

Phase 2 Vegetation Survey

Proposed Rabbit Ings Regeneration Scheme,
Near Royston, Barnsley

On behalf of the City of Wakefield Metropolitan
District Council and Yorkshire Forward

By WYG Environment

from strength to strength

Phase 2 Vegetation Survey

Proposed Rabbit Ings Regeneration Scheme,
Near Royston, Barnsley

On behalf of the City of Wakefield Metropolitan
District Council and Yorkshire Forward

By WYG Environment

WYG Environment Planning Transport Ltd accept no responsibility or liability for any use which is made of this document other than by the Client for the purpose for which it was originally commissioned and prepared.

Reference: A039273			
Issue	Prepared by	Checked by	Verified by
V1 06.10.2008			
V2 -			
V3 -			
V4 -	Richard Penson	Claire Wilmer MIEEM	Dr. Stephen Bolt
WYG Environment, Aqua House, 20 Lionel Street, Birmingham, B3 1AQ Tel: 0121 233 1833 Fax: 0121 212 8330 Email: midlands.ecology@wyg.com			

CONTENTS

1. Introduction
2. Desk Study
3. Survey Methodology
4. Survey Results
5. Interpretation & Evaluation
6. Mitigation & Compensation
7. References

Plan 1 Phase 2 Habitat Survey

Appendix 1 Vegetation Species Lists

RABBIT INGS REGENERATION SCHEME: PHASE 2 VEGETATION SURVEY

1. INTRODUCTION

1.1 Background to Activity

WYG Environment (WYGE) was commissioned by Carillion on behalf of City of Wakefield Metropolitan District Council (WMDC) and Yorkshire Forward (YF) to undertake ecological work as part of a regeneration scheme for the Rabbit Ings site ('the Site') that covers 65.9 hectares of land near the village of Royston, Barnsley. The Site includes land formerly used as a colliery spoil heap, former drift mine and disused sports pitches/recreation ground. The Rabbit Ings Regeneration Scheme ('the Scheme') will include the importation of soil making materials, regrading of steep slopes for Health and Safety reasons, and reclamation works to provide formal and informal recreation uses including sports pitches with two team changing facilities with ancillary site access, car parks and informal open areas with landscape and ecological enhancements.

Following a Phase 1 survey undertaken by Scott Wilson at the Site in 2007, a number of specific habitat and protected/notable species surveys were recommended to accurately predict potential ecological impacts as a result of the proposals. This report provides details of work undertaken at the site in relation to vegetation and notable plant species, assesses predicted ecological impacts on protected or notable species and proposes measures with regards to the vegetation mitigation strategy for the site.

The aims of these surveys were:

- To record vegetation types within the site and provide species lists;
- To record and map the presence of notable vegetation ;
- To provide proposals for mitigation measures to offset any environmental impacts caused by the proposed work and to maintain the notable species at a favourable conservation status; and
- To assist the client to operate within the law.

1.2 Site Location and General Description

The Site (centred around OS grid reference SE 381 118) is located to the north-east of the village of Royston, east of Lund Hill Lane (B6428), some 4.5km north-east of Barnsley, and covers approximately 65.9 hectares (ha). The site is within the administrative boundary of Barnsley Metropolitan Borough Council (BMBC). The majority of the site is owned by WMDC with the recreation ground owned by the Royston and Carlton Community Partnership (RCCP) and a relatively small parcel of land within the south part of the site under the ownership of BMBC.

The site effectively comprises three distinct areas, namely as follows:

- (i) the former Rabbit Ings spoil heap;
- (ii) the former Royston drift mine site located to the north-west of the spoil heap;
and
- (iii) the RCCP recreation ground located to the south-west of the spoil heap.

The Rabbit Ings spoil heap occupies the majority of the Site covering an area of approximately 50.9ha. Sandybridge Lane forms the eastern boundary of the spoil heap and Sandybridge Dyke is located to the south. A dismantled railway, part of Lund Hill Lane, along with the former Royston Drift Mine and some existing employment land is located to the west of the former spoil heap. Open agricultural fields and a former railway line forms the northern boundary of the spoil heap.

The spoil heap comprises a mound of colliery spoil rising approximately 35m to 40m above surrounding land. There are some areas of tree and shrub growth mainly on the southern slopes of the spoil heap, but other parts are sparsely vegetated. The spoil heap appears to be terraced on its northern flank, with steep embankments separating the terrace levels. Parts of the southern flank of the spoil heap are steep sided, leading to a much flatter area of land adjacent to Sandybridge Dyke that has more established areas of tree and shrub vegetation. The top of the spoil heap is generally flat with limited vegetation cover. There is evidence of surface erosion from uncontrolled surface water run-off on parts of the spoil heap. In addition, there is evidence of unauthorised use by motor bikes and 4x4 vehicles on the spoil heap and adjacent land within the Site.

A man-made pond is located in the north-east corner of the Site and a former lagoon is located in the south-west corner.

The former Royston Drift Mine site occupies an area of land approximately 6.5ha, located to the north-west of the spoil heap, east of Lund Hill Lane, and to the north of existing industrial land. It comprises a relatively flat area of land with an area of hardstanding along with the remains of former roadways and footings for former colliery buildings.

The RCCP derelict sports pitches/recreation ground is located adjacent to the south-west part of the spoil heap and covers an area of approximately 8.5ha. The sports pitches are in poor condition and are infrequently used; they have been 'ploughed' to prevent motorcycle and 4x4 access. The eastern boundary of this part of the Site is formed by a disused railway line adjacent to the spoil heap. The western boundary is formed by a public footpath, with Lund Hill Lane to the west, and the southern boundary by a hedgerow.

A public footpath runs generally along the northern site boundary, in part within the Site, providing a link between Lund Hill Lane in the west and Sandybridge Lane to the east. In addition, a public footpath runs from Lund Hill Lane in a south-east direction, to the north of the sports pitches/recreation ground, and leaves the southern boundary of the Site to connect with the wider rights of way network including the Trans Pennine Trail.

1.3 Surrounding Area

Land to the north and east of the Site includes open fields used for agriculture. The village of Shafton is located approximately 0.5km to the south-east of the spoil heap with intervening agricultural land. The Sandybridge Dyke is located along the southern boundary of the Site and the Trans Pennine Trail, with woodland areas and agricultural land to the south.

South-west of the spoil heap and outside the Site is a restored waste disposal tip (Cudworth Landfill Site) forming a prominent mound rising 10m above the surrounding land. West of the RCCP recreation ground is a railway line that runs north-south, passing over Lund Hill Lane, approximately 100m west of the site boundary. In addition, a former landfill site is located outside and to the north of the former drift mine part of the Site.

Between Lund Hill Lane and the former spoil heap is an area of land that is currently used for employment purposes, including a pallet yard and a number of other business activities.

The Monkton Coke and Chemical Works is located to the west of the Site and Lund Hill Lane. North of this coke works and to the west of Lund Hill Lane is a coal storage yard.

Royston Village is located to the south-west of the Site. Some residential properties and a nursery school on the east side of this village are located to the west of Lund Hill Lane approximately 100m distant from the south-west of the Site boundary. There are some residential properties along Lund Hill Lane approximately 250m north of the Site.

The Site is surrounded by arable land to the north, amenity fields and agricultural fields beyond to the south and is bordered by Lund Hill Lane and Sandybridge Lane to the west and east respectively.

1.4 **Proposed Work**

The Scheme provides for the regeneration of the Site and will primarily involve some importation of soil making materials, regrading and reclamation works to provide formal and informal recreation uses including sports pitches with two team changing facilities, ancillary site access, car parks, and informal open space areas with landscape and ecological enhancements. The Scheme will take 12-18 months to complete, subject to works being progressed within the appropriate soil handling season.

2. **DESK STUDY**

In a recent (2007) ecological survey, Scott Wilson Ltd made consultation with the West Yorkshire Biological Records Centre (WYBRC) and the North and East Yorkshire Ecological Data Centre (NEYEDC) to obtain up-to-date information pertaining to notable vegetation within a 2km radius of the survey area.

2.1. Local Ecological Records Centres

The local ecological records centre, West Yorkshire Ecology, was consulted to obtain information relating to records of notable plant species within the site and within a radius of up to 2km from it. No records were returned from the area of search.

2.2 Previous Survey Information

The most recent Phase 1 survey of Rabbit Ings was undertaken by Scott Wilson in 2007, the survey being carried out over two days in mid-July of that year. Habitats identified included species-poor grassland on the top and steep sides of the spoil tip with diversity increasing towards the base where nutrient levels and shelter were higher. There is a network of ponds and reed beds throughout the site with blocks of immature woodland and scrub. Further details of previous species recorded can be found in Scott Wilson's *Rabbit Ings: Extended Phase 1 Habitat Survey* report (2007).

3. METHODOLOGY

A Phase 2 vegetation and habitat survey was carried out to identify any habitats of substantive nature conservation value and record the presence of any rare or protected species of flora, as well as any harmful or invasive species. Descriptions of habitat types and methodology are taken from the Phase 1 Vegetation and Habitat Survey manual (Joint Nature Conservation Committee, 2003).

The surveys were undertaken by an experienced ecologist from WYGE on 28th April and 9th July 2008.

All of the water bodies (with the exception of Pond 3 which was inaccessible) were sampled for aquatic flora using a grapnel.

4. SURVEY RESULTS

The area covered by the Phase 2 vegetation survey is shown on Plan 1 and includes all land included in the Regeneration Scheme.

The site comprises a former coal spoil heap and former colliery yard of Monkton Colliery (which closed in 1989). Habitats present on site include poor grassland on the top and steep sides of this spoil heap, which becomes richer in herbaceous species towards the base of the heap. There is a low-lying valley stream to the south and west of the site (Sandybridge Dyke), which in areas has an extensive system of reed beds, some of which are developing into willow carr. The site also contains a number of ponds, blocks of young woodland dominated by birch and areas of dense continuous scrub, particularly silver birch (*Betula pendula*) and goat willow (*Salix caprea*). Semi mature planted black poplar hybrids line the edge of a large former amenity playing field on the south-west border of the survey area.

The north-west corner of the site near the site entrance contained several alien species that had presumably colonised the site through seeds on vehicle wheels or tracks.

The habitats recorded within the site are described below:

4.1 Neutral Grassland (Area 1)

This habitat was prevalent around the site entrance and surrounded the areas of concrete to the east, up to the eastern corner of the pallet factory. The areas of disturbed ground in the site entrance are also included in this habitat description. The grassland was becoming rank in places through lack of management.

False oat-grass (*Arrhenatherum elatius*) and cock's-foot (*Dactylis glomerata*) were dominant with frequent Yorkshire-fog (*Holcus lanatus*) and common bent (*Agrostis capillaris*). Rough meadow-grass (*Poa trivialis*) was occasionally recorded throughout, along with red fescue (*Festuca rubra*) and timothy (*Phleum pratense*). There were a few herbs associated with less improved swards, comprising red clover (*Trifolium pratense*), black knapweed (*Centaurea nigra*), bird's-foot trefoil (*Lotus corniculatus*), meadow vetchling (*Lathyrus pratensis*) and ox-eye daisy (*Leucanthemum vulgare*). Red bartsia (*Odontites vernus*) was locally frequent, this

species being a hemi-parasite on grasses. Other herbs included yarrow (*Achillea millefolium*), black medick (*Medicago lupulina*), hairy tare (*Vicia hirsuta*), smooth hawk's-beard (*Crepis capillaris*), common cat's-ear (*Hypochoeris radicata*), self-heal (*Prunella vulgaris*), hop trefoil (*Trifolium campestre*) and goat's-beard (*Tragopogon pratense*). Both white clover (*Trifolium repens*) and tufted vetch (*Vicia cracca*) were locally abundant. The alien goat's-rue (*Galega officinalis*) was frequent in this area.

The strip nearest to Lund Hill Lane has been more recently disturbed and this area, together with the site entrance had a high number of introduced species, aliens and garden escapes. There were also species more readily associated with arable margins such as pineapple-weed (*Matricaria discoidea*), germander speedwell (*Veronica chamaedrys*), cut-leaved dead-nettle (*Lamium hybridum*), red dead-nettle (*Lamium purpureum*), petty spurge (*Euphorbia peplus*), sun spurge (*Euphorbia helioscopia*), charlock (*Sinapis arvensis*), prickly lettuce (*Lactuca serriola*), scentless mayweed (*Tripleurospermum inodorum*), common poppy (*Papaver rhoeas*) and Italian rye-grass (*Lolium multiflorum*).

Other species typical of disturbed ground included common centaury (*Centaureum erythraea*), common mallow (*Malva sylvestris*), common couch (*Elytrigia repens*), prickly sow-thistle (*Sonchus oleraceus*), teasel (*Dipsacus fullonum*), wormwood (*Artemisia absinthum*), bristly ox-tongue (*Picris echioides*), Oxford ragwort (*Senecio squalidus*) and ribbed melilot (*Melilotus officinalis*). Small amounts of treacle-mustard (*Erysimum cheiranthoides*) and annual wall-rocket (*Diplotaxis muralis*) were present around the site entrance.

A single plant of narrow-leaved bird's-foot trefoil (*Lotus glaber*) was found and the approximate location is marked on Plan 1. This species is considered native in South Yorkshire but is mapped as alien in the 10km square that incorporates the site. The habitat for this species was not considered typical and this species is almost certainly not native at Rabbit Ings.

Ruderal species were beginning to invade the grassland; species recorded included broad-leaved dock (*Rumex obtusifolius*), curled dock (*Rumex crispus*), rosebay willowherb (*Chamerion angustifolium*) and mugwort (*Artemisia vulgaris*).

Garden escapes and other casual species were present in small amounts and included opium poppy (*Papaver somniferum*), large-flowered evening primrose

(*Oenothera glazioviana*), purple toadflax (*Linaria purpurea*) and montbretia (*Crocodymia x crocosmiiflora*).

A small wet flush near the western perimeter held a low level of water on the first survey date (28th April) but was dry on the July visit. Bulrush (*Typha latifolia*) was occasionally present, along with creeping bent (*Agrostis stolonifera*), creeping buttercup (*Ranunculus repens*) and tufted hair-grass (*Deschampsia caespitosa*).

Pond 1 is described separately, although Area 1 includes an area of concrete west of Pond 1 that had small amounts of sharp-flowered rush (*Juncus acutiformis*) growing out of the cracks.

Another area of disturbed ground to the south of the above concrete area also had a high proportion of garden escapes and casuals, including purple toadflax, opium poppy, another cultivated poppy species, a cultivated form of fever-few (*Tanacetum parthenium*), tree mallow (*Lavatera arborea*) and large bindweed (*Calystegia sylvatica*). Other species recorded comprised slender brome (*Bromus lepidus*), wall barley (*Hordeum murinum*) and tufted vetch.

Trees planted around the site entrance included Swedish whitebeam (*Sorbus intermedia*) and balsam poplar (*Populus candicans*).

4.2 Neutral / Acidic Grassland (Area 2)

This habitat comprised the majority of the site, dominated by the central spoil mound. The summit of the mound was only partly vegetated and there were several other areas of bare ground around the slopes. Common bent was the dominant grass with abundant red fescue and occasional mat grass (*Nardus stricta*) although coarser species were beginning to invade from the lower slopes upwards, these including cock's-foot and timothy. Herbs were very few in both number and diversity over the majority of this area with the greatest diversity on the slopes and in the north-west corner.

A large area of bird's-foot trefoil was present in bare ground to the north east of the pallet factory and this area is considered to be of particular importance for dingy skipper butterflies.

A single plant of grass vetchling (*Lathyrus nissolia*) was found adjacent to the track in the extreme north-west corner of this area. This plant has been recorded in four

10km squares within South Yorkshire although the New Atlas of the British Flora states that in three of these squares (including the one containing Rabbit Ings), this plant is an alien introduction. The one square where this species is considered to be native is in the extreme south-east of the county on limestone. It is considered highly likely that grass vetchling was imported onto the site via vehicle movements in the past.

Other herbs recorded from the slopes of the tip and in the north-west corner of Area 2 included black knapweed (including the subspecies *nemoralis*), common centaury, weld, yarrow, perforate St. John's-wort (*Hypericum perforatum*), tufted vetch and common sorrel. Common cat's-ear (*Hypochoeris radicata*) and mouse-ear hawkweed (*Pilosella officinarum*) were locally present to the north of the former playing fields. A few common spotted orchids (*Dactylorhiza fuchsii*) were present adjacent to the track along the northern edge of this area. Broom fork-moss (*Dicranum scoparium*) was frequent throughout this area.

Colt's-foot (*Tussilago farfara*) was beginning to colonise the bare spoil on the slopes and top of the tip and were also present in small seasonally wet flushes where there was also tufted hair-grass (*Deschampsia caespitosa*).

Ruderal species were also invading the lower slopes, these comprising rosebay willowherb (*Chamerion angustifolium*), wormwood, creeping thistle and hemlock (*Conium maculatum*). Alien species recorded comprised purple toadflax (*Linaria purpurea*), fox-and-cubs (*Pilosella aurantiaca*) and green alkanet (*Pentaglottis sempervirens*) although these were only present in small quantity.

Scrub and young trees were present scattered throughout the area, dominated by sapling silver birch with frequent goat willow and occasional broom (*Cytisus scoparius*) and young rowan (*Sorbus aucuparia*).

There was a band of viper's bugloss along the track near the southern boundary of this area, where there were also a few plants of southern marsh-orchid (*Dactylorhiza praetermissa*). Both species are shown as being reasonably widespread in South Yorkshire on the NBN Gateway when mapped at 10km level although as with lesser bulrush, this is considered to over-estimate the population levels. Both species are considered to be locally notable; the orchid distribution thins out noticeably in adjacent counties to the north.

4.3 Dense Scrub (Area 3)

This area is located immediately to the west of Ponds 2a and 2b and is dominated by young silver birch and goat willow with smaller amounts of hawthorn, dog rose and bramble. The ground flora was species-poor, being dominated by stinging nettles with some cleavers (*Galium aparine*). Common feather-moss (*Eurhynchium praelongum*) was frequent beneath the scrub as it is in all of the wooded areas on the site.

4.4 Scrub (Area 4)

This area is located immediately to the east of Pond 2b and is of more open character than Area 3 although it is also dominated by young silver birch with some goat willow and bramble. The ground flora suggests that this area is periodically inundated as there was frequent immature common reed (*Phragmites australis*) along with smaller amounts of creeping buttercup (*Ranunculus repens*), hard rush (*Juncus inflexus*) and jointed rush (*Juncus articulatus*). The water table appeared to be close to the surface on both survey dates.

4.5 Dense Scrub (Area 5)

This area directly adjoined Area 4 and graded into it so that there was no clear cut distinction between the two. This area was dominated by silver birch and goat willow of a more dense character than Area 4 although broom, bramble and hawthorn were also present. The ground flora of this area was similar to Area 4 and likewise dominated by species that prefer a high water table such as reed canary-grass (*Phalaris arundinacea*) and tufted hair-grass, both species dominating a small clearing in the centre. Broad-leaved dock and stinging nettles were also present.

4.6 Scrub and Wet Ditch (Area 6)

This area formed part of the northern boundary of the surveyed area and is continuous with Area 5. The ditch held a low level of water (approx 0.3m) on the April survey but was almost dry in July. Common reedmace (*Typha latifolia*) was dominant with small stands of common reed. Water dock (*Rumex hydrolapathum*) was present and there was some invading hawthorn scrub, especially at the eastern end where there was also wild cherry (*Prunus avium*) and rowan.

4.7 Ephemeral Short Perennial (Area 7)

This habitat surrounded Pond 4 (outside the perimeter fence) and extended along the eastern boundary up to the large area of dense scrub. This habitat contained many species found in the sparser parts of Area 5 but also included several garden escapes including a lady's mantle (*Alchemilla mollis*). Bird's-foot trefoil was also present in bare ground and this area supported a colony of dingy skippers. Yellow-wort (*Blackstonia perfoliata*), common centaury and perforate St John's-wort were also present, yellow-wort having a restricted distribution in the county. Viper's bugloss was present very locally on the southern fringe on the edge of the scrub.

A small wet flush to the south of Pond 4 held a stand of lesser bulrush (*Typha angustifolia*). This species has been recorded from approximately half of the 10km squares in South Yorkshire according to the National Biodiversity Network (NBN Gateway) although this is considered likely to mask a much more limited distribution in the county.

Scrub within this area was composed of broom, silver birch saplings, gorse and a single bush of wayfaring tree (*Viburnum lantana*). This species was present in atypical habitat and was considered to have been either planted or bird-sown.

4.8 Heathland (Area 8)

There were two distinct areas of regenerating heathland to the north and south of a block of young birch woodland (Area 9). These two areas were dominated by dense heather (*Calluna vulgaris*) with small amounts of common bent. Lichens of the genus *Cladonia* were frequent. Sapling and seedling silver birches were beginning to colonise this area. Small amounts of reindeer-moss (*Cladonia rangiferina*) were present and common hair-cap moss (*Polytrichum commune*) was occasional to frequent in these areas.

4.9 Birch Woodland (Area 9)

This woodland was dominated by relatively young silver birch with some gorse and broom on the fringes. Small amounts of grey alder (*Alnus incana*) and field maple (*Acer campestre*) were also present. At least two cotoneaster species were recorded and these were considered to have been bird-sown. Bullate cotoneaster (*Cotoneaster rehderi*) and entire-leaved cotoneaster (*Cotoneaster integrifolius*)

were recorded in small amounts although other species may also have been present.

The ground flora was species-poor, being dominated by grasses although wood small-reed (*Calamagrostis epigejos*) was present.

A similar area of young birch woodland was also present to the south of Area 7.

4.10 Bracken (Area 10)

There was a large stand of dense bracken (*Pteridium aquilinum*) on the top of the slope overlooking the southern boundary of the site. Species recorded underneath the fronds and on the edges included field woodrush (*Luzula campestris*), common vetch, sheep's sorrel, wood sage (*Teucrium scorodonia*), black knapweed and a single plant of cowslip (*Primula veris*). Grasses were present on the track sides and comprised mat grass and red fescue. A small amount of heather was also present and a small clump of ragged robin (*Lychnis flos-cuculi*) was found at the bottom of the slope.

4.11 Dense Scrub (Area 11)

This habitat was present to the south of the bracken stand and extended westwards along the southern site boundary. Scrub was also beginning to invade the bracken area, especially at the western end. Sapling silver birch was dominant, with occasional elder (*Sambucus nigra*), sapling pedunculate oak (*Quercus robur*), broom, cultivated cherry species (*Prunus* sp.) and Juneberry (*Amelanchier lamarckii*). The latter species is not native to Britain and had either been planted or bird-sown. Honeysuckle (*Lonicera periclymenum*) was locally frequent. The ground flora underneath the scrub was species-poor and dominated by grasses with few herbs although there were localised stands of raspberry (*Rubus idaeus*).

The dense scrub along the southern boundary was dominated by mature hawthorn with some ash trees. There was a dense shade cast by the canopy and the ground flora was extremely sparse, being dominated by ruderal species and straggly grasses.

There were three separate stands of Japanese knotweed (*Fallopia japonica*) at the eastern end of the scrub although this had been treated with herbicide between the April and July survey visits and was much less obvious in July.

4.12 Hawthorn Scrub (Area 12)

This area formed a dense stand to the west of Area 10 on the lower slopes of the spoil mound. Hawthorn dominated although there were scattered clumps of bramble and raspberry. Greater stitchwort (*Stellaria holostea*) was present in the more open areas, other species being represented by hogweed and stinging nettles. Hawkweed species (*Heiracium umbellatum* sect.) were very locally present

Small glades within the scrub supported a grassland flora of Yorkshire-fog, red fescue and common bent with black knapweed and bird's-foot trefoil. Seasonally wet areas were dominated by tufted hair-grass and young common reed with localised stands of field horsetail (*Equisetum arvense*).

4.13 Reed Swamp (Area 13)

This habitat occupied a band along the southern site boundary, mostly to the north of the stream and footpath and continued to the north of Pond 5. These areas were dominated by dense stands of common reed although there were several open areas amongst this. Other species recorded were typical of at least seasonally wet habitats and comprised reed canary-grass, bulrush, soft rush, great willowherb (*Epilobium hirsutum*), tufted hair-grass, colt's-foot, field horsetail and marsh thistle (*Cirsium palustre*). Species added during the July survey comprised meadow vetchling (*Lathyrus pratensis*), greater bird's-foot trefoil (*Lotus uliginosus*), angelica (*Angelica sylvestris*) and common spotted orchid.

Viper's bugloss, wavy hair-grass (*Deschampsia flexuosa*), tormentil (*Potentilla erecta*) and a hawkweed species (*Heiracium* sp) were present in small amounts in the drier parts of this area north of the footpath. Scrub was beginning to invade this area and was dominated by young hawthorn.

4.14 Sandybridge Dyke (Area 14)

This dyke formed the southern boundary to the site and was up to 3m in width at the widest point but was approximately 2m in width over the majority of its length. The banks were up to 1.5m in height and either steep or vertical, being composed of earth.

Grasses dominated the bankside vegetation, comprising Yorkshire-fog and creeping bent although other coarse species were also present such as false oat-

grass and timothy. Herbs comprised celery-leaved buttercup (*Ranunculus sceleratus*), angelica, creeping cinquefoil (*Potentilla reptans*), red-leg (*Polygonum maculosa*), pale persicaria (*Persicaria lapathifolium*), hedge woundwort (*Stachys sylvatica*) and common comfrey (*Symphytum officinale*). Scattered plants of male fern (*Dryopteris felix-mas*) were present along the banks.

The banks had collapsed near the small bridge at the western end of the dyke and this had caused very localised flooding on the July survey. Species present at this western end and not found elsewhere along the stream comprised water chickweed (*Myosoton aquaticum*), toadflax (*Linaria vulgaris*), common water-plantain (*Alisma plantago-aquatica*), great bindweed (*Calystegia sylvatica*), Russian comfrey (*Symphytum x uplandicum*) and a small stand of the invasive Himalayan balsam (*Impatiens glandulifera*).

Scrub along the stream banks was dominated by hawthorn and had a ground flora comprising rough meadow-grass, Yorkshire-fog, lesser celandine (*Ranunculus ficaria*), winter-cress (*Barbarea vulgaris*) and male fern.

4.15 Spoil Stockpile (Area 15)

A large spoil mound near the western end of the dyke had a sparse flora of pioneer vegetation, dominated by colt's-foot and creeping bent grass.

4.16 Willow Scrub (Area 16)

A small area of goat willow scrub was present on the east side of the footpath, bordering the western edge of Area 13. The ground flora did not differ significantly from the adjacent reed swamp but included the aquatic form of bittersweet (*Solanum dulcamara*).

4.17 Former Playing Fields and Surrounding Land (Area 17)

The former playing field in the south west corner of the site had become dominated by rank grasses such as false oat-grass, cock's-foot and rough meadow-grass. The herbs were dominated by ruderal species although a few species characteristic of less improved swards were present. These comprised black knapweed, common sorrel, sheep's-sorrel, field woodrush, autumn hawkbit (*Leontodon autumnalis*), field scabious (*Knautia arvensis*) and bird's-foot trefoil. Other herb species recorded included self-heal, yarrow, Germander speedwell, weld, ribwort plantain,

daisy, common cat's-ear, lesser stitchwort (*Stellaria graminea*), goat's-beard, tufted vetch, perforate St. John's-wort and wormwood.

Areas where water collects in winter were demarcated by locally dominant stands of creeping buttercup and jointed rush. Ruderal species comprised large stands of almost pure creeping thistle and also broad-leaved dock. Several trial pits had been dug in this area prior to the surveys and the bare ground had become colonised by pioneer species such as knotgrass (*Polygonum aviculare*), scentless mayweed and pineapple-weed.

A narrow strip of grassland along the western edge of the field had small amounts of common centaury and yellow-rattle (*Rhinanthus minor*).

The field was surrounded on three sides by mature black poplar hybrids (*Populus x canadensis*), some of which had become damaged by fire. There were also scattered elder and hawthorn bushes. A separate arboricultural survey report has been prepared by JCA (JCA reference 8460/AB).

An area of dense hawthorn scrub was present to the west of the footpath and south of the playing field, this area having some goat willow also present. Foxglove and ground-ivy (*Glechoma hederacea*) represented the ground flora although a small clearing adjacent to the footpath also had two plants of southern marsh orchid and small amounts of tansy (*Tanacetum vulgare*) and wild mignonette.

4.18 Ponds

Pond 1 comprises a relatively shallow concrete bottomed pond near the entrance to the site. The nature of the substrate has held back the normal progress of vegetation succession at an immature stage. There was a large bed of a stonewort species (*Chara vulgaris* var. *vulgaris*) in the centre of this pond. Marginal species comprised common water-plantain, creeping bent grass, soft rush, bulrush, marsh foxtail (*Alopecurus geniculatus*), immature common reed and water dock.

Pond 2a is extensively surrounded by common reed with a fringe of common spike-rush (*Eliocharis palustris*). Other marginal species included marsh bedstraw (*Galium palustre*), jointed rush, water-mint (*Mentha aquatica*), angelica, celery-leaved buttercup, tufted hair-grass and great willowherb. Submerged species comprised common water-starwort (*Callitriche stagnalis*) and greater water-moss

(*Fontinalis antipyretica*). No pondweed species were recorded. A small amount of the invasive Australian swamp-stonecrop (*Crassula helmsii*) was present in this pond, having presumably colonised from Pond 2b during flood conditions.

Pond 2b is extensively fringed with bulrush and some common reed although there is a severe infestation of Australian swamp-stonecrop covering approximately 50% of the pond surface. Other marginal species recorded comprised common club-rush (*Schoenoplectus lacustris*), jointed rush, common spike-rush, celery-leaved buttercup, lesser spear-wort (*Ranunculus flammula*), marsh bedstraw and common winter-cress. No pondweeds were recorded.

Floating and submerged species recorded comprised pond water-crowfoot (*Ranunculus peltatus*) and thread-leaved water-crowfoot (*Ranunculus trichophyllus*). The latter species has a restricted distribution in the county and is found mainly in the eastern half. No pondweeds were recorded.

Pond 3 was extensively surrounded by dense goat willow scrub and had unstable banks. For these reasons, this pond could not be accessed directly although no aquatic vegetation was visible through binoculars during either survey.

Pond 4 is dominated by common reed and bulrush with small amounts of soft rush, common spike-rush and jointed rush around the margins. No pondweeds were recorded. The banks around Pond 4 were steep and sparsely vegetated except for the western bank where there was abundant brown bent (*Agrostis vinealis*), this species not being recorded elsewhere on the site. This species has a restricted distribution in the county being recorded in ten 10km squares since 1970 although some of these records could feasibly be from surrounding counties. Scrub around this pond included alder (*Alnus glutinosa*), grey alder, dogwood (*Cornus sanguinea*) and a single bush of round-leaved dog rose (*Rosa obtusifolia*). This rose species is present in only one other 10km square in the county and the record from the site is close to its northern limit in Britain although it may be under-recorded.

Pond 5 is a brick-lined pond of unknown depth that has become surrounded by dense reed swamp and was therefore inaccessible during the vegetation surveys. No water was actually visible due to the dense nature of the surrounding vegetation.

Ponds 6, 7 and 8 were present within the reedswamp immediately to the north of Pond 5. These had become overgrown with common reeds and no open water was visible during the surveys.

Pond 9 comprised the southern end of a linear ditch, goat willows being present along its entire length. Marginal species comprised common reedmace, marsh thistle, soft rush, creeping bent, marsh foxtail and floating sweet-grass (*Glyceria fluitans*).

5. INTERPRETATION & EVALUATION

No nationally scarce plant species were recorded on the site although a total of ten locally notable species were recorded including two species close to the northern limits of their range in Britain.

The following locally notable species were recorded on the site during the surveys:

- Round-leaved dog rose (*Rosa obtusifolia*)
- Brown bent (*Agrostis vinealis*)
- Thread-leaved water crowfoot (*Ranunculus trichophyllus*)
- Viper's bugloss (*Echium vulgare*)
- Yellow-wort (*Blackstonia perfoliata*)
- Lesser bulrush (*Typha angustifolia*)
- Southern marsh orchid (*Dactylorhiza praetermissa*)
- Common stonewort (*Chara vulgaris* var. *vulgaris*)
- Narrow-leaved bird's-foot trefoil (*Lotus glaber*) – Alien
- Grass vetchling (*Lathyrus nissolia*) – Alien

The maps available on the NBN Gateway do not show resolution at less than 10km squares and this is considered likely to mask a more restricted distribution of the species concerned. The map for common stonewort appears to be incomplete and shows a much more restricted distribution than is thought to be the case.

5.1 Round-Leaved Dog Rose and Brown Bent

Both species occur around Pond 4 and are found nowhere else on the site. The round-leaved dog rose is present in only one other 10km square in the county, this

probably relating to only one other site. However, roses are difficult to identify and this species could have been overlooked elsewhere.

Brown bent occurs in ten 10km squares in the county although it is considered to be abundant where it does occur.

Originally, the area around Pond 4 was proposed to be re-profiled as the banks are steep and are potentially considered to be a health and safety hazard. Re-profiling has the potential to destroy the populations of both these notable plant species and measures will be taken to ensure their retention at Rabbit Ings (see Section 6.2.1).

5.2 **Thread-Leaved Water Crowfoot**

This species is found in only thirteen 10km squares in the county and is only found in Pond 2b. This pond has a severe infestation of Australian swamp-stonecrop, which will eventually displace all of the native vegetation. No work to this pond is proposed.

5.3 **Viper's Bugloss**

Viper's bugloss has been recorded in twenty-four 10km squares covering all or part of the county although it is considered that at least some of these records are from neighbouring counties. Furthermore, the relatively coarse resolution shown on the NBN Gateway map is thought to mask a smaller distribution.

This species is relatively abundant in the southern half of the site, especially on the lower southern slopes of the coal tip in Area 2. Spoil re-profiling has the potential to destroy at least some of the population of this plant, although it is considered that seeds will be present in the seed bank both in the area it currently occupies and in directly adjacent areas.

5.4 **Yellow-Wort**

Yellow-wort has been recorded in fourteen 10km squares covering all or part of the county but, as with the previous species, some records are thought likely to be from adjacent counties. A strong population of yellow-wort is found in the disturbed ground in Area 7. This is an annual species and seed is likely to be present in the seed bank so is not especially vulnerable to ground disturbance caused by re-profiling.

5.5 Lesser Bulrush

The NBN Gateway map of this species appears to show a widespread distribution in South West Yorkshire at the 10km square level although the plant is thought to be much less common than the map would suggest. One small stand of this species was recorded in a wet flush to the south of Pond 4. This is a rhizomatous species and any re-profiling of the area where it is found has the potential to eliminate this species from the site, as the rhizomes are the only means by which this plant can persist.

5.6 Southern Marsh Orchid

As with the lesser bulrush above, the NBN Gateway map of this species also appears to show a widespread distribution when mapped at the 10km level although again, this species is considered to be much less common than it would appear. Rabbit Ings appears to be at the northern edge of the core range of southern marsh orchid as the distribution thins out markedly in adjacent northern counties.

There are four separate areas where this species occurs on the site, all four being vulnerable as they are within areas where earthworks are proposed.

This species over-winters as a tuber with new ones growing attached to the old tuber of the previous year. Soil disturbance has the potential to destroy existing colonies of this species and recovery could take several years as the plants are very slow to develop from seed.

5.7 Common Stonewort

Stoneworts are greatly under-recorded in Britain and the NBN Gateway map is incomplete, showing a much more restricted distribution than is actually the case.

The map for this species that is shown in the Botanical Society for the British Isles (BSBI) *Handbook No. 5 Stoneworts* (2005) shows a very scattered distribution north of the River Trent.

Stoneworts are intolerant of competition with more vigorous plants and the only population of common stonewort on the site is in Pond 1 where vegetation succession has effectively been suppressed by the concrete substrate.

The removal of Pond 1 has adverse implications for the population of common stonewort on this site as none of the other ponds are capable of supporting a viable population due to severe competition with other species.

5.8 **Narrow-Leaved Bird's-Foot Trefoil**

This species is present in nine 10km squares in South West Yorkshire, although as with other species, some of these records could be from adjacent counties. It is considered a native species in the county although the *New Atlas of the British Flora* shows that the native population is restricted to the extreme east of the county in Doncaster District. The record from the 10km square that includes Rabbit Ings is regarded as an alien introduction (either deliberate or inadvertent).

Only a single plant was found on the site, in Area 1 near the site entrance. This was present in atypical habitat alongside other alien species and garden escapes. As this species is considered to be alien on this site, no native populations will be affected and the loss of a single alien plant is not considered to significantly affect the conservation status of this species in South West Yorkshire.

5.9 **Grass Vetchling**

Grass vetchling is present in five 10km squares in the county although it is only regarded as native on one site on Magnesian limestone near Doncaster in the extreme south-east of the county. All of the remaining records are mapped as alien in the *New Atlas of the British Flora* (2002) and this is also considered to relate to the population on site. Grass vetchling has been recorded from several former coal tip sites well outside its natural range e.g. several sites in north Cheshire, and these are also thought to relate to alien populations whose seed may have come from conservation seed mixes sown in an attempt to stabilise such former coal tips or other industrial workings.

The spoil movements on this site have the potential to destroy the small population of grass vetchling.

5.10 **Other Species**

Two large patches of bird's-foot trefoil were identified on the site, one having a confirmed colony of dingy skipper butterflies (Area 7) whilst the other in Area 2 has high potential for this species. The potential impacts and mitigation for this butterfly

are given separately in the *Rabbit Ings Regeneration Scheme: Terrestrial Invertebrate Survey* report (WYGE ref: A039273, 2008).

The two areas of heathland will be impacted upon by the spoil movements, relating in some degree of loss of this habitat. However the regeneration plan will entail a significant increase in heathland on the site on the tip slopes.

The former sports pitches/recreation ground do not contain any notable flora species and there are no constraints to re-instating these as formal pitches. There are however several plant species growing on the western and northern boundaries that are indicative of less improved swards such as yellow rattle and black knapweed. Consideration has been given to retaining these fringes as neutral grassland.

5.11 Invasive Species

Three invasive species were recorded within the site boundary comprising Japanese knotweed, Himalayan balsam and Australian swamp-stonecrop.

There were three separate stands of Japanese knotweed in the south east corner of the site within an area of bracken and scrub. All three of these stands were being controlled through application of an approved herbicide at the time of writing this report. This appears to be already effective as the stands visible in April were less obvious on the July survey date.

There is currently only a low level of Himalayan balsam within the site, near the access bridge at the western end of Sandybridge Dyke.

There is currently a severe infestation of Australian swamp stonecrop in Pond 2b, which is beginning to spread into Pond 2a through direct movement of water between the two ponds during flood conditions in April 2008.

6. MITIGATION & COMPENSATION

Rabbit Ings comprises a former colliery spoil heap and drift mine along with disused sports pitches left over from the mine that closed in 1989 and has relatively immature habitats, dominated by pioneer grassland. There are a high proportion of

garden escapes and other casual species on the site, especially in the areas of disturbed ground.

No nationally scarce or protected plant species were recorded on the site, although there are ten locally notable species present, two of which are close to their northern distributional limits in Britain.

6.1 Round-Leaved Dog Rose and Brown Bent

The area where these two species occur (around Pond 4) will be fenced prior to the commencement of works and retained. Fencing will remain in place once work is complete to negate the Health and Safety risks associated with the steep banks.

6.2 Thread-Leaved Water Crowfoot

The area where this species occurs (Pond 2b) will remain undisturbed throughout the Regeneration Scheme. This pond has a severe infestation of the invasive Australian swamp stonecrop so will be fenced during the spoil movement operations to prevent spread of this invasive species and inadvertent damage to the habitat.

6.3 Viper's Bugloss

There is a large population of this species on Rabbit Ings although the vast majority are found in the southern half of the site. A wildlife refuge will be created in the south-east corner of the site which will remain undisturbed during the proposed work and which coincides with a large proportion of the viper's bugloss. This species is a pioneer of disturbed ground and has the potential to increase on the site once spoil movements have been completed. It is considered that there is likely to be a considerable seed resource in the seed bank which will enable this process.

6.4 Yellow-Wort

The main population of this species on the site is centred on Area 7, which will be retained to protect the dingy skipper butterflies there. Yellow-wort is an annual and almost certainly has a stored seed bank. As the main population will be retained throughout the development, this species has the potential to colonise adjacent areas once development has taken place.

6.5 Lesser Bulrush

The only population of this species on the site (in a wet flush to the south of Pond 4) is small and therefore vulnerable to extinction on the site. The area where it occurs will be retained and kept out of the earthworks footprint. Sections of rhizome will be moved to the new ponds that will be created as part of the great crested newt mitigation strategy once they have been created.

6.6 Southern Marsh Orchid

All four areas where this species occurs are vulnerable to destruction through spoil movement. The main population of this species will be safeguarded throughout the proposed work as it is within the wildlife refuge area in the south-east corner of the site.

6.7 Common Stonewort

This species is only present in Pond 1 within the site as the other ponds are at too advanced a stage of vegetation succession to support viable populations. Pond 1 will be lost as part of the development proposals. New ponds will be created as part of the great crested newt mitigation strategy although these will not be dug until some time after Pond 1 has been lost and the stonewort population cannot be retained on site during the spoil movement operations.

The mud at the bottom of Pond 1 will contain the reproductive bodies (oospores) of the stonewort and this will be stored off-site until such time as the new ponds are created. At least one of these ponds will have an artificial base to restrict vegetation succession and therefore keep the pond at a relatively immature stage that is favourable for stonewort growth whilst limiting competition from more vigorous plants.

6.8 Narrow-Leaved Bird's-Foot Trefoil and Grass Vetchling

Both species are regarded as aliens on the site and no natural populations of either species will be affected by the proposed works. No mitigation is proposed for either species.

6.9 Other Species

There will be a short term reduction in the area of heathland due to spoil movements although the Regeneration Scheme will entail a significant increase in this habitat once spoil movements have been completed.

The area of bracken is currently at a low level and expansion of this species into some of the other areas of importance for flora is currently held in check by periodic water logging from Sandybridge Dyke, which bracken cannot tolerate. The management plan for Rabbit Ings will include monitoring of the bracken population at least once every two to three years and, where there is an increase, control measures will be implemented to restrict its spread.

On-going monitoring of all of the notable plant species will be undertaken post-development which will be undertaken using local volunteers familiar with the site.

6.10 Invasive Species

The populations of Japanese knotweed in the south-east corner of the site are located within the wildlife refuge area although the knotweed is currently being controlled through herbicide applications.

The management plan for the site will include the control of the Himalayan balsam along the Sandybridge Dyke whilst the population is still small and therefore manageable. Prompt application of an approved herbicide will prevent a population explosion in future years and safeguard the existing riparian vegetation the dyke which is of ecological value, especially with regard to providing foraging habitat and cover for water voles and nesting birds.

Spread of the Australian swamp stonecrop in Pond 2b will be prevented by the installation of temporary fencing during the proposed work.

The populations of invasive species will be monitored after control measures have been implemented. This will inform the success or otherwise of the herbicide applications and will determine whether further applications are necessary. This is particularly the case with Japanese knotweed, which have more aggressive rates of spread than Himalayan balsam.

7. REFERENCES

Graham, G.G and Primavesi, A.L. (2005)

Roses of Great Britain and Ireland, BSBI Handbook No. 7. London.

JCA Ltd(2008)

Arboricultural Survey to BS 5837: 2005 at Site at Rabbit Ings, Lund Hill Lane, Royston, Barnsley, South Yorkshire. Unpublished report.

Moore, J.A. (2005)

Charophytes of Great Britain and Ireland, BSBI Handbook No. 5 London

Preston, C.D., Pearman, D.A. and Dines, T.D. (2002)

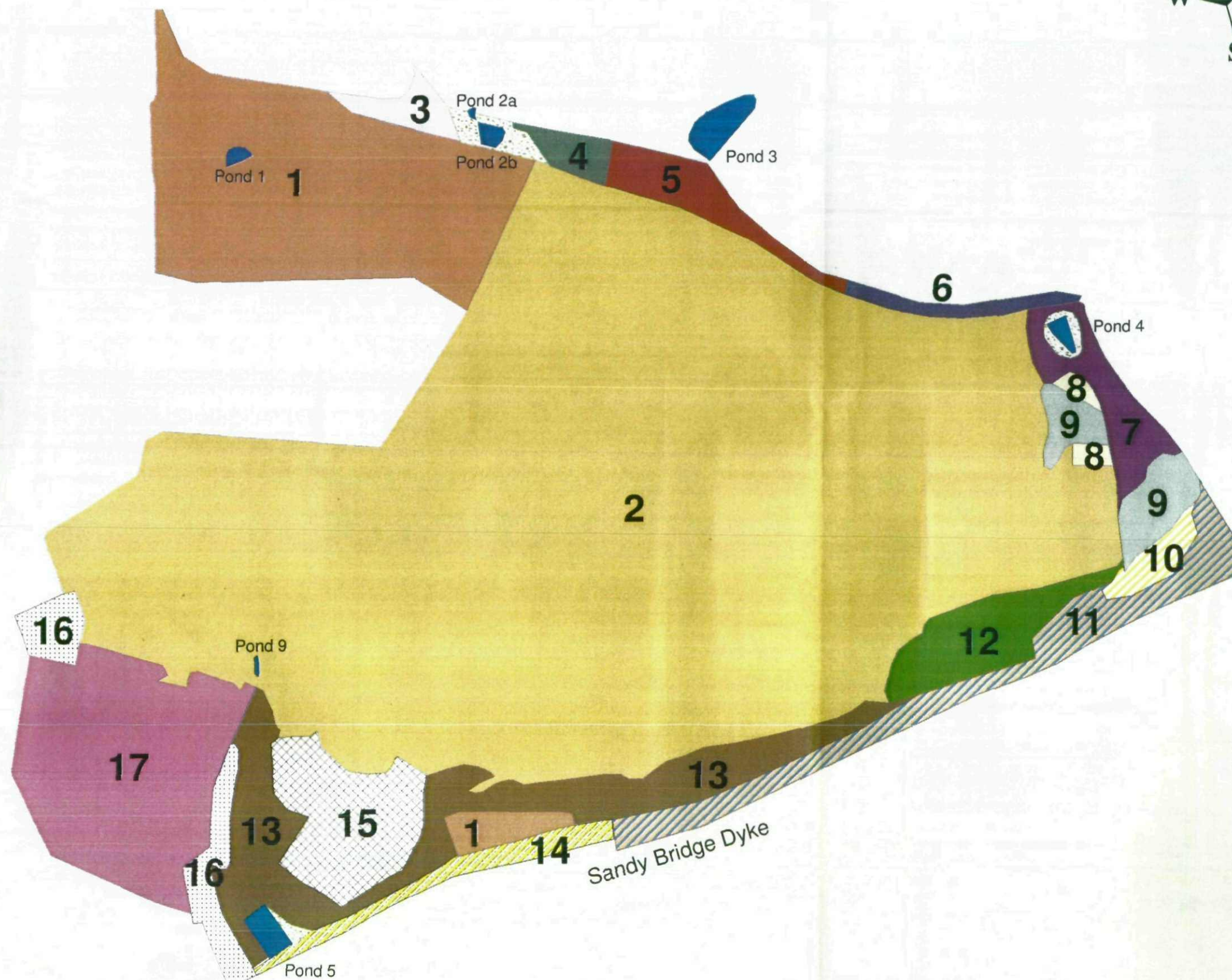
New Atlas of the British and Irish Flora. Oxford University Press

Scott Wilson (2007)

Rabbit Ings: Extended Phase 1 Habitat Survey.

WYGE (2008)

Rabbit Ings: Terrestrial Survey report. Unpublished report.



Legend

- Area 1
- Area 2
- Area 3
- Area 4
- Area 5
- Area 6
- Area 7
- Area 8
- Area 9
- Area 10
- Area 11
- Area 12
- Area 13
- Area 14
- Area 15
- Area 16
- Area 17
- Pond
- Pond Surroundings

Executive Park
Avalon Way
Anstey
Leicester
LE7 7GR

Tel: 0116 2348100
Fax: 0116 2348002
email: midlands.ecology@wyg.com

White
Young
Green

Environmental

Project

Rabbit Ings

Drawing Title:

Plan 1.
Phase 2 Habitat Survey

Scale at A3:	Drawn by: ST	Date: 14/08/08	Checked By: RP	Date: 14/08/08	Approved By:	Date:
Project No: A039273	Office: 38	Type: 05	Drawing No.		Revision	

Base map provided by

APPENDIX 1

Vegetation Species List

Table 1: Trees and Shrubs

Notable species are shown in **Bold**

English Name	Scientific Name	Status on Site
Alder	<i>Alnus glutinosa</i>	Occasional
Ash	<i>Fraxinus excelsior</i>	Occasional
Balsam poplar	<i>Populus candicans</i>	Scarce – planted near site entrance
Bramble	<i>Rubus fruticosus</i> agg.	Abundant
Broom	<i>Cytisus scoparius</i>	Frequent
Bullate cotoneaster	<i>Cotoneaster rehderi</i>	Rare – planted or bird-sown
Dog rose	<i>Rosa canina</i>	Frequent
Dogwood	<i>Cornus sanguinea</i>	Occasional – possibly planted
Elder	<i>Sambucus nigra</i>	Occasional
Entire-leaved cotoneaster	<i>Cotoneaster integrifolius</i>	Rare – planted or bird-sown
Field maple	<i>Acer campestre</i>	Occasional
Goat willow	<i>Salix caprea</i>	Frequent, locally abundant
Gorse	<i>Ulex europaeus</i>	Frequent
Grey alder	<i>Alnus incana</i>	Occasional – planted
Hawthorn	<i>Crataegus monogyna</i>	Abundant
Heather	<i>Calluna vulgaris</i>	Occasional, locally dominant
Hybrid black poplar	<i>Populus x canadensis</i>	Locally frequent
Juneberry	<i>Amelanchier lamarckii</i>	Rare – planted or bird-sown
Pedunculate oak	<i>Quercus robur</i>	Rare
Round-leaved dog rose	<i>Rosa obtusifolia</i>	Very rare – one bush
Rowan	<i>Sorbus aucuparia</i>	Occasional
Silver birch	<i>Betula pendula</i>	Abundant, locally dominant
Swedish whitebeam	<i>Sorbus intermedia</i>	Rare – planted at site entrance
Sycamore	<i>Acer pseudoplatanus</i>	Occasional
Wayfaring tree	<i>Viburnum opulus</i>	Very rare, possibly planted
Wild cherry	<i>Prunus avium</i>	Occasional

Table 2: Grasses and Rushes

English Name	Scientific Name	Status on Site
Brown bent	<i>Agrostis vinealis</i>	Rare but locally frequent around Pond 4
Cock's-foot	<i>Dactylis glomerata</i>	Abundant
Common bent	<i>Agrostis capillaris</i>	Abundant – locally dominant
Common club-rush	<i>Schoenoplectus lacustris</i>	Scarce
Common couch	<i>Elytrigia repens</i>	Frequent
Common reed	<i>Phragmites australis</i>	Occasional - locally dominant
Common spike-rush	<i>Eliocharis palustris</i>	Occasional- locally abundant
Compact rush	<i>Juncus conglomeratus</i>	Rare
Creeping bent	<i>Agrostis stolonifera</i>	Frequent
Crested dog's-tail	<i>Cynosurus cristatus</i>	Frequent
False oat-grass	<i>Arrhenatherum elatius</i>	Abundant
Field wood-rush	<i>Luzula campestris</i>	Occasional
Floating sweet-grass	<i>Glyceria fluitans</i>	Rare
Gardener's-garters	<i>Phalaris arundinacea</i> var <i>picta</i>	Rare – garden escape
Hard rush	<i>Juncus inflexus</i>	Occasional
Italian rye-grass	<i>Lolium multiflorum</i>	Occasional
Jointed rush	<i>Juncus articulatus</i>	Rare, frequent around ponds
Marsh foxtail	<i>Alopecurus geniculatus</i>	Rare
Mat-grass	<i>Nardus stricta</i>	Scarce
Perennial rye-grass	<i>Lolium perenne</i>	Abundant
Red fescue	<i>Festuca rubra</i>	Abundant
Reed canary-grass	<i>Phalaris arundinacea</i>	Scarce
Rough meadow-grass	<i>Poa trivialis</i>	Frequent
Smaller cat's-tail	<i>Phleum bertolonii</i>	Scarce
Sharp-flowered rush	<i>Juncus acutiformis</i>	Rare – in cracks of concrete east of Pond 1
Sheep's fescue	<i>Festuca ovina</i>	Occasional
Slender brome	<i>Bromus lepidus</i>	Scarce
Soft brome	<i>Bromus hordeaceus</i>	Occasional
Soft rush	<i>Juncus effusus</i>	Occasional

English Name	Scientific Name	Status on Site
Timothy	<i>Phleum pratensis</i>	Occasional
Tufted hair-grass	<i>Deschampsia caespitosa</i>	Occasional
Wall barley	<i>Hordeum murinum</i>	Occasional
Wavy hair-grass	<i>Deschampsia flexuosa</i>	Occasional
Wood small-reed	<i>Calamagrostis epigejos</i>	Scarce
Yorkshire-fog	<i>Holcus lanatus</i>	Frequent

Table 3: Herbs

Notable species are shown in **Bold**; invasive species are shown in Red

English Name	Scientific Name	Status on Site
American willowherb	<i>Epilobium ciliatum</i>	Occasional
Angelica	<i>Angelica sylvestris</i>	Occasional near water
Annual wall-rocket	<i>Diploxys muralis</i>	Rare – one plant only near site entrance
Apple mint	<i>Mentha x villosa</i>	Scarce – garden escape
Australian swamp-stonecrop	<i>Crassula helmsii</i>	Abundant on Pond 2a, occasional on Pond 2b
Autumn hawkbit	<i>Leontodon autumnalis</i>	Scarce
Beaked hawk's-beard	<i>Crepis vesicaria</i>	Occasional
Bird's-foot trefoil	<i>Lotus corniculatus</i>	Occasional
Black knapweed	<i>Centaurea nigra</i>	Occasional
Black medick	<i>Medicago lupulina</i>	Occasional, locally frequent
Bristly ox-tongue	<i>Picris echioides</i>	Occasional
Broad-leaved dock	<i>Rumex obtusifolius</i>	Abundant
Brooklime	<i>Veronica beccabunga</i>	Scarce
Bulrush	<i>Typha latifolia</i>	Occasional, locally abundant or dominant
Celery-leaved buttercup	<i>Ranunculus sceleratus</i>	Frequent in wet areas
Charlock	<i>Sinapis arvensis</i>	Frequent in disturbed ground
Cleavers	<i>Galium aparine</i>	Frequent, locally abundant
Clustered dock	<i>Rumex conglomeratus</i>	Scarce
Colt's-foot	<i>Tussilago farfara</i>	Frequent

English Name	Scientific Name	Status on Site
Common cat's-ear	<i>Hypochoeris radicata</i>	Occasional
Common centaury	<i>Centaurium erythraea</i>	Occasional
Common chickweed	<i>Stellaria media</i>	Frequent
Common comfrey	<i>Symphytum officinale</i>	Scarce
Common evening-primrose	<i>Oenothera biennis</i>	Scarce (alien)
Common mallow	<i>Malva sylvestris</i>	Occasional
Common mouse-ear	<i>Cerastium fontanum</i>	Occasional
Common orache	<i>Atriplex patula</i>	Occasional in disturbed ground
Common poppy	<i>Papaver rhoeas</i>	Occasional
Common ragwort	<i>Senecio jacobaea</i>	Frequent
Common sorrel	<i>Rumex acetosa</i>	Occasional
Common spotted orchid	<i>Dactylorhiza fuchsii</i>	Scarce
Common vetch	<i>Vicia sativa</i>	Frequent
Common water-plantain	<i>Alisma plantago-aquatica</i>	Scarce, on Ponds 1, 2a and 2b
Cow parsley	<i>Anthriscus sylvestris</i>	Abundant in places
Creeping buttercup	<i>Ranunculus repens</i>	Occasional in wet places
Creeping cinquefoil	<i>Potentilla reptans</i>	Frequent
Creeping thistle	<i>Cirsium arvense</i>	Abundant
Curled dock	<i>Rumex crispus</i>	Occasional
Cut-leaved crane's-bill	<i>Geranium dissectum</i>	Occasional
Cut-leaved dead-nettle	<i>Lamium hybridum</i>	Scarce – in disturbed ground
Daisy	<i>Bellis perennis</i>	Occasional
Dandelion species	<i>Taraxacum spp.</i>	Frequent
Dove's-foot crane's-bill	<i>Geranium molle</i>	Occasional
Fat-hen	<i>Chenopodium album</i>	Occasional in disturbed ground
Feverfew	<i>Tanacetum parthenium</i>	Scarce
Field bindweed	<i>Convolvulus arvensis</i>	occasional
Field scabious	<i>Knautia arvensis</i>	Occasional
Fox-and-cubs	<i>Pilosella aurantiaca</i>	Scarce (alien on this site)
Foxglove	<i>Digitalis purpurea</i>	Occasional
Garden daffodil	<i>Narcissus poeticus</i>	Occasional – garden escape
Garden lady's-mantle	<i>Alchemilla mollis</i>	Scarce – garden escape
Goat's-beard	<i>Tragopogon pratense</i>	Occasional
Goat's-rue	<i>Galega officinalis</i>	Occasional – locally frequent

English Name	Scientific Name	Status on Site
Grass vetchling	<i>Lathyrus nissolia</i>	Rare, one small clump only. Possibly alien on this site
Greater bird's-foot trefoil	<i>Lotus uliginosus</i>	Scarce – along southern stream only
Greater plantain	<i>Plantago major</i>	Occasional
Greater stitchwort	<i>Stellaria holostea</i>	Occasional in wooded areas
Green alkanet	<i>Pentaglottis sempervirens</i>	Occasional
Ground-ivy	<i>Glechoma hederacea</i>	Occasional
Hairy tare	<i>Vicia hirsuta</i>	Frequent
Hairy willowherb	<i>Epilobium hirsutum</i>	Occasional, locally frequent
Hedge bindweed	<i>Calystegia sepium</i>	Frequent
Hedge woundwort	<i>Stachys sylvatica</i>	Occasional
Hedge-garlic	<i>Alliaria petiolata</i>	Frequent in wooded areas and along stream
Hedge-mustard	<i>Sysimbrium officinale</i>	Frequent in disturbed ground
Hemlock	<i>Conium maculatum</i>	Occasional
Herb-Robert	<i>Geranium robertianum</i>	Occasional
Himalayan balsam	<i>Impatiens glandulifera</i>	Scarce – a clump near the bridge on the southern stream
Hogweed	<i>Heracleum sphondylium</i>	Frequent
Honeysuckle	<i>Lonicera periclymenum</i>	Occasional
Hop trefoil	<i>Trifolium campestre</i>	Occasional
Japanese knotweed	<i>Fallopia japonica</i>	Scarce – in three stands in the north east corner of the site
Knot-grass	<i>Polygonum aviculare</i>	Frequent
Large bindweed	<i>Calystegia sylvaticum</i>	Scarce
Large-flowered evening-primrose	<i>Oenothera glazioviana</i>	Occasional (alien)
Leafy hawkweed	<i>Heiracium umbellatum</i> sect.	Scarce but very locally frequent
Lesser bulrush	<i>Typha angustifolia</i>	Rare one patch only near Pond 4
Lesser burdock	<i>Arctium minus</i>	Occasional
Lesser celandine	<i>Ranunculus ficaria</i>	Occasional in wooded areas
Lesser knapweed	<i>Centaurea nigra</i> ssp. <i>nemoralis</i>	Scarce, scattered all over the site
Lesser spearwort	<i>Ranunculus flammula</i>	Scarce, in Pond 2b only

English Name	Scientific Name	Status on Site
Lesser stitchwort	<i>Stellaria graminea</i>	Occasional
Love-in-a-mist	<i>Nigella damascena</i>	Rare – garden escape
Lucerne	<i>Medicago sativa ssp. sativa</i>	Occasional
Marsh bedstraw	<i>Galium palustre</i>	Scarce – Ponds 2A and 2B only
Marsh thistle	<i>Cirsium palustre</i>	Scarce – along stream
Meadow vetchling	<i>Lathyrus pratensis</i>	Occasional
Montbretia	<i>Crocsmia x crocosmiiflora</i>	Scarce – garden escape
Mouse-ear hawkweed	<i>Pilosella officinarum</i>	Occasional on tip sides
Mugwort	<i>Artemisia vulgaris</i>	Frequent
Musk mallow	<i>Malva moschata</i>	Scarce, possibly alien on this site
Narrow-leaved bird's-foot trefoil	<i>Lotus glaber</i>	Very rare – one plant only (Alien on this site)
Opium poppy	<i>Papaver somniferum</i>	Scarce – casual or garden escape
Ox-eye daisy	<i>Leucanthemum vulgare</i>	Occasional
Oxford ragwort	<i>Senecio squalidus</i>	Occasional on disturbed ground
Pale persicaria	<i>Persicaria lapathifolium</i>	Scarce – along southern stream only
Pencilled crane's-bill	<i>Geranium versicolor</i>	Scarce – garden escape
Petty spurge	<i>Euphorbia peplus</i>	Occasional in disturbed ground
Pineapple-weed	<i>Matricaria discoidea</i>	Occasional
Pond water crowfoot	<i>Ranunculus peltatus</i>	Rare – in Pond 2B only
Prickly lettuce	<i>Lactuca serriola</i>	Occasional
Prickly sow-thistle	<i>Sonchus asper</i>	Occasional
Primrose	<i>Primula veris</i>	Rare
Purple toadflax	<i>Linaria purpurea</i>	Occasional – garden escape
Ragged robin	<i>Lychnis flos-cuculi</i>	Rare
Red bartsia	<i>Odentites vernus</i>	Occasional
Red clover	<i>Trifolium pratense</i>	Frequent
Red dead-nettle	<i>Lamium purpureum</i>	Frequent in disturbed ground
Red valerian	<i>Centranthus ruber</i>	Occasional
Red-leg	<i>Polygonum maculosa</i>	Occasional
Ribbed melilot	<i>Melilotus officinalis</i>	Occasional
Ribwort plantain	<i>Plantago lanceolata</i>	Occasional
Rosebay willowherb	<i>Chamerion angustifolium</i>	Frequent
Russian comfrey	<i>Symphytum x uplandicum</i>	Scarce – along stream

English Name	Scientific Name	Status on Site
Scentless mayweed	<i>Tripleurospermum inodorum</i>	Frequent in disturbed ground
Sheep's-sorrel	<i>Rumex acetosella</i>	Locally frequent on tip sides
Shepherd's-purse	<i>Capsella bursa-pastoris</i>	Frequent
Smooth hawk's-beard	<i>Crepis capillaris</i>	Occasional
Smooth sow-thistle	<i>Sonchus oleraceus</i>	Occasional in disturbed ground
Southern marsh orchid	<i>Dactylorhiza praetermissa</i>	Scarce
Spear thistle	<i>Cirsium vulgare</i>	Occasional
Stinging nettle	<i>Urtica dioica</i>	Frequent
Sun spurge	<i>Euphorbia helioscopia</i>	Occasional in disturbed ground
Tansy	<i>Tanacetum vulgare</i>	Scarce
Teasel	<i>Dipsacus fullonum</i>	Occasional
Thread-leaved water crowfoot	<i>Ranunculus trichophyllus</i>	Rare – in Pond 2b only
Toadflax	<i>Linaria vulgaris</i>	Occasional
Tormentil	<i>Potentilla erecta</i>	Occasional
Treacle-mustard	<i>Erysimum cheiranthoides</i>	Scarce – in disturbed ground
Tree-mallow	<i>Lavatera arborea</i>	Scarce – casual or garden escape
Tufted vetch	<i>Vicia cracca</i>	Frequent, locally abundant
Viper's bugloss	<i>Echium vulgare</i>	Scarce – mostly in southern half of the site
Water chickweed	<i>Myosoton aquaticum</i>	Scarce- southern stream only in one place near bridge
Water dock	<i>Rumex hydrolapathum</i>	Scarce, on all ponds
Water mint	<i>Mentha aquatica</i>	Scarce – Pond 2B only
Wavy bitter-cress	<i>Cardamine flexuosa</i>	Occasional
Weld	<i>Reseda luteola</i>	Occasional
White clover	<i>Trifolium repens</i>	Frequent
White dead-nettle	<i>Lamium album</i>	Occasional
Wild mignonette	<i>Reseda lutea</i>	Scarce, scattered around the site
Winter-cress	<i>Barbarea vulgaris</i>	Scarce – along stream
Wood sage	<i>Teucrium scorodonia</i>	Occasional
Wormwood	<i>Artemisia absinthum</i>	Occasional
Yarrow	<i>Achillea millefolium</i>	Occasional
Yellow loosestrife	<i>Lysimachia vulgaris</i>	Rare – garden escape on this site

English Name	Scientific Name	Status on Site
Yellow rattle	<i>Rhinanthus minor</i>	Rare – one clump only on fringe of old playing fields
Yellow-wort	<i>Blackstonia perfoliata</i>	Scarce

Table 4: Ferns and Fern-allies

English Name	Scientific Name	Status on Site
Bracken	<i>Pteridium aquilinum</i>	Locally frequent
Field horsetail	<i>Equisetum arvense</i>	Frequent
Male fern	<i>Dryopteris felix-mas</i>	Occasional

Table 5: Stoneworts

English Name	Scientific Name	Status on Site
Common stonewort	<i>Chara vulgaris</i> var. <i>vulgaris</i>	Rare – Pond 1 only

Table 6: Bryophytes and Lichens

English Name	Scientific Name	Status on Site
Broom fork-moss	<i>Dicranum scoparium</i>	Frequent on tip sides and heather areas
Common feather-moss	<i>Eurhynchium praelongum</i>	Occasional in wooded areas
Common hair-cap moss	<i>Polytrichum commune</i>	Occasional throughout
Greater water-moss	<i>Fontinalis antipyretica</i>	Scarce – in Pond 2A only
Lichen species	<i>Cladonia</i> spp.	Occasional in heather areas
Reindeer-moss	<i>Cladonia rangiferina</i>	Scarce – in heather areas

