential
Ash	TL 48460 62453	Ivy covered.	Low
Ash x2	TL 48472 62487	Damage / splits. Hole on the east side of one of the trees.	High
Ash	TL 48511 62549	Hole on east side of tree where branch had broken off.	High
Willow	TL 48515 62581	Multi-stemmed. Two holes visible.	High
Willow	TL 48526 62617	Hole on east side.	High
Willow	TL 48621 62759	Holes.	Medium
Ash	TL 48647 62783	Hole on east side.	Medium
Horse chestnut & oak	TL 49043 63893	No obvious defects but good potential due to size of trees.	Medium

Table 3. Bats recorded during activity survey at south of site.

19 th May	Still, dry, patchy cloud, mild (15.1° C @ 21:45). Sunset = 20:51	
Time	Species	Location
21:43	Soprano Pipistrelle	Along hedge / path. TL 485 626
21:46	Soprano Pipistrelle x2	Along hedge / path. TL 486 627
22:01	Myotis	Along hedge / path. TL 486 627
22:39	Myotis	Along hedge / path. TL 486 627
22:40	Common Pipistrelle	Along hedge / path. TL 485 626

Table 4. Bats recorded during activity survey at north of site.

2 nd June	Still, dry, some high cloud, cool (10.3° C @ 21:50). Sunset = 20:10	
Time	Species	Location
21:50	noctule	Feeding over Car Dyke. TL 495 645
21:50	Soprano Pipistrelle	Feeding around willow along Car Dyke
21:54	Soprano Pipistrelle	Feeding around willow along Car Dyke
21:55	Soprano Pipistrelle	Feeding along Car Dyke
21:57	Soprano Pipistrelle	Feeding along Car Dyke
21:58	Soprano Pipistrelle	Feeding along Car Dyke TL 495 644
22:00	Soprano Pipistrelle	Over meadow in between hedges TL 495 644
22:03	Common Pipistrelle	Close to Car Dyke over meadow
22:05	Common Pipistrelle	Close to Car Dyke over meadow
22:42	Soprano Pipistrelle	Over Car Dyke
22:44	Soprano Pipistrelle	Over Car Dyke
22:45	Common Pipistrelle	Along Car Dyke. TL 495 645

Annex E: Badger, Water Vole, Otter, Reptile and Amphibian Survey

Annex E: Cambridge Sport Lakes Protected Species Surveys

September 2004

H.Hillier

1.0). Introduction and Methodology

1.1 An ecological impact assessment was to be carried out on the land between Milton Country Park and Waterbeach, the proposed site of the Cambridge Sport Lakes .

1.2 The following surveys were required to assess the ecological impact that the proposed development would have on the following protected species otter *Lutra lutra*, water vole *Arvicola terrestris*, badger *Meles meles*, great crested newt *Triturus cristatus* and reptiles.

1.3 The site is at present agricultural land, made up of the following habitats:

- Arable
- Set Aside
- Hedgerows
- Plantation Woodland
- Trees
- Dykes

The habitats present on the site are capable of supporting protected species.

1.4 The following methodologies were employed:

Otter

1.5 The standard methodology (Macdonald et al 1998) was used.

1.6 A metre-by-metre search of all watercourses within the site will be carried out to look for the following signs:

- Spraints
- Resting Places
- Holts
- Slides
- Footprints
- Haul-out places
- Live sightings

Water Vole

1.7 The standard methodology for water vole (Strachan 1998) was used.

1.8 A metre by metre search of all watercourses to look for the following signs:

- Latrines
- Feeding signs
- Footprints
- Burrows
- Runways in vegetation
- Live sightings

1.9 An assessment, of the suitability of the watercourse to meet the habitat requirements of water voles was made:

Badger

1.10 A walkover of the site was carried out to search for the following signs (Harris et al 1989): -

- Setts
- Latrines
- Dung
- Badger Hair
- Footprints
- Pathways

1.11 Evidence of badger activity was recorded.

1.12 If setts are identified, an assessment was made of the level of activity displayed at each one this was done by means of visual inspection using the standard criteria.

1.13 It is usual for badger setts to be used by foxes and rabbits, even simultaneously. Therefore if badgers have been absent for a long time, it can be difficult to interpret whether or not holes were originally dug by badgers. Also it is important to note that badger setts and territories are dynamic features, which are constantly changing. In effect, setts found to be unoccupied could be re-occupied at any time.

Great Crested Newt

1.14 An aquatic and terrestrial habitat assessment was made as to their suitability to sustain a great crested newt population.

1.15 A systematic search of all wet dykes was carried out with a standard hand net.

Reptiles

1.16 The most effective ways of detecting reptiles is artificial refugia (rectangles of corrugated sheet or roofing felt) and transect walks (HGBI 1998 and Gent and Gibson 1998), these two methods compliment each other.

1.17 Refugia is placed on the site, for lizards and snakes to hide under or bask on, these are best placed at various aspects over the site, which will be attractive to reptiles. The refugia require checking twice daily in the am and pm.

1.18 The transect walk is carried out over suitable habitat within the site to look for basking animals.

1.19 A combination of the two methods enables a statement to be made on the presence/absence of reptiles.

1.20 The optimal survey period is April/May/June or September, the recommended survey length is five days to detect presence/absence.

1.21 The best time to carry out surveys is generally between 8.30 am and 11.00 am, and between 4.00 pm and 6.30 pm. Weather conditions play an important part, in cooler conditions they can be encountered later in the morning and earlier in the afternoon, conversely in hot conditions reptiles are encountered earlier in the morning and later in the afternoon.

1.22 It is generally best to survey for reptiles when the air temperature is between 9 and 18° c. On cooler days bright sunshine is good, while hazy or intermittent sun is best on warmer days. Light showers are all right. Rain and windy conditions are usually unsuitable.

2.0). Survey Results

Otters

2.1 No signs of otter were recorded on the site, but an otter spraint was found on the east bank of the River Cam under the A14 road bridge at Milton.

Water Voles

2.2 The survey was carried out on the 22nd May 2004; the survey area included the River Cam and thirteen dykes of which six were dry and one partially dry at the time of the survey. Field signs were found that indicated that water voles are present along three of the dykes within the survey area. The quality of the habitat was medium to high.

2.3 The findings are summarised in **Table 1**.

Table 1. Water Vole Field Signs.

Watercourse	Field Signs	Population Estimate
Dyke 5	FS, D	Small
Dyke 11	FS, D, L	Medium
Dyke 12	FS, D	Small

Key

FS - Feeding Station

D - Droppings

L - Latrine

2.4 The population estimate was made on the number of field signs found.

Badger

2.5 The survey was carried out on the 23rd May 2004

2.6 No setts were found within the survey area, droppings that were thought to be badger were found in two areas . This suggests that the site is used for foraging.

Great Crested Newt

2.7 No great crested newts were found during the netting of the dykes, all wet dykes had stickleback present in varying numbers.

2.8 The majority of the site is made up of arable/set aside with a small area of plantation woodland and poor quality hedgerows.

2.9 The terrestrial habitat is sub-optimal for great crested newt arable land is recognized as being inhospitable for either foraging or hibernating.

2.10 Arable is only thought to be used by newts to access optimal foraging/hibernacula areas, or when there are a large number of ponds in the vicinity.

Reptiles

2.11 The survey produced a negative result with no reptiles found, it is possible that both common lizard and grasssnake are present in low numbers and were not picked up by the survey, the site provides optimal habitat for grass snake.

2.12 The reptile survey is shown in **Figures E1, E2 and E3** along with sampling points for water voles and areas where badger signs were identified.

2.13 The dates and weather conditions of the reptile survey are shown in **Table 2**.

Table 2. Reptile Survey Dates and Weather Conditions.

Date	Time	Temperature	Weather Conditions
29/5/04	AM	17.5	Sun
	PM	19.2	
3/6/04	AM	16.9	Sun
	PM	18.0	Sun/Cloud
5/6/04	AM	17.1	Sun
	PM	16.3	Overcast/Showers
9/6/04	AM	18.1	Sun
	PM	19.4	
12/6/04	AM	16.0	Sun
	PM	17.8	

3.0). Assessment of Impacts

3.1 The major impacts of the scheme are as follows:

- Loss of water vole habitat
- Loss of foraging area of badgers
- Possible loss of grass snake habitat

4.0). Mitigation Measures

4.1 A translocation programme for the water voles will need to be put in place, best practice suggests this should be carried out in early spring before the breeding season commences.

4.2 Alternative sites will need to be created/found to accommodate the water vole population.

4.3 If the sites are to be created then the work will need to be carried out well in advance of the translocation to allow both terrestrial and aquatic vegetation to develop, to create optimal habitat.

4.4 If an alternative site is to be used, a survey should be carried out to ensure water vole and American mink are absent, and that the donor site meets the habitat requirements of water voles.

4.5 Suitable foraging habitat for badgers should be taken into consideration.

5.0). Conclusions

5.1 The survey has shown that otters are using the River Cam within close proximity of the site.

5.2 The survey has shown that water voles are present on the three of the dykes within the development area.

5.3 Prior to development work commencing a further water vole survey should be carried out, to ensure that no other areas have been colonised.

5.4 Badgers appear to be using the site for foraging; a full badger survey should be carried out of the surrounding area in the winter, to try to establish where the sett/setts are.

5.5 No great crested newts were found during the survey, both aquatic and terrestrial habitat was thought to be sub-optimal.

5.6 No evidence was found of reptiles being present were found; the site is thought to have the potential to hold grass snake.

6.0). References

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