ECOLOGY TECHNICAL APPENDIX

1 INTRODUCTION

This appendix provides technical details on ecology surveys undertaken at the Spicer Hill proposed windfarm site. Initially an extended Phase 1 survey and desk study were undertaken to identify the habitats present and any historical records of protected or designated species or habitats. The results of these surveys informed the need to undertake further specific surveys to establish the current baseline conditions on the site.

During this assessment the "survey area" is the red line site boundary of the proposals.

Following the Phase 1 survey and desk study the following additional surveys were undertaken

- Riparian Mammal Survey
- Bat Survey
- Badger Survey (see confidential appendix)
- Breeding Bird Survey
- Winter/Passage Bird Survey
- Preliminary Flight Activity Survey for bird activity.

Details and assessment of the three bird surveys are included in Chapter 7 Ornithology, and associated technical appendices.

2 METHODOLOGY

2.1 Consultation

A range of statutory and non-statutory organisations were contacted in order to gather available information regarding statutorily protected and other designated or notable sites, habitats and species. Data requested during the desk study was for appropriate designated sites and species from within the survey area and surroundings.

In addition the Multi-Agency Geographic Information for the Countryside (MAGIC) website was used to search for the presence of any statutorily protected sites (SAC, SPA and SSSI) or local nature reserves within 5km of the site.

2.2 Field Survey

2.2.1 Extended Phase 1 Survey

This survey followed Phase 1 habitat survey methodology (JNCC, 1993) and was extended to assess faunal potential. This modified approach to the Phase 1 survey is in accordance with the approach recommend by the Guidelines for Baseline Ecological Assessment (IEA, 1995). The survey involved walking the entire site, identifying key habitats and plant species and assessing their inherent value and their potential for holding important populations of faunal species. The habitats were marked on a field plan along with target notes marking the locations of areas of particular interest and/or requiring additional survey. Based on the findings of this survey the following additional surveys were undertaken:

2.2.2 Riparian Mammal Survey

All watercourses running through or adjacent to the site were surveyed for any evidence of Otter or Water Vole.

Evidence searched for included:

- Otter; tracks, feeding remains, spraints, footprints, holts, potential resting places etc.
- Water Vole; droppings/latrines, burrows, feeding remains, "lawns", footprints, runs etc.

All parts of the watercourses within or adjacent to the survey area were easily accessible during the survey. Surveys were undertaken during October 2007 and repeated during March 2008.

2.2.3 Bat Activity Survey

A single preliminary visit was made on 12th to 13th September 2007 to determine the scope of survey that would be necessary at this site, based upon the level of bat activity observed. This survey provides indicative results but does not allow detailed determination of seasonal variation in the level of activity at the site or identification of any regularly used commuting routes.

Two surveyors made an initial visit to the site during daylight to assess any trees and structures as to their suitability as bat roosts, and to plan a transect route, incorporating 12 set listening stops. In addition, listening stops and potential roost sites were also recorded on a handheld GPS. The transect route was designed so as to follow field boundaries and hedgerows, and to bring the surveyors into close proximity to features such as woodlands and watercourses, and open silage or manure stores which may be used by bats. It is to be noted that access was not possible to a portion of a field in the south east part of the survey area due to the stock present in this field.

Trees were assessed based upon features (e.g. cracks, fissures and holes offering access to the interior) that may support bat roosts, and all structures were noted. No trees or structures were assessed in detail for staining or droppings, and surveys were not intrusive.

A dusk transect survey was then undertaken on 12th September 2007, beginning at sunset and completed three hours later. Bat activity was detected using a heterodyne bat detector (Batbox Duet). When activity was detected between listening stops, a digital recording device (EDIROL R-09) was used in conjunction with a frequency division bat detector (Batbox Duet) to record echolocation calls. When the surveyors arrived at a predetermined listening stop, they waited for 3 minutes, and recorded for the duration of the stop using the frequency division bat detector, ensuring any bat activity during that period was recorded.

A dawn transect survey was undertaken the following morning (13th September 2007), beginning two hours before sunrise, and ending thirty minutes after sunrise. The transect route was reversed, and the survey protocol was otherwise identical to that followed during the dusk transect survey.

The two transect surveys were designed with reference to Bat Conservation Trust good practice guidelines.

Recordings were later analysed by a combination of listening and comparing with a reference CD of bat calls and a sample of the recordings were analysed using "Batsound" spectrogram sound analysis software.

2.2.4 Badger Survey

Details of the badger survey are provided in the Confidential Annex.

3 BASELINE CONDITIONS

3.1 Desk Study

A summary of the data received from the consultees is shown below in Table 1

Table 1 Consultation Responses

Consultee	Summary
Natural England	The application should make reference to the latest policy guidance i.e PPS 9. Recommends that the EIA should consider opportunities for increasing biodiversity both within the site and the surrounding countryside, with particular reference to contributing to repairing the fragmentation of heathland in the area.
Environment Agency (EA)	Commented that the scope set out in the scoping document appeared appropriate.
Yorkshire Wildlife Trust (YWT)	No response received.
RSPB	Details in Ornithology chapter.
Barnsley Council	Provided details of local wildlife sites, see below.
West Yorkshire Ecology	A data search was conducted covering the southern part of the site boundary and surrounding area, results of which consisted of: 3 Positive Otter records from Ingbirchworth reservoir (750m + from survey area). Records from 2004/05. Known bat roosts from in and around Penistone (closest record over 2km from survey area); total of 10 records received.
South Yorkshire Bat Group	A total 33 records were received. Of these none were located within 2km of the nearest turbine,25 of the records related to Pipistrelle or indeterminate species with other species including: whiskered, Brandt's, brown long-eared and natterer's bats.
South Yorkshire Badger Group	See confidential appendix
County Bird Recorder	Records of statutorily protected and designated breeding and wintering/passage birds. Details in Ornithology Chapter.
Local Herpetofauna Recorder	Records limited to "toads at the local reservoir".

3.1.1 Internationally Statutorily Designated Sites

The survey area does not include any or any part of an Internationally designated site i.e. Special Area of Conservation (SAC) or Special Protection Area (SPA).

The nearest such site is the South Pennine Moors SAC/Peak District Moors SPA located over 4km to the south-west of the survey area. This site is designated under both directives and listed for the presence of significant amounts of Annex 1 habitats (EC Habitats Directive 1992) and populations of Annex 1 species (Birds Directive 1979).

SAC designation criteria:

Annex I habitats that are a primary reason for selection of this site:

- European Dry Heaths
- Blanket Bogs
- Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles

Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:

- North Atlantic wet heaths with *Erica tetralix*
- Transition mires and quaking bogs

The survey area does not include any areas of these habitats, although the dry dwarf shrub heath habitat within the survey area does share similar characteristics as European Dry Heath, it is found in a significantly less diverse and natural form in its current state.

SPA designation criteria:

The Peak District Moors SPA is designated due to its populations of the following species of bird:

- Golden Plover
- Dunlin
- Merlin
- Short-eared Owl
- Peregrine

None of these species were recorded during any of the breeding or wintering bird surveys within the survey area. Details of bird activity within the site are included within the Ornithology chapter.

Due to the distance between the survey area and the nearest internationally designated sites and the lack of significant shared habitats and species and low connectivity of habitats it is considered that there would be no impact on these sites by the proposed wind farm during any of the phases of development.

3.1.2 Nationally Statutorily Designated Sites

The survey area does not include any Site's of Special Scientific Interest (SSSI).

The nearest SSSI is "Spring Meadows, Alderman's Head & Cow Croft Meadows", Site of Special Scientific Interest, which is located c.3.9km south-east of the survey area.

This site consists of a number of separated meadows to the south and west of the survey area. This site is designated due to the presence of nationally important "species-rich unimproved neutral grassland" in the form of "flower-rich hay meadows".

This entire site is currently considered to be in favourable condition according to the latest assessment of the site dated 10th January 2006, (http://www.english-nature.org.uk/special/sssi/reportAction.cfm?report=sdrt13&category=S&reference=2000514).

The site is characterised by crested dog's-tail (*Cynosurus cristatus*) and common knapweed (*Centaurea nigra*) and includes a rich variety of grasses along with a wide variety of forb species including several which are scarce in the South Yorkshire area.

No faunal interest is mentioned within the SSSI citation.

The Dark Peak SSSI, located over 4km from the survey area, covers the same area as the South Pennine Moors SAC and Peak District Moors SPA. It is designated for a combination of its habitats and fauna. In addition to the criteria listed above for the SAC and SPA the following additional habitats and species are mentioned

- Peatlands
- Blanket Mires
- Acid Grassland
- Flushes and Mires
- Curlew
- Red Grouse
- Twite
- Ring Ouzel
- Wheatear
- Whinchat

A small amount of semi-improved and relatively species-poor acid grassland is located within the survey area. No other additional habitats occur within the survey area in significant amounts when compared to the SAC site.

The survey area does not hold any significant areas of habitat or species populations linking it to any of the SSSIs in the wider area. Based on this fact and the distance and lack of connectivity of high value habitats between these sites and the survey area, it is considered that there will be no impact upon the features, habitats and species mentioned within the citations of Spring Meadows or Dark Peak from the proposed windfarm.

3.1.3 Locally Designated Sites

There are four Natural Heritage Sites located within 1km of the site (but no closer than c.500m. These are designated by Barnsley Borough Council and details of the designations are appended to the end of this document in Appendix 1.

Ingbirchworth Nature Reserve is located on the opposite side of Spicer House Lane to the site. No information was received about this site during the desk study, however a sign at the entrance describes it as a Parish Council Nature Reserve. The site consists of dwarf shrub (heather and bilberry) with young trees and bracken. Two small quarry ponds are also present close to the northern boundary.

Figure 5.1 of the Volume 1 of the Spicer Hill Wind Farm Environmental Statement shows the locations of the various designated sites.

3.1.4 Natural England Natural Area

The entire survey area falls within the Coal Measures Natural Area as designated by Natural England. The key nature conservation features of local significance within this area are

- Acid grassland
- Fen, marsh and swamp
- Lowland heathland
- Neutral grassland
- Rivers and streams
- Standing open water and canals
- Wet woodland

3.1.5 Barnsley Biodiversity Action Plan (BBAP)

In addition to species listed on the UK BAP, BBAP includes the following locally listed species

- Twite
- Little ringed plover
- Bluebell
- Glow worm
- Barn owl
- Lapwing

Locally designated habitats include

- Floodplain Grazing Marsh
- Parkland Ponds & Canals
- Post Industrial Derelict and Degraded Land
- Rush Pasture
- Urban Built-up Areas

The survey area held a small population of lapwing and some areas of species-poor rush pasture. No other listed habitats or species were recorded.

3.2 Field Survey

3.2.1 Extended Phase 1 Survey

3.2.1.1 Overview

The survey area is dominated by stone-walled arable fields and improved grassland used for intensive livestock grazing. To the south-east of the site are fields showing indications of more limited improvement and the acidic nature of the original soil and ground rock is revealed in the species present within the sward. Several areas within grazing fields, particularly north of Whitley Road, have damp areas, usually at the base of slopes which hold high proportions of rush. Within part of the acid grassland and on steep slopes with little soil south of Whitley road, western gorse scrub occurs in limited patches forming a dry dwarf shrub heath/acid grassland mosaic.

Three streams run through or adjacent to the site. None of these streams have significantly diverse associated flora either underwater or emerging. There are no ponds within the site although there are ponds in the surrounding area.

Trees within the site are limited to areas of plantation woodland other than a very few semi-mature trees along boundary walls.

The only buildings within the site are at Spicer House and the front garden holds the only area of dense scrub on the site.

The extended Phase 1 survey identified the following habitats within the survey area

- Arable
- Improved grassland
- Poor semi-improved grassland
- Semi-improved acid grassland
- Dry dwarf shrub heath
- Marshy grassland
- Plantation broad-leaved woodland
- Coniferous plantation woodland
- Dense scrub
- Scattered trees
- Scattered scrub
- Running water
- Fences
- Wall
- Buildings
- Bare ground

Figure 5.2 (ES Volume 1) shows the Phase I Habitat Plan and Target Note Locations. Target Note Descriptions are contained at the end of this document.

3.2.1.2 Arable

All fields included within this category where either ploughed or tilled during the survey and planted with non-cereal crops. The survey area included 4 such fields. These fields lacked any significant features of value to ecological groups such as wide verges or

banks and no evidence of any protected or designated flora or fauna was found. A few other small fields surrounding the survey area also held this habitat.

3.2.1.3 Improved Grassland

This habitat covers the largest land area within the survey area and its immediate surroundings. It consists of grassland which has been subject to extensive fertilization and grazing, resulting in a sward with significantly diminished structure and diversity from that of a more natural state. In many instances synthetic fertilizers and/or manure were seen spread across these fields and evidence of extensive grazing was recorded.

The dominant grass species within this habitat was perennial rye-grass (*Lolium perenne*) with other extremely common species such as Yorkshire fog (*Holcus lanatus*) and crested dog's tail (*Cynosurus cristatus*) often present in lesser amounts. Forbs within the sward were largely restricted to species typical of improved grassland, particularly white clover (*Trifolium repens*), daisy (*Bellis perennis*), dandelion (*Taraxacum agg.*), docks (*Rumex spp.*) and creeping buttercup (*Ranunculus repens*).

In some damper areas tussocks of soft rush (*Juncus effuses*) and tufted hair-grass (*Deschampsia cespitosa*) were also included within the sward. Where significant stands of rush were recorded this habitat was classed as marshy grassland.

This habitat and its constituent floral community is extremely common and widespread throughout the country and is of little ecological value. Although fields of this habitat did hold some displaying ground nesting birds (particularly lapwing and skylark) the high levels of disturbance from farm machinery and livestock greatly reduce the likelihood of significant breeding success.

There is a lack of any significant communities, species or value for faunal groups in this habitat.

3.2.1.4 Poor semi-improved grassland

The areas of this habitat included within the survey area consisted of sections of fields on and adjacent to "Spicer Hill" itself. These areas were subject to high levels of improvement via fertilization and heavy grazing but at the time of survey retained a slightly better diversity of species within the sward than the improved grasslands described above. The sections of fields included within this habitat did not however retain any significant quantities of species indicating higher value habitats such as unimproved grassland or acid grassland.

Features which were used to differentiate between this habitat and improved grassland included

- Higher amounts of grass species other than perennial rye-grass (e.g. common bent (*Agrostis capillaris*), cock's foot (*Dactylis glomerata*), Yorkshire fog, sweet vernal-grass (*Anthoxanthum odoratum*) and tufted hair-grass.Greater amounts of common forb species such as sorrel (*Rumex acetosa*), hawkweed (*Leontodon* sp.), chickweed (*Stellaria media*) and thistles (*Cirsium* sp.)

The majority of the fields designated within this category should be considered to be borderline "improved" and with continued fertilization and grazing or drainage may continue to reduce in their ecological value and become improved within a few years. It

is considered that these fields in their current management are more likely to reduce in ecological value than increase.

The value of this habitat for faunal groups is considered to be largely similar to that of improved grassland. This area is of small size and poor diversity for its habitat type.

3.2.1.5 Semi-improved Acid Grassland

This habitat occurred largely within parts of the fields included in the poor semi-improved grassland, generally on slopes where presumably leaching of nutrients had allowed some of the more natural soil and base rock characteristics to show in the species composition. Along the fields around Spicer Hill the sward described in the previous habitat included a higher quantity of common bent and fescue grasses (sheep fescue (*Festuca ovina*), red fescue (*Festuca rubra agg.*), with small amounts of sheep sorrel (*Rumex acetosella*) and very occasional heath bedstraw (*Galium saxatile*) and harebell (*Campanula rotundifolia*). A similar sward was present in steeper areas south of Whitley Road.

In the field forming the south-east corner of the survey area (see target note 2) the sward become more diverse and showed far greater concentrations of fescues, sheep sorrel and heath bedstraw along with frequent mat-grass (*Nardus stricta*) and tormentil (*Potentilla erecta*). This field was grazed by highland cattle at the time of the survey and did not appear to be as intensively grazed (by sheep) as the remainder of the site. Within the sward of this field were stands of western gorse forming a dry dwarf shrub heath (see below)/acid grassland mosaic. The field also held large amounts of scattered rushes (*Juncus effusus and Juncus conglomeratus*). The highest value area with regard to diversity and quantity of acid indicators appeared to be in the southern and eastern sections of this field.

Acid indicators were also noted in the sward of the grass beneath the trees and adjacent to the stream running c. south-west to north-east near Spicer House (target note 3). This sward contained few acid indicator herb species but some notable patches of mat-grass and fescues.

Due to the greater interest of this habitat than all other habitats recorded within the survey area and its listing as a key habitat under the local natural area criteria, and despite its small area and vulnerability to further improvement, it is considered to be of **LOCAL VALUE**, particularly in its association with the dry dwarf shrub heath.

3.2.1.6 Dry dwarf shrub heath

This habitat within the survey area consists almost entirely from a single species; western gorse (*Ulex gallii*). Numerous patches of this low scrub occur within the field of more diverse acid grassland at target note 2, forming a mosaic of habitats. Also within this area a few very small heather (*Calluna vulgaris*) seedlings were seen, suggesting the potential for a succession to more mature and typical heathland habitat would be possible with appropriate management. A few bilberry (*Vaccinium myrtillus*) plants were also scattered along the banks of the stream running along the southern boundary of this field.

Other stands of gorse were located on steep slopes in improved grassland fields south of Whitley Road and immediately east of these fields (adjacent to the survey area), Small Shaw Bank held a mature and extensive block of gorse running for several hundred metres eastwards.

Due to the greater interest of this habitat than all other habitats recorded within the survey area and its listing as a key habitat under the local natural area criteria, and despite its small area and vulnerability to further improvement, it is considered to be of **LOCAL VALUE,** particularly in its association with the more diverse areas of semi-improved acid grassland.

3.2.1.7 Marshy grassland

A few small sections of the semi-improved grassland hold dense populations of rush and tufted hair-grass which are included within this category. This habitat also includes other damp loving species such as marsh thistle (*Cirsium palustre*) and in lower amounts: oval sedge (*Carex ovalis*), glaucus sedge (*Carex flacca*) and rarely sneezewort (*Achillea ptarmica*).

Areas of grassland which held a sward with over 25% *Juncus spp*., and were not subjected to extensive grazing were included within this category as described within the Phase 1 Handbook (JNCC, 2003).

Due to the small areas of this habitat, exposure to grazing and the lack of species diversity (except the small section which lies within the semi-improved acid grassland/dry dwarf shrub heath mosaic) this habitat is considered to be of **NEGLIGIBLE VALUE** for ecological features.

3.2.1.8 Broad-leaved plantation woodland

The survey area includes trees alongside the stream running south of Spicer House (target note 3) and blocks of trees either side of the site entrance on Whitley Road. All trees are semi-mature or young and somewhat stunted due to exposure to elements. They are in good condition and no trees within this habitat were seen to have potential bat roosting holes or cracks. The dominant species included within this habitat were beech (*Fagus sylvatica*) and sycamore (*Acer pseudoplatanus*). The narrow woodland strip running south to north just outside the survey area from the entrance to the site from Whitley Road, comprises young, native species screen planting including; field maple (*Acer campestre*), birch (*Betula sp.),* ash (*Fraxinus excelsior*), beech, rowan (*Sorbus aucuparia*) and larch (*Larix decidua*).

No significant ground flora was located beneath these trees due to grazing and density of planting (with regard to the woodland strip outside the survey area).

Due to the lack of notable communities of flora or fauna within this habitat within the survey area and the large number of similar woodland blocks in the wider area this habitat is considered to be of **NEGLIGIBLE VALUE** for ecological features.

3.2.1.9 Coniferous plantation woodland

A small block of woodland dominated by spruce (*Picea sp*.) is located immediately west of Spicer House. This area of habitat is densely planted and holds no significant scrub layer or ground flora.

Due to the size and lack of naturalness and diversity of this area of habitat it it considered to be of **NEGLIGIBLE VALUE** for ecological features.

3.2.1.10 Dense scrub

This habitat is restricted to overgrown hedgerows surrounding and spreading in to the front garden of Spicer House, dominated by bramble (*Rubus fruticosus*) and hawthorn (*Crataegus monogyna*) with a few young sapling trees including ash and willow (Salix sp.).

The small size of this habitat and the extremely common nature of the species involved make this habitat of **NEGLIGIBLE VALUE** for ecological features.

3.2.1.11 Scattered Trees

This habitat is only represented by four semi-mature sycamore trees along a field boundary near the centre of the site. These trees are in generally good condition and are in an extremely exposed situation. They have extremely limited ecological value and are considered to be of **NEGLIGIBLE VALUE** for ecological features.

3.2.1.12 Scattered Scrub

The site includes a few individual hawthorn shrub/small trees included within this category. They occur along field boundaries in exposed positions and are considered to be of **NEGLIGIBLE VALUE** for ecological features.

3.2.1.13 Running Water

The survey area includes three streams running through or adjacent to boundaries of the site.

A stream running along the southern boundary of the site, south of Whitley Road has no exposed water as it is covered by a dense mat of floating sweet-grass (*Glyceria fluitans*). It was not clear whether there was any flowing water along this stretch of the stream at the time of survey due to the cover of the sweet-grass, and no other significant emergent vegetation was recorded. This area and the banks of this stream were considered to have some limited potential to hold water vole although no evidence was found (see Riparian mammals below).

A stream runs south-west to north-east through the site along a narrow strip of semi-improved grassland (with some acid indicators, see above) with trees either side (target note 3). This stream is shallow and fast flowing with a width generally restricted to c.50cm or lower. Emergent vegetation is limited to occasional clumps or stands of rush and willowherb (*Epilobium sp.*). This area and the banks of this stream were considered to have some limited potential to hold water vole although no evidence was found (see Riparian mammals below). The stream was also considered to potentially be used by commuting otters from Ingbirchworth Reservoir (if present) although again no evidence was found.

The third stream follows part of the boundary of the main acid grassland/dry dwarf shrub heath mosaic field around the south-eastern corner to Spicer House Lane. The majority of this stream was dry during the autumn and summer and had been recently canalized along the stretch closest to the road during the survey, with the banks being scraped clear of vegetation. No emergent vegetation was recorded within the canalized section and floating sweet-grass, rush and willowherb were recorded in small amounts along the remainder. This area and the banks of this stream were considered to have

some limited potential to hold water vole although no evidence was found (see Riparian mammals below).

The streams within the survey area held no evidence of protected species and had limited species-poor associated flora. The water quality or flow of the streams should not be altered during the development, thus potential pollution of surrounding habitats both on or away from the survey area is limited. This habitat is currently considered to be of **NEGLIGIBLE VALUE** for ecological features.

3.2.1.14 Fences

Barbed wire and other wire fences form some field boundaries within the site often adjacent to dry stone walls. This feature within the survey area is considered to be of **NEGLIGIBLE VALUE** for ecological features.

3.2.1.15 Walls

The majority of the field boundaries within the site are dry stone walls. These offer little in the way of habitat for faunal groups other than the occasional nesting bird (e.g. Wren). No notable floristic communities such as mosses, lichens or ferns were found on any of the walls in the survey area.

This feature within the survey area is considered to be of **NEGLIGIBLE VALUE** for ecological features.

3.2.1.16 Buildings

The only buildings located within the survey area are the farmhouse and barns at Spicer House. These buildings have some limited value for common nesting birds, particularly swallow and jackdaw. It is possible that bats may roost within some of these buildings during some periods of the year, although the desk study stated that there were no records of roosts within 2km of the buildings.

The buildings within the site are considered to be of **NEGLIGIBLE VALUE** for ecological features.

3.2.1.17 Bare ground

Areas of bare ground occur as hard standing around Spicer House and tracks and roads throughout the survey area. This habitat within the survey area is considered to be of **NEGLIGIBLE VALUE**.

3.2.2 Faunal Interest

Due to the presence of generally species-poor habitats dominated by open, managed grassland and the exposed location of the survey area it was considered unlikely that the site would hold any significant populations of invertebrates, amphibians or reptiles.

The site held no areas or features of potentially high ecological significance such as mature trees, ponds or high quality hedgerows.

3.2.2.1 Riparian Mammals

No evidence of water vole or otter was found anywhere along any of the streams or anywhere else within the site during the survey.

All of the streams were considered to have some potential to hold water vole populations if they colonized the site in the future. The site did not include any habitats likely to offer valuable foraging or resting habitats for otters. However, due to desk study records from the nearby Ingbirchworth Reservoir it is considered possible that a nearby population could use the watercourses for commuting between higher value areas.

Despite a lack of evidence from the field survey, due to the nearby records of otter, the potential for otter and water vole to occur within the site and their high levels of protection, the survey area is considered to be of **LOCAL VALUE** for these species.

3.2.2.2 Bat Activity Survey

The majority of bat activity recorded related to pipistrelle bats, with both soprano and common pipistrelle featuring in the recordings. Some calls were identified as being of the *Myotis* group of bats, however these calls are very difficult to separate even with analysis software. Brandt's, Daubenton's, Natterer's and Whiskered are all species in this group that are present in the surrounding area according to the records provided by the local bat group. Thus at this stage it is assumed that some foraging activity by all of these species is possible over the proposed development area.

3.2.2.3 Badger Survey

The results of the badger survey are provided as a separate Confidential Annex.

Table 2 Phase 1 Survey Target Notes

Target Note Number	Description of feature
1.	Base of slopes where the improved grassland gives way to a sward with a few acid indicators i.e. heath bedstraw, sheep's fescue and sheep's sorrel. On the steepest slopes are stands of western gorse. The stream running adjacent to this area is dominated by a dense mat of floating sweet-grass and no exposed water is visible. The banks of this stream have some potential to hold water vole due to the presence of potential food and cover although no evidence was found.
2.	Field containing semi-improved sward that includes notable amounts of acid indicators. Sward appears to face lower levels of grazing than the remainder of the survey area, retaining frequent well spaced tussocks of rush throughout. The diversity of acid indicators is greatest on the southern side of the field. The field contains numerous stands of low western gorse scrub and a very few seedling heather plants. The lack of relative improvement in this area increases its potential to be managed to create a higher value habitat more typical of the natural character of the area.
3.	Strip of grassland with planted trees adjacent to a stream which is partially enclosed on both sides by walls. This area is heavily grazed but appears less improved than surrounding fields with acid indicators (especially mat-grass) present in some areas. The stream is narrow and fast-flowing with little emergent vegetation and has some potential for water vole although no evidence was found. The stream runs on in to Ingbirchworth reservoir and upstream joins a field outside the survey area which includes ponds around the quarry. It is therefore considered possible that this strip of habitat could provide a commuting route for otter. This area does not hold any

	large trees with exposed roots, dense scrub or any other habitats likely to provide cover for resting otters.
4.	Ingbirchworth Nature Reserve. A small former quarry apparently designated as a nature reserve by the Parish Council (according to the sign at the site). Dominated by mature heather with frequent bilberry, bramble and bracken. Two ponds were present in the deepest parts of the quarry with limited associated vegetation dominated by rush. Few small sapling trees and hawthorn shrubs along the boundaries and in the eastern half of the site. South Yorkshire Badger Group described the ponds as having been "partially filled a few years ago". The site has some potential to hold reptile and amphibian populations although it is extremely isolated and surrounded by improved grassland making colonization after decommissioning of the quarry and since water was introduced to the ponds potentially unlikely.
5.	A pond shown on maps of the area is now apparently permanently dry holding the same grassland sward as the surrounding field, with some *Juncus*. The hollow where the pond stood has been largely filled with dumped/stored local stone. No standing water was seen in this area between October 2007 and March 2008 despite regular checks.

References:

IEA. (1995). *Guidelines for Baseline Ecological Assessment*. Chapman & Hall
IEEM. (2002) *Guidelines for Ecological Evaluation and Assessment*. IEEM
IEEM. (2006) *Guidelines for Ecological Impact Assessment*. IEEM (www.ieem.co.uk).
NCC. (1990) *Handbook for Phase 1 habitat survey.* NCC
Strachan R; Moorhouse T (2006) *WATER VOLE Conservation Handbook* (2nd Ed.). Wildlife Conservation Research Unit Oxford University.

Appendix 1

Details of Local Wildlife Sites provided by Barnsley Borough Council

Site Name: **Whitley Edge** **Parish:** **Dunford**

Grid Reference: **SE 188048** **Area:** **42 ha**

SITE DESCRIPTION

Whitley Edge is located at Crow Edge and extends from the road at 304 m AOD to the plateau above.

Upper Whitley Edge is a mosaic of habitats dominated by a swathe of Ulex gallii (western gorse) heath at its upper limits. Below this belt of heath is acid grassland dominated by mat-grass (Nardus stricta) and red fescue (Festuca rubra) with some patches of bilberry (Vaccinium myrtillus). In the north the land is wetter and an area of valley mire is dominated by water horsetail (Equisetum fluviatile), soft rush (Juncus effusus), lesser spearwort (Ranunculus flammula), common cotton-grass (Eriophorum angustifolium) and some Sphagnum species.

The grassland is taller in the south and dominated by tufted hair-grass (Deschampsia caespitosa) with common sedge (Carex nigra), creeping cinquefoil (Potentilla reptans) and sheep's sorrel (Rumex acetosella). The site extends east and south from Upper Whitley Edge to include fields of semi-improved acid grassland with significant areas of Ulex gallii heath.

The land slopes down to Lower Whitley Edge, which is grazed acid grassland, with flushes of Juncus effusus. The mire areas of Upper Whitley Edge drain into Calf Hey dyke. The species found on the banks of the dyke include cross-leaved heath (Erica tetralix), lady-fern (Athyrium filix-femina), bird's-foot trefoil (Lotus corniculatus) and violets (Viola species). This rough grassland is used as a breeding area by snipe, curlew, lapwing (all Birds of Conservation Concern) and whinchat. The site also attracts wheatear and twite on passage.

SITE EVALUATION

Criteria

Size: Whiteley Edge contains one of the largest areas of western gorse heathland in Barnsley.

Diversity: The site contains a diversity of habitat types, from heath and grassland to mire, rush pasture and running water. It is also of value for breeding wading birds.

Naturalness: All the habitats present are semi-natural. The grassland is modified by grazing, other habitats are unmanaged.

Rarity: Western gorse heathland is at the northern edge of its main range in Great Britain in South Yorkshire and is a scarce habitat of great value in Barnsley. This site is one of nineteen lowland sites in Barnsley, some of which are quite small and isolated and may be of recent origin. Ulex gallii is listed on the UK BAP Long List. Valley mire is a scarce habitat in Barnsley and this is the only example outside the Western Moors area.

Fragility: Grassland and heathland are vulnerable to agricultural improvement or changes in stocking practices, which would also threaten the mire areas. The eastern site boundary adjoins improved grassland.

Typicalness: Whitley Edge comprises a mosaic of typical habitats, with heathland at the top of a slope grading to grassland with areas of impeded drainage downhill.

Evaluation of important features

Site Feature		Importance		
1.	Habitat type	District		
	Heathland	High		
	Acid grassland	Average		
	Rush pasture	Average		
	Valley mire	Average*		
	Running water	Low		
2.	Species	National	County	District
	Ulex gallii			Average
	Wading birds			Average*

* Requires survey to verify current status

Existing site designations: NHS

Site justifications: Whitley Edge has a diversity of habitats including acid grassland and mire areas and in particular western gorse heathland, a rare and vulnerable habitat in Barnsley. The site also has ornithological interest, especially for breeding waders.

Barnsley Biodiversity Action Plan
HAP 10 Lowland Heathland
HAP 12 Rush Pasture
HAP 15 Running Water
SAP 11 Twite

SITE MANAGEMENT

Management objective:

To maintain the mosaic of habitats on the site. Maintain the areas of Ulex gallii heathland, the unimproved grassland for breeding waders and protect the areas of valley mire.

Initial Management:

Ensure that there is adequate fencing to prevent encroachment of improved agricultural land into the heathland.

Ongoing management:

Discourage encroachment into heathland by arable crops, such as Brassica crop present in 1991. Maintain the present grazing regime for the rough grassland areas of Lower Whitley Edge.

Constraints:

Land in private ownership and part of agricultural holding.

Opportunities:

Potential for FWAG liaison with landowner.

REVIEW OF BARNSLEY NHS SITES – FEBRUARY/MARCH 2003

Whitley Edge

1. Site Boundaries

The boundaries of the site as shown on the 1990 Survey Map are confirmed as correct, but it is suggested that a sizeable area of gorse scrub near the south-eastern end is included within the site. The boundary has been amended accordingly.

2. Main Habitat Components

The main habitat components have undergone some change since the Survey of 1990. The changes identified during this (2003) survey are listed in (3) below.

3. Habitat Change/Loss

1) The western third of the site is now a mosaic of acid grassland and marshy grassland, containing locally frequent Juncus spp, and was not grazed at the time of survey.
2) The area of Ulex scrub on Upper Whitley Edge is less extensive than is shown on the 1990 Habitat Map, and a proportion of this former scrub zone is now occupied by semi-improved acidic grassland. It may be that the respective habitat boundaries were not accurately mapped in 1990.
3) There was not observed to be any Ulex scrub in the north-eastern field near Whitley Road. All this area was semi-improved acidic grassland.
4) Part of the south-central acidic grassland grades into marshland/rush pasture towards the southern boundary of the site.
5) It is suggested that a sizeable area of dense Ulex scrub near the south-eastern end of the site is added to the Whitley Edge SSI. This would compensate in some degree for the apparent loss of Ulex scrub elsewhere on site.

4. Notable/Rare Species

One of the principal reasons for notifying this site is the presence of significant populations of western gorse (Ulex gallii), - one of the largest concentrations of the species in Barnsley District. While *Ulex gallii* is not a rare plant nationally, it is confined to the western half of Britain generally and in Barnsley District is reaching its easternmost limit.

5. Potential Threats

None apparent.

Site Name: **Royd Moor Reservoir** **Parish:** **Gunthwaite and Ingbirchworth/Penistone TC**

Grid Reference: SE 222048 Area: 32.2 ha

SITE DESCRIPTION

Royd Moor Reservoir is located north of Thurlstone, at an altitude of 268 m AOD. The reservoir area is surrounded by improved grassland and arable farmland. Annat Royd Beck flows into the reservoir at its northern end. There is no aquatic vegetation in the reservoir.

A littoral zone of vegetation noted around the water in 1990/1 includes shoreweed (Littorella uniflora) which is rare in the district, slender tufted sedge (Carex acuta), marsh pennywort (Hydrocotyle vulgaris) and marsh yellow-cress (Rorippa palustris).

There is a diversity of habitats around the reservoir. Much of the land is acid grassland with scrub, dominated by wavy hair-grass (Deschampsia flexuosa) and creeping soft-grass (Holcus mollis). Purple moor-grass (Molinia caerulea), bilberry (Vaccinium myrtillus) and crowberry (Empetrum nigrum) occur occasionally. The western edge of the reservoir is oak woodland with a ground cover of creeping soft-grass. At the northern end of the water body is a small wooded area containing several patches of wood horsetail (Equisetum sylvaticum).

There is an exposure of rock at the south-eastern end of the site, with rough grassland and heather (Calluna vulgaris). An old quarry in the southern arm of the site contains willow (Salix species) scrub and bramble (Rubus fruticosus). Northern marsh-orchid (Dactylorhiza purpurella) which is rare in the district grows in this area. In the old quarry there is a pond surrounded by common sallow (Salix cinerea), at the base of a steep bank.

The site has a variety of faunal interests. It is the location for several scarce beetles and has a diversity of invertebrate interest. A pond in the site contains a good population of great-crested newt, a protected species under the Wildlife and Countryside Act 1981.

Royd Moor reservoir is a ringing site for Barnsley Ringing Group and supports breeding yellow wagtail, grey wagtail (UK BAP Long List), teal and kingfisher (the latter two being Birds of Conservation Concern and listed on the UK BAP Long List). Birds using the site on passage include wheatear, blackcap, garden warbler, willow warbler and whitethroat.

SITE EVALUATION

Criteria

Size: The reservoir itself is of average size in the context of upland reservoirs in Barnsley.

Diversity: The whole reservoir site has a wide variety of habitats, including woodland, scrub, acid grassland, pools and rock exposures.

Naturalness: The reservoir and quarry are man-made. The surrounding habitats are semi-natural and unmanaged.

Rarity: The great-crested newt is regarded as a vulnerable species in Great Britain and is protected from harm under Schedule 5 of the Wildlife and Countryside Act 1981. *Littorella uniflora* is a locally frequent species nationally, being widespread and frequent in much of

Scotland, Cumbria, Wales and throughout much of Ireland, In northern England it is of scattered occurrence but may be locally frequent where it is found. This species is found in 972 10 x 10 km squares in Great Britain (New Atlas of the British Flora 2002), but noted as in need of special protection in the Yorkshire Water area (Palmer and Newbold, 1983). *Equisetum sylvaticum* is a northern plant at the southernmost edge of its range in this area. *Dactylorhiza purpurella* is a predominantly northern species which is widespread in Scotland and the northernmost parts of England and is virtually at its southernmost limit in England in South Yorkshire where it is rare and local.

Fragility: The water body itself is secure whilst it is used as a drinking water supply. The new pond may be vulnerable to encroachment by vegetation or drying out. Surrounding habitats are vulnerable to agricultural improvement.

Typicalness: The site contains good, typical examples of unimproved acid grassland and willow carr.

Evaluation of important features:

Site Feature		Importance		
1.	Habitat type	District		
	Standing water	High		
	Running water	Low		
	Inundation	High		
	Woodland	Low		
	Scrub	Average		
	Acid grassland	Average		
2.	Species	National	County	District
	Breeding birds			Average
	Passage birds			Average
	Great-crested newt	Average*	High*	
	Littorella uniflora		High*	
	Dactylorhiza purpurella			High*

* Requires survey to verify current status

Existing site designations: NHS, Grassland Inventory Site (R01 SE 20)

Site justifications: This reservoir site has a particularly good diversity of habitats which have botanical and faunal interest, including scrub, acid grassland and inundation communities. Dactylorhiza purpurella is rare in Barnsley and Littorella uniflora is of significance in the Yorkshire water area. The site supports a population of great-crested newt, a vulnerable species in Great Britain and a variety of breeding and passage bird species.

Barnsley Biodiversity Action Plan
HAP 1 Upland Oak Woodland
HAP 10 Lowland Heathland
HAP 16 Standing Water
SAP 3 Great Crested Newt

REVIEW OF BARNSLEY NHS SITES – FEBRUARY/MARCH 2003

Royd Moor Reservoir

1. Site Boundaries
The site boundaries, as shown on the 1990 Survey Map, are confirmed as being correct.

2. Main Habitat Components
The main habitat components, as shown on the 1990 Habitat Map, are broadly correct, but see comments under (3) below.

3. Habitat Change/Loss
1) The area which is shown as acidic grassland on the south-western edge of the site on the 1990 Habitat Map also contains a mosaic of heathland species including bilberry (Vaccinium myrtillus) and heather (Calluna vulgaris) and is interspersed with a scattered scrub cover predominantly of oak (Quercus spp.).

2) There are also small to moderate sized stands of reed canary-grass (Phalaris arundinacea) in shallow water margins around some parts of the reservoir. This species was not mentioned in the 1990 Report.

4. Notable/Rare Species
The site contains shoreweed (Littorella uniflora) and northern marsh-orchid (Dactylorhiza purpurella) which are categorised as rare in Barnsley District. Littorella uniflora is a locally frequent species nationally, being widespread and frequent in much of Scotland, Cumbria, Wales and throughout much of Ireland, In northern England it is of scattered occurrence but may be locally frequent where it is found. Dactylorhiza purpurella is a predominantly northern species which is widespread in Scotland and the northernmost parts of England and is virtually at its southernmost limit in England in South Yorkshire where it is rare and local.

5. Potential Threats
None.

Site Name: **Broadstone Reservoir** **Parish:** **Dunford**

Grid Reference: **SE 193063** **Area:** **19.3 ha**

SITE DESCRIPTION

Broadstone Reservoir is situated north of Crow Edge and is an upland reservoir surrounded by acid grassland. The water is clear and the bed of the reservoir is stony, grading to gravel at the shallow western end where bulbous rush (Juncus bulbosus) is dominant with soft rush (Juncus effusus). The reservoir has no aquatic vegetation and little marginal vegetation, except for an area at the southern side with Sphagnum species, Polytrichum commune and a variety of species such as lesser spearwort (Ranunculus flammula), celery-leaved crowfoot (R. sceleratus) and marsh violet (Viola palustris).

Within the confines of the reservoir walls rough acid grassland is found with creeping soft-grass (Holcus mollis), tufted hairgrass (Deschampsia caespitosa) and rush (Juncus species). On the north side of the reservoir two dry banks are separated by a ditch, dry except for some water at the western end. The ditch contains broad-leaved pondweed (Potamogeton natans), starwort (Callitriche species) and floating sweet-grass (Glyceria fluitans), with marsh willow-herb (Epilobium palustre) and mountain fern (Oreopteris limbosperma). Creeping soft-grass dominates the bank to the south of the reservoir, with areas of heather (Calluna vulgaris).

The field east of the reservoir is dominated by common bent-grass (Agrostis capillaris) with areas of western gorse (Ulex gallii), heather and bracken (Pteridium aquilinum). Broadstone Dyke runs along the southern boundary of the field and beside it are found heather, western gorse, bilberry (Vaccinium myrtillus), sneezewort (Achillea ptarmica), cat's ear (Hypochaeris radicata), tufted and bush vetch (Vicia cracca, V.sepium) and large bird's -foot trefoil (Lotus uliginosus).

The reservoir and surrounding habitats support breeding birds associated with upland standing water including snipe, curlew (Birds of Conservation Concern), little ringed plover (Barnsley SAP 7), and common sandpiper. Wheatear, twite (Barnsley SAP 11) and whinchat (all UK BAP Long List Species) also breed in the vicinity. The site is used by birds on passage, particularly waders and wildfowl such as dunlin, green sandpiper, greenshank, whimbrel, wigeon, goldeneye and teal. It supports wintering golden plover, lapwing and wildfowl.

SITE EVALUATION

Criteria

Size: The reservoir is of average size for an upland reservoir in Barnsley.

Diversity: There is a diversity of ecological interest on the site. Habitats include both standing and running water, acid grassland and heath/grassland mosaic and a significant diversity of ornithological interest, both breeding and on passage.

Naturalness: The reservoir is man-made and its adjacent habitats semi-natural and unmanaged. The site is surrounded by improved grassland and arable land.

Rarity: There are no scarce habitats on the site. Western gorse is listed on the UK BAP Long List. The site supports a variety of breeding birds including several Birds of Conservation Concern.

Fragility: The reservoir is used as a drinking water supply and as long as this continues its future is secure. The field to the east could be subject to agricultural improvement.

Typicalness: This is a typical upland reservoir site surrounded by a mosaic of typical upland habitats.

Evaluation of important features

Site Feature		Importance		
1.	Habitat type			District
	Standing water			Average
	Running water			Low
	Acid grassland			Low
	Calluna heath/grassland mosaic			Average
2.	Species	National	County	District
	Breeding birds			Average*
	Passage birds			High
	Ulex gallii			Average

* Requires survey to verify current status of these species.

Existing site designations: NHS

Site justifications: The site includes a diversity of wet and dry habitats and a typical upland habitat mosaic of Calluna heath and grassland. These habitats support a diversity of breeding birds. The site is particularly notable for birds on passage, especially waders and wildfowl.

Barnsley Biodiversity Action Plan
HAP 11 Upland Heathland
HAP 15 Running Water
HAP 16 Standing Water
SAP 7 Little Ringed Plover
SAP 8 Skylark

SAP 11 Twite
SITE MANAGEMENT

Management objective:

To maintain the present diversity of habitats, for the benefit of the bird interest.

Initial Management:

Ongoing management:
Discourage agricultural improvement or significant alteration to the habitats surrounding the reservoir.

Constraints:

Opportunities:
Conservation management potential through liaison with Yorkshire Water.

SITE CONSTRAINTS AND OPPORTUNITIES

Constraints:

Operational requirements of Yorkshire Water.

Opportunities:

Owned by Yorkshire Water who have an obligation to further nature conservation.

REVIEW OF BARNSLEY NHS SITES – FEBRUARY/MARCH 2003

Broadstone Reservoir

1. Site Boundaries
The site boundaries, as shown on the 1990 Survey Maps, have been confirmed as correct.

2. Main Habitat Components
The main habitat components, as shown on the 1990 Habitat Map, have been broadly confirmed as correct, but see (3) below.

3. Habitat Change/Loss
In addition to the reservoir being full of water in the winter season, instead of being half full as at the time of the 1990 survey, there are one or two minor habitat changes. These are :

1) the small area of bracken (*Pteridium aquilinum*) near the road on the eastern edge of the site has apparently increased somewhat in area as compared with the delineation on the 1990 Habitat Map.

2) There is a small shelter belt/copse of trees not noted in the 1990 Survey.

4. Notable/Rare Species
None.

5. Potential Threats
None.

Site Name: **Ingbirchworth Reservoir** **Parish:** **Gunthwaite and Ingbirchworth**

Grid Reference: **SE 214060** **Area:** **31.3 ha**

SITE DESCRIPTION

Ingbirchworth is a mesotrophic reservoir located west of Ingbirchworth village at a height of 256 m AOD. It is a large reservoir surrounded by a stone wall, enclosing a variety of habitats. There is no aquatic vegetation in the reservoir. A littoral zone of vegetation which exists below the highest water mark was noted in the survey undertaken in 1990/1.

There are fringing areas of woodland and trees around much of the reservoir. In the southern area is a mixed woodland of willow (Salix species), birch (Betula species) and sycamore (Acer pseudoplatanus). West of this is a band of new planting of sycamore, rowan (Sorbus aucuparia) and oak (Quercus species). The woodland extends to the western access gate where there is an area of goat willow (Salix caprea) and common osier (S. viminalis) with large stands of amphibious bistort (Polygonum amphibium). Along the northern reservoir boundary are areas of willow scrub with bilberry (Vaccinium myrtillus) and occasional trees of ash (Fraxinus excelsior), sycamore and common osier. In the northern arm of the reservoir is an area of tall ruderal vegetation and willow. Sycamore, ash and goat willow form a dense belt of trees is at the top of the north-western bank. Behind the trees is an area of heather (Calluna vulgaris) heath and grassland with ox-eye daisy (Leucanthemum vulgare), tufted vetch (Vicia cracca), meadow vetching (Lathyrus pratensis) common knapweed (Centaurea nigra) and goat's beard (Tragopogon pratensis).

In the 1990/1 survey of the site an extensive littoral zone around the reservoir, was found to be dominated by shoreweed (Littorella uniflora), which is a rare plant in the district, and water mint (Mentha aquatica). In the drier areas silverweed (Potentilla anserina) and marsh pennywort (Hydrocotyle vulgaris) dominated with heath bedstraw (Galium saxatile), red veined dock (Rumex sanguineus), soft rush (Juncus effusus) and bittersweet (Solanum dulcamara). The nationally scarce plant mudwort (Limosella aquatica), was noted in the western arm of the reservoir amongst an area of willow scrub and marsh ragwort (Senecio aquaticus). This littoral zone was submerged during a site visit in March 2003 but reed canary grass (Phalaris arundinacea) was found to be locally frequent as a bankside/shallow emergent species around the reservoir.

An area of mixed scrub and heathland north-west of the reservoir is included. Western gorse (Ulex gallii) and common gorse (Ulex europaeus) are dominant over this area. A more open community of lady fern (Athyrium filix-femina), harebell (Campanula rotundifolia), heath bedstraw and red fescue (Festuca rubra) is found towards Broadstone Dyke in the south of the field.

The reservoir has a diversity of ornithological interest. Breeding birds have included great created grebe, little grebe and tufted duck. In summer large numbers of house martin, swallow and swift feed over the water. In winter wildfowl such as goldeneye, smew and wigeon use the reservoir. The most significant bird interest is in the passage birds using the site, which include black tern, common tern, common sandpiper, cormorant, whinchat and wheatear.

A population of animals protected under the Wildlife and Countryside Act 1981 was found on the site and these are scarce in the counties of South and West Yorkshire.

SITE EVALUATION

Criteria

Size: This is the largest upland reservoir in Barnsley outside the Western Moors site.

Diversity: There is a large diversity of habitats on the site; woodland, scrub, heathland, grassland, inundation and water. There is also a variety of bird interest present throughout the year.

Naturalness: The reservoir is man-made and the woodland and trees mainly of planted origin. The willow scrub, heathland and grassland habitats are semi-natural and unmanaged.

Rarity: Western gorse heath is a rare habitat in Barnsley and at the northern edge of its main range in Great Britain. Ulex gallii is listed on the UK BAP Long List. Neither *Limosella aquatica* nor Littorella uniflora was seen during this current 2003 survey, being both presumably dormant/submerged under the higher water levels. Limosella aquatica is listed in *Scarce Plants in Britain* (eds. A. Stewart, D.A. Pearman & C.D. Preston, 1994), and 55 – 10 x 10 km. square (hectad) occurrences are noted. In the *New Atlas of the British & Irish Flora* (op. cit.) 77 – 10 x 10 km. square (hectad) occurrences are listed for Great Britain and Ireland. In West and South Yorkshire, however, it remains a very scarce plant. Littorella uniflora is a much commoner species nationally, being widespread and frequent in much of Scotland, Cumbria, Wales and throughout much of Ireland, In northern England it is of scattered occurrence but may be locally frequent where it is found. Littorella uniflora is found in 972 10 x 10 km squares in Great Britain (*New Atlas of the British Flora* 2002), but is noted as in need of special protection in the Yorkshire Water area (Palmer and Newbold, 1983).

Fragility: The water body is secure whilst it is used as a drinking water supply. The grassland and woodland is confined within the reservoir wall. The heathland is vulnerable to agricultural improvement. The creation of a footpath on the north bank of the reservoir caused much disturbance on the site and may have caused a decline in breeding birds such as great-crested grebe and little grebe.

Typicalness: The fringing habitats of the reservoir are similar to Scout Dyke and Royd Moor reservoirs, although these do not have such a significant littoral zone as Ingbirchworth.

Evaluation of important features

Site Feature		Importance
1.	Habitat type	District
	Standing water	High
	Running water	Low
	Inundation	High
	Woodland	Low
	Scrub Average	
	Grassland	Low
	Heathland	Average

		Importance		
2.	Species	National	County	District
	Summer feeding birds			Average
	Wintering birds			High
	Passage birds			High
	Limosella aquatica	High*		
	Littorella uniflora		High*	
	Ulex gallii			Average

* Requires survey to verify current status.

Existing site designations: NHS

Site justifications: This is a large reservoir with a diversity of wet and dry habitats including the locality for a nationally scarce plant, Limosella aquatica and locally rare plant, Littorella uniflora. There is a variety of bird interest throughout the year and this is a significant site for wintering and passage birds.

Barnsley Biodiversity Action plan
HAP 1 Upland Oak Woodland
HAP 10 Lowland Heath
HAP 16 Standing Water

SITE MANAGEMENT

Management objective:

To maintain the diversity of habitats present within the site. To diversify and supplement the woodland areas. To protect the habitat and location of mudwort (Limosella species).

Initial Management:

Underplant sparse woodland with native broadleaved trees. Supplement single rows of trees to give a wider band of woodland in some areas.

Ongoing management:

Discourage agricultural improvement of the scrub and heathland area.
Ensure that the habitat for mudwort is preserved, that mud areas where the plant grows are safeguarded, both from drying out and encroachment by willow scrub.
Consider designation of a conservation area between the western and southern access gates to prevent disturbance to birds, so they have a haven area within the reservoir site.

Constraints:

The timing and methods employed in management must taken account of the bird interest and be carried out in such a way as to minimise disturbance to the birds.

Opportunities:

Possibility of conservation management. A scheme has already constructed the new path and young trees are being planted. Trees could be planted to screen the water from the footpath and maintain undisturbed areas of water for birds. The construction of hides at the western end of the reservoir would provide a constructive recreational element to the site.

SITE CONSTRAINTS AND OPPORTUNITIES

Constraints:

Potential conflict between bird interest and public wishing to see birds and use site.
Operational requirements of Yorkshire Water.

Opportunities:
Owned by Yorkshire Water who have an obligation to further nature conservation.

DEFRA EIA Regulations may apply.

4 REVIEW OF BARNSLEY NHS SITES – FEBRUARY/MARCH 2003

Ingbirchworth Reservoir

1. Site Boundaries
The site boundaries, as shown on the 1990 Survey Map, were identified as being correct.

2. Main Habitat Components
The main habitat compartments, as shown on the 1990 Survey Map, were identified as being correct, except that the area of open water in this winter period covered the whole of the reservoir, and the zone of inundation vegetation shown on the 1990 Habitat Map (presumably Littorella uniflora) was not apparent on the present survey.

3. Habitat Change/Loss
No habitat change or loss noted.

4. Notable/Rare Species
Neither Limosella aquatica nor Littorella uniflora was seen during this current survey, being both presumably dormant/submerged under the higher water levels. Limosella aquatica is listed in *Scarce Plants in Britain* (eds. A. Stewart, D.A. Pearman & C.D. Preston, 1994), and 55 – 10 x 10 km. square (hectad) occurrences are noted. In the *New Atlas of the British & Irish Flora* (op. cit.) 77 – 10 x 10 km. square (hectad) occurrences are listed for Great Britain and Ireland. In West and South Yorkshire, however, it remains a very scarce plant. Littorella uniflora is a much commoner species nationally, being widespread and frequent in much of Scotland, Cumbria, Wales and throughout much of Ireland, In northern England it is of scattered occurrence but may be locally frequent where it is found.

5. Potential Threats
None.