Retford Circular Economy Project Environmental Statement Addendum – Volume 3 Technical Appendices

Technical Appendix 8.7: Updated Habitat Data

January 2024

Project No.: 0695864

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Retford Circular Economy Project Environmental Statement Addendum – Volume 3 Technical Appendices

Technical Appendix 8.7: Updated Habitat Data

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Acronyms and Abbreviations

Name	Description
BAP	Biodiversity Action Plan
Defra	Department for the Environment and Rural Affairs
ERM	Environmental Resources Management Ltd
IHP	Invertebrate Habitat Potential
ECoW	Ecological Clerk of Works
HE	Habitat Element
HGV	Heavy Goods Vehicle
LWS	Local Wildlife Site
PEA	Preliminary Ecological Appraisal
PRF	Potential Roost Feature
RCEP	Retford Circular Economy Project
SSSI	Site of Special Scientific Interest
SQE	Suitably Qualified Ecologist
TN	Target Note
UK	United Kingdom
UKHab	UK Habitat Classification

1. INTRODUCTION

1.1 Background to the Project

In February 2023, Lound Hive Limited (‘the Applicant’, ‘Hive’), part of Hive Aggregates and the Hive Energy Group applied to the Nottinghamshire County Council (‘NCC’) in its capacity as minerals planning authority under the provisions of the Town and Country Planning Act 1990, seeking consent and deemed planning permission for the extraction of pulverised fuel ash (‘PFA’) from former ash disposal lagoons located near Lound, Retford, Nottinghamshire (DN22 8SG) (the ‘Site’) and their progressive restoration, along with associated development. The proposals are hereafter collectively referred to as the ‘Amended Proposed Development’, following amendments being made to the scheme since the submission of the application (Refer to Chapter 5, Volume 1 of this Environmental Statement Addendum (ESA) for details). The Amended Proposed Development is also referred to as the 'Retford Circular Economy Project’ (‘RCEP’).

1.2 Scope

Environmental Resources Management Ltd. (ERM) was commissioned by Hive to undertake an ecological survey of habitats and protected species in June 2023. The purpose of the surveys was to update the findings of the Preliminary Ecological Appraisal (PEA)[1] survey undertaken in 2021, and to gather additional information.

The survey area comprised the Site and a 30 m buffer for protected species (Appendix A Figure 8.7.1). Habitats within the survey area were assigned UK Habitat Classification (UKHab) categories and habitat condition was assessed. Signs of protected or invasive species observed within the survey area were recorded and a rapid assessment of invertebrate habitat potential was undertaken in suitable locations. This report presents the findings of these surveys.

1.3 Site Location and Description

The Site is centred approximately on National Grid Reference SK 69404 84864, approximately 670 m north of Retford within the administrative boundary of Bassetlaw District Council and Nottinghamshire County Council (NCC). It comprises mainly agricultural land, field boundary vegetation, and part of an existing industrial estate and an access road to the A638.

The Site is low-lying, covering a relatively flat area within the floodplain of the River Idle, between 100 m and 500 m to the south-east. The Site is surrounded by a series of water bodies which have formed within the pits of disused sand and gravel quarries along the floodplain of the River Idle, some of which have been included in designated Nature Reserves. A majority of the Site boundary is formed of raised, vegetated embankments, which include tree planting and hedgerows along the Site’s perimeter and broadleaved woodland and hedgerows in the surrounding area.

[1] Arcus Consultancy Services (2021) *Preliminary Ecological Appraisal: Lound Ash Extraction.* Report prepared for Hive Energy. Arcus, York

2. METHODS

2.1 Preliminary Ecological Appraisal Update

Surveys comprised a walkover to rapidly assess ecological features present, or potentially present, within the survey area presented in Appendix A Figure 8.7.1. Surveys were carried out following the CIEEM Guidelines for Preliminary Ecological Appraisal[2]. Ecological features identified in the initial PEA report were targeted for reassessment and any new features observed were noted, as presented in the following sections.

2.2 UKHab Habitat Survey

The UKHab survey was based on the methods described in the UK Habitat Classification User Manual (2020)[3] as the survey was undertaken in June 2023, prior to the updated manual that was released in July 2023[(4)]. The alphanumeric UKHab habitat codes have been reported in the findings and map figures (Appendix A Figure 8.7.2).

In addition to the findings of the UKHab survey (Section 3.1), features of interest were recorded as target notes (TN) with a geographic reference and accompanying photograph(s), where relevant (Appendix D Target Notes). Plants and their frequency of occurrence were recorded using the subjective DAFOR scale (dominant, abundant, frequent, occasional, or rare)[5]. The nomenclature of vascular plants occurring within the defined survey area follows Stace (2019)[6]. A species list is presented in Appendix E. Survey limitations are presented in Section 2.8.

2.3 Habitat Condition Assessment

Habitats within the survey area were assessed using the Natural England Biodiversity Metric 4.0 (BM 4.0)[7] habitat condition assessment sheets. Each habitat type is evaluated against a corresponding set of condition assessment criteria and a value applied, either a numerical rating, or a 'yes/no' response. The results were recorded within the metric's condition assessment sheets, which have been summarised to present the findings of this survey.

2.4 Invertebrate Habitat Potential Assessment

An Invertebrate Habitat Potential (IHP) assessment was carried out by ERM following the methods outlined in Dobson and Fairclough (2021)[8]. Parcels of habitat within the survey area with the potential to support important invertebrate assemblages were identified from desktop review and the findings of previous surveys in 2021.

Within each parcel, 11 habitat elements (HE) were assessed (see Table 2.1) and a grading was applied to each element to identify its quality and relative value for supporting invertebrate communities, coded using the letters A to E (see Table 2.2). Each parcel assessed was characterised by a string of 11 letters, corresponding to each of the habitat elements. The need for 'further action' is

[2] CIEEM (2017) *Guidelines for Preliminary Ecological Appraisal, Second Edition.* Chartered Institute of Ecology and Environmental Management, Ampfield.

[3] Butcher, B., Carey, P., Edmonds, R., Norton, L., and Treweek, J. (2020). *UK Habitat Classification User Manual*, Version 1.1. UKHab Ltd, Stockport,. Available at: https://ukhab.org/

[4] UKHab Ltd (2023) *UK Habitat Classifiaction Version 2.0.* UKHab Ltd, Stockport. Available at: https://ukhab.org/

[5] The DAFOR scale is used for semi-quantitative sampling, to provide a quick estimate of the relative abundance of species (generally plants) in a given area. Abundance (number of individuals) and cover (area coverage) are often used interchangeably in this type of surveying, although in fact they may have very different meanings.

[6] Stace, C. (2019). *New Flora of the British Isles*. 4th edition. UK. Cambridge University Press

[7] Natural England (2023) *The Biodiversity Metric 4.0 – Natural England Joint Publication JP039.* Natural England, York. Available at: https://publications.naturalengland.org.uk/publication/6049804846366720

[8] Dobson, J., and Fairclough, J. (2021) *Rapid Assessments of the Potential Value of Invertebrate Habitats: Applications for Planning and Nature Conservation ('Phase 1 for Bugs').* CIEEM InPractice, 112, 44-48. CIEEM, Ampfield, UK

based on minimum thresholds represented by the three upper grades A-C, comprising at least: one A; or two B's; or one B and two C's.

The course of further action is then determined by consultation with a specialist entomologist, who would interpret the findings in the context of the Site.

Table 2.1: Habitat Elements assessed by IHP survey

No.	Habitat element	Description
HE1	Decaying Wood	In all its forms; from decaying wood on/in large trees to woodland floor debris.
HE2	Rotational Management	Planned or serendipitous; and whether for nature conservation or other purposes.
HE3	Nectar Resources	As a proxy for nectar- and pollen resources, assessment of pollen resources is impracticable on a walk-through survey
HE4	Wet Substrates	Including marginal, marshy, muddy and seasonally inundated habitats, as well as flushes.
HE5	Open Water Habitats	The open water element of rivers, lakes, ponds, streams, ditches, etc.
HE6	Structural Patchwork	Habitat mosaics, including, but by no means restricted to open mosaic habitats on previously developed land.
HE7	Still Air (S)	Suntraps and still-air microclimates in open situations; the term 'still air' is used in preference to 'wind breaks' as many rigid wind breaks are likely to produce turbulent air in their lee.
HE8	Still Air (H)	Humid still-air microclimates in sheltered and shaded situations.
HE9	Connectivity	Landscape-scale connectivity between the site and external habitats.
HE10	Ecoclines	A graded transition between two or more broad habitats.
HE11	Bare Earth	Unshaded bare or sparsely vegetated well-drained substrate, regardless of soil type.

SOURCE: Adapted from Dobson and Fairclough (2021)[8]

Table 2.2: Grading System Applied to Habitat Elements

Grade	Habitat Quality	Description
A	Exceptional	Very high-quality examples of the habitat element, including but not restricted to those of potential regional significance. This may be for reasons of intrinsic quality, rarity, vulnerability, or the perceived importance of its position in the wider landscape.
B	Major	Good quality examples of each habitat element which do not meet the criteria for Exceptional. Likely to be a predominant factor in supporting characteristic and specialised invertebrate assemblages. Considerations might include the extent, maturity, and historic and current connectivity of the element.
C	Moderate	A clear example of the habitat element is present, but which does not qualify as Major. Likely to be of sufficient quality to support a characteristic invertebrate fauna.
D	Minor	Habitat element is present but is insufficient quality to qualify as Moderate or above. For example, it may be of extremely limited extent, or very sparsely dispersed. Likely to support common and widespread, generalist species.
E	Negligible/Absent	Habitat element is absent or of insignificant (barely perceptible) quantity.

SOURCE: Adapted from Dobson and Fairclough (2021)[8]

2.5 Protected Species Survey as Part of the Habitat Walkover

A walkover survey for protected and priority species was undertaken during the habitat walkover, which included a search for signs/ sightings of species likely to occur in the locality and in the habitats present. Protected species are those that are deemed 'sensitive' and especially vulnerable to persecution or over-exploitation and are protected under legislation such as the Conservation of Habitats and Species Regulations 2017 (as amended)[9], Wildlife and Countryside Act 1981[10] (as amended), and Protection of Badgers Act 1992[11]. Other notable species of priority, such as Local Biodiversity Action Plan species, reptiles, and amphibians, which are of particular importance for the conservation of biodiversity, were also recorded if present.

Habitat or habitat features which were identified during previous surveys, and which were accessible during the walkover, were also reassessed for any change in status. Limitations to the survey, including accessible areas are presented in Section 2.8.

2.6 Invasive Non-Native Species

Observations of Invasive Non-Native Species (INNS), as listed in the Wildlife and Countryside Act 1981 (as amended), comprising both flora and fauna were also recorded.

2.7 Survey Personnel and Timing

The surveys were carried out between 21 to 23 June 2023 by a team led by Callum Gilhooley (ERM Managing Technical Consultant, ACIEEM) who has 13 years' experience. Surveys were conducted within the optimal period for these surveys. Timing and weather conditions are presented in Table 2.3.

Table 2.3 Weather Conditions

Date	Start and End Time[1]	Weather conditions[2]
21 June 2023	1300 – 1800	Rain 0 mm, Temp. 25°C; Wind 3, Cloud cover 2
22 June 2023	0900 – 1830	Rain 1 mm, Temp. 24°C, Wind 1, Cloud cover 4
23 June 2023	0900 – 1530	Rain 0 mm, Temp. 24°C, Wind 2, Cloud cover 2

[1] Times are approximate. [2] Variables were recorded as follows: Rainfall in mm, Temperature (Temp.) in degrees Celsius (°C), Wind in Beaufort wind force scale[12], Cloud cover (total cloud amount) in oktas (eighths)[13].

2.8 Limitations

It was not possible to relocate and reassess previously identified badger setts due to vegetation (mainly comprising nettles and tall ruderals, with some bramble) being too tall and/or dense to gain access.

The assessment of bat roost potential was undertaken from the ground only. A tree climbing survey to inspect potential bat roost features was recommended by the 2021 PEA and was undertaken in August 2023(14). Details of this survey are provided in Technical Appendix 8.8 in Volume 3 of this ESA.

[9] UK Government Legislation (2017). The Conservation of Habitats and Species Regulations 2017. Available at: https://www.legislation.gov.uk/uksi/2017/1012/contents

[10] UK Government Legislation (1981). Wildlife and Countryside Act 1981. Available at: https://www.legislation.gov.uk/ukpga/1981/69/contents

[11] UK Government Legislation (1992). Protection of Badgers Act 1992. Available at: https://www.legislation.gov.uk/ukpga/1992/51/contents

[12] https://www.metoffice.gov.uk/weather/guides/coast-and-sea/beaufort-scale

[13] https://www.metlink.org/resource/student-charts/

[14] Peak Ecology Ltd (2023) *Tree Climbing Survey: Retford Circular Economy Project.* Report prepared for ERM on behalf of Hive Lound Ltd. Peak Ecology Limited, Bakewell.

3. SURVEY RESULTS

3.1 UKHab Survey

The following 15 UKHab habitats were recorded within the survey area, listed by classification grouping order as set out in the UK Habitat Classification User Manual (2023), not in order of ecological value:

- Grassland – g3c, Other neutral grassland;
- Grassland – g4, Modified grassland;
- Woodland – w1g, Other woodland; broadleaved;
- Woodland – w1g6, Line of trees;
- Woodland – w1h, Other woodland; mixed;
- Woodland – w2c, Other coniferous woodland;
- Heathland and shrub – h3h, Mixed scrub;
- Heathland and shrub – h2a, Hedgerow (priority habitat);
- Cropland – c1c, Cereal crops;
- Cropland – c1d, Non-cereal crops;
- Urban – u1b, Developed land; sealed surface;
- Urban – u1c, Artificial unvegetated, unsealed surface;
- Urban – u1e, Built linear features;
- Urban – u1f, Sparsely vegetated urban land; and
- Rivers and lakes – r1g, Other standing water.

Descriptions of these habitats are provided in Section 3.1.1 and the mapped findings of the UKHab survey are presented in Appendix A Figure 8.7.2. Target notes (TN) are presented in Appendix D.

3.1.1 Habitat Descriptions

3.1.1.1 Grassland

g3c Other neutral grassland

Areas of other neutral grassland mainly occurred along the northern and western perimeter of the survey area, frequently in combination with scattered scrub, and were largely species poor (see Appendix D TN 12). Grasses recorded include occasional smooth meadow-grass (*Poa pratensis*), cock's-foot (*Dactylis glomerata*), Yorkshire fog (*Holcus lanatus*), crested dog's-tail (*Cynosurus cristatus*), and perennial ryegrass (*Lolium perenne*). Forbs included occasional white clover (*Trifolium repens*), meadow buttercup (*Ranunculus acris*), ribwort plantain (*Plantago lanceolata*), dandelion (*Taraxicum officionale* agg.), common nettle (*Urtica dioica*), broad leaved dock (*Rumex obtusifolius*), and cleavers (*Galium aparine*).

Scattered scrub was present within the grassland, surrounding the field margins throughout the survey area (see Appendix D TN 18-19). Species included scattered gorse (*Ulex europaeus*) along the northern and southern boundaries of the survey area, and scattered blackthorn (*Prunus spinosa*), bramble, and dog rose (*Rosa canina*).

A small area of more diverse other neutral grassland was located in the Sutton and Lound Gravel Pits Site of Special Scientific Interest (SSSI) (OS grid ref SK 69387 84514, Appendix D TN 28) towards the centre of the survey area. Grasses recorded include occasional smooth meadow-grass, cock's-

foot, Yorkshire fog, crested dog's-tail, and rare perennial ryegrass. Forbs included rare selfheal (*Prunella vulgaris*), herb Robert (*Geranium robertianum*), perforate St. John's wort (*Hypericum perforatum*), oxeye daisy (*Leucanthemum vulgare*), foxglove (*Digitalis purpurea*), and black medic (*Melilotus indicus*). Ruderal species included occasional ribwort plantain, and rare dandelion, goatsbeard (*Tragopogon pratensis*), common nettle, broad leaved dock, cleavers, and ragwort (*Senecio jacobaea*). Woody species mainly occurring around the edges of the parcel include rare bramble (*Rubus fruticosus* agg), dog rose, broom (*Cytisus scoparius*), hawthorn (*Crataegus monogyna*), and silver birch (*Betula pendula*).

g4 Modified grassland

Most fields in the survey area comprised modified grassland with a very short sward at the time of the survey, attributed to grazing by sheep and/or cattle (either present or with evidence of recent presence), see Appendix D TN 11, 13, 14, 21. Grasses recorded include dominant perennial ryegrass, with occasional cock's-foot and tufted hair-grass (*Deschampsia caespitosa*) more frequent within the field margins. Within the sward, frequent herb species included white clover, meadow buttercup, common nettle, dandelion, and ribwort plantain, and occasional tufted vetch (*Vica cracca*) which was restricted to the field margins.

3.1.1.2 Woodland

w1g Other woodland; broadleaved

A small, triangular area of semi-natural broadleaved woodland is present to the south of three cropland fields (OS grid ref SK 68528 83444). Species included ash (*Fraxinus excelsior*) and Pedunculate oak (*Quercus robur*). Trees in this area were more mature than to the north of the survey area, notably three large oaks. The understorey was limited and dominated by bramble, with large brash piles also present.

The remaining other woodland; broadleaved habitat within the survey area was of plantation origin, occurring on the western, southern, eastern and north-western perimeters, including in the Sutton and Lound Gravel Pits SSSI, concurrent with Sutton and Lound Local Wildlife Site (LWS) (see Appendix D TN 27), and in the west of the survey area. Tree species recorded include occasional Pedunculate oak, hawthorn, wild cherry (*Prunus avium*), poplar sp. (*Populus* sp.), elder (*Sambucus nigra*), and rare hazel (*Corylus avellana*). Scrub species present in the understory and woodland edges include occasional broom and bramble, with rare dog-rose. Grasses included occasional Yorkshire fog, cock's-foot, and smooth meadow-grass, with rare soft brome (*Bromus hordaeceus*). Other ground flora included occasional yarrow (*Achillea millefolium*), oxeye daisy, ribwort plantain, cleavers. Rare species included herb Robert, tufted vetch, meadow cranesbill (*Geranium praetense*), dandelion, goat's-beard (*Taragopogon pratensis*), creeping thistle (*Cirsium arvense*), spear thistle (*Cirsium vulgare*), hogweed (*Heracleum sphondylium*), ragwort and bee orchid (*Ophrys apifera*).

Broadleaved plantation strips, of relatively young age, were present separating the field margins in the centre of the survey area (see Appendix D TN 5, 12, 13). Species included occasional alder (*Alnus glutinosa*), ash, Pedunculate oak, and hawthorn.

w1h Other woodland; mixed

Mixed plantation woodland was present within the south of the survey area, with species comprising occasional alder, Pedunculate oak, ash and hawthorn, Japanese larch (*Larix kaempferi*) and Scot's pine were also present. The understory in these areas was limited, with a deep litter leaf layer (predominantly needles in coniferous areas) and occasional scattered bramble and dead wood.

Also, in the south of the survey area, a line of mixed broadleaved and coniferous trees formed the field boundary between a field of cereal crops and a parcel of other coniferous woodland plantation (see Appendix D TN 42-43). Tree heights varied between approximately 10 m to 25 m tall, with

shorter scrub/shrub trees also present, however it was not managed as a hedgerow (attributed to the absence of livestock). Species included ash, willow sp (*Salix* sp), Scots pine (*Pinus sylvestris*), hawthorn, and blackthorn. Some gaps between the trees/field boundary were dominated by bracken (*Pteridium aquilinum*).

w2c Other coniferous woodland

Scattered Scots pine, approximately 25 m in height, were present along a section of the embankment to the south of Lound Low Road.

3.1.1.3 Heathland and shrub

h3h Mixed scrub

Mixed scrub occurred in several locations, largely adjoining areas of woodland outside the livestock-fenced field boundaries in the central and southern parts of the survey area (see Appendix D TN 16, 18, 19). Species comprised gorse, broom, silver birch, hawthorn, and blackthorn.

h2a6 Other native hedgerow

An intact species-poor hedge was present along part of the survey area's northern boundary, south of Lound Low Road and the stocked fishing lakes (outside of the survey area), see Appendix D TN 12. This hedgerow comprised only hawthorn and the shape of the hedgerow was well-managed. Ground flora were limited to common nettle, creeping thistle and ragwort.

Further hedgerows occurred in the south of the Site, dividing cultivated cropland fields (see Appendix D TN 40-41. These hedgerows were species-poor and gappy, comprising hawthorn and blackthorn.

3.1.1.4 Cropland

c1c Cereal crops

To the south of the survey area, two arable fields were planted with wheat (*Triticum* sp) at the time of the survey. The western field margins were retained unplanted and species included abundant cock's-foot, occasional bracken, and rare spear thistle, oxeye daisy and common poppy (*Papaver rhoeas*), see Appendix D TN 43.

c1d Non-cereal crops

Between the two cereal crop fields in the south of the survey area, one field of oilseed rape was present. As for the adjacent cropland, the western field margins were retained unplanted and species included abundant cock's-foot, occasional bracken, and rare spear thistle, oxeye daisy, and common poppy.

3.1.1.5 Urban

u1b Developed land; sealed surface

The Breedon Retford Concrete Plant in the southern part of the survey area, comprised areas of concrete and tarmac hardstanding, with industrial buildings and equipment (see Appendix D TN 32). The Site was in active use and opportunities for biodiversity were limited.

u1c Artificial unvegetated, unsealed surface

Several unmetalled access tracks were present throughout the central and northern parts of the survey area. Two areas of bare ground were present in the north of the survey area, associated with the access tracks and temporary storage areas, e.g. for silage bales (see Appendix D TN 3-4). A third

area of bare ground was present in the south of the survey area, north of the Breedon Retford Concrete Plant and was being used for heavy goods vehicle (HGV) trailer storage at the time of the survey (see Appendix D TN 34-35). These areas appear to be subject to periodic inundation.

u1e Built linear features

In the south of the survey area, a tarmac access road connects the Breedon Retford Concrete Plant to the A636 (see Appendix D TN 31).

u1f Sparsely vegetated urban land

Mounds of soil and rubble/rocks in varying states of re-vegetation surrounded a small area of bare ground north of Breedon Retford Concrete Plant. This area was being used for HGV trailer storage and decommissioning. Mounds in the east and north of this area, backing onto woodland, were vegetated with early successional stage ruderal species (see Appendix D TN 34-35).

3.1.1.6 Rivers and lakes

r1g Other standing water

To the south of Lound Low Road, a drainage ditch (D2, Appendix D TN 7, 9) follows the northern edge of the survey area within a strip of broadleaved woodland, exiting where the ditch turns to the northwest. The ditch was wider in the west and the water level was low, with low flow and appeared turbid. Riparian and edge vegetation was limited.

Within an area of broadleaved woodland north of the Breedon Retford Concrete Plant, a drainage ditch (D3, Appendix D TN 33, 36) runs north before exiting the survey area. The water level was low, with low flow. Riparian vegetation was generally limited however dense patches of Himalayan balsam (*Impatiens galndulifera*) were observed along the ditch and within adjacent patches of the woodland.

A drainage ditch (D4, Appendix D TN 31) crosses the survey area, culverted under the access road to Breedon Retford Concrete Plant. The water level was low with low flow. To the west of the access road, dense stands of Himalayan balsam line the banks of the ditch.

Within the 30 m buffer of the survey area, one pond (P14, Appendix D TN 1) is located immediately to the north, running parallel with the boundary, south of Lound Low Road, see Appendix A Figure 8.7.2. The pond was surrounded by willow trees and marginal and emergent vegetation included great reedmace (*Typha latifolia*). Ground flora around the pond was dense and included broad leaved dock, spear thistle, ribwort plantain, bramble, and daffodil (*Narcissus pseudonarcissus*).

3.2 Habitat Condition Assessment

The condition of habitat parcels within the survey area ranged from Poor to Good. A summary of the habitat condition assessment results for individual habitat parcels assessed is presented in Table 3.1. Further details are presented in Appendix B.

Table 3.1: Summary of Habitat condition

Habitat Type	Condition Assessment Result		
	Good	Moderate	Poor
Grassland (medium, high and very high distinctiveness)	1	8	7
Grassland (low distinctiveness)	3	-	4
Woodland	1	20	2
Line of Trees	-	3	-

Habitat Type	Condition Assessment Result		
	Good	Moderate	Poor
Hedgerow	-	3	1
Hedgerow with Trees	1	-	-
Scrub	-	6	-
Sparsely Vegetated Land	-	1	-
Ditches	-	-	3

Note: No watercourse habitats qualifying as rivers and requiring River Habitat Condition assessment were present within the survey area. Cropland does not qualify for habitat condition assessment. Following the Biodiversity Metric 4.0 definition, modified grassland is assessed as a 'low' distinctiveness' habitat and other neutral grassland is assessed using the 'medium, high, and very high' distinctiveness habitat.

3.3 Invertebrate Habitat Potential

Summary results of the 11 parcels assessed, including a habitat description for each are presented in Table 3.2 below and locations are shown in Appendix A Figure 8.7.3. Detailed results showing the grading for each habitat element and photos are presented in Appendix C.

Following the IHP protocol, two parcels were assessed as requiring further action, which was undertaken by a consultant entomologist in August and October 2023[15]. Following these site visits, no further surveys for invertebrates were identified.

Table 3.2: IHP Summary Results

No.	Grid Reference	Parcel description	Results (ranked by higest scoreing HE)	Further Action
1	SK 70119 85412	Woodland strip adjacent to lake and seasonally inundated drainage ditch, some deadwood and stone piles and a lot of litter. Ditch, banks provide low levels of still air.	CCDDDDDDDEE	No
2	SK 70320 84955	Immature plantation woodland with scrub boundary. No dead wood (standing or on ground). Limited understory, leaf litter covers floor. Small pockets of standing air created by tree stands.	DDDDDEEEEEE	No
3	SK 69739 85020	Mound (orchids previously identified) gorse also have pollen opportunities, high levels of dead wood including large brash pile and scattered cut trunks, in clearing between plantation woodland. Low levels of connectivity through adjacent woodland. Reduced deadwood potential lowers to 'no further action" required compared to 2021.	CCCDDDDEEEE	No
4	SK 68931 84159	Large pile of wood surrounded by scrub and tall ruderals, this graduates to plantation woodland. Several small wood piles and one larger. Some small clearings likely to get sun. Likely to be ample nectar resource in summer months.	BCCDDDEEEEE	**Yes**
5	SK 68990 84547	Dense gorse adjacent improved field. Grassy clearings in scrub, grasses into woodland toward lake offsite. Likely high pollen resource in summer from ruderals and gorse.	DDDDDDDDEEE	No
6	SK 69911 84632	Deciduous woodland (willow dominated), leaf litter. Some pollen availability (orchids previously noted). Connected to similar habits and fenced so eco tone	CCDDDEEEEEE	No

[15] Godfrey, A. (2003) *Invertebrate Scoping Survey for Retford Circular Economy Project, Nottinghamshire: August & October 2023.* Report to Peak Ecology on behalf of ERM. Andy Godfrey Entomological Consultant, Barnsley.

No.	Grid Reference	Parcel description	Results (ranked by higest scoreing HE)	Further Action
		absent. understory with brash and grass cuttings and small stacks of decaying wood.		
7	SK 68916 84023	Area of dense scrub at base of embankment. Good connectivity to woodland and scrub adjacent. Large woodpile surrounded by scrub and ruderal vegetation within dip, sheltering the area and making section of still air. Woodpiles likely created due to woodland management.	BCCCDDEEEEE	**Yes**
8	SK 68567 83533	Area of plantation coniferous woodland. Limited pollen resource, lot of dead wood on floor (otherwise understory limited). Still air created by shelter from bank and trees. Good connectivity to woodland and scrub (but not on Breedon site side).	CCDDDDEEEEE	No
9	SK 69659 85079	Plantation (young) woodland upon top of embankment. Areas of scrub, grassland and ruderals for pollen. Piles of brash and old hay bales, open grassland sections and unshaded areas of bare ground. Trees may provide wind break.	CCCCDDDEEEE	No
10	SK 69549 84801	Clearing in woodland with scattered scrub over SI grassland. Embankment creates still air. Bare ground around rabbit warrens.	DDDDDDDEEEE	No
11	SK 70082 85203	Cut logs and brash pile in field. Large amount of deadwood but signs of recent/regular log cutting, presumed for firewood. Limited connectivity, structural patchworks, or mosaic habitats. Not present in 2022. Assumed to be wood cleared from parcel 3.	CDDDEEEEEEE	No

Note: Thresholds for 'further action' are: 1x A, or 2x B's, or 1x B and 2x C's (i.e. Axxxxxxxxxx, or BBxxxxxxxxx, or BCCxxxxxxxx).

3.4 Protected Species

3.4.1 Bats

The survey area is mainly modified grassland fields, however the surrounding woodland, scrub, hedgerows and edge habitats, along with water bodies and watercourses in the survey area provide a mosaic of habitats suitable to support foraging and commuting bats. Artificial light sources were absent from most of the survey area, with some residential, agricultural, and industrial buildings and facilities lit in the north and south of the Site.

During surveys in 2022, 21 trees were identified as having moderate and low potential to support roosting bats. Nineteen of these trees were reassessed from the ground for potential roost features (PRFs). Two trees (8 and 9) were outside of the 30 m survey buffer so were excluded from the survey and are not reported here. For the trees assessed, no change in roost potential or additional PRFs were identified compared with 2022. Buildings in the survey area were identified as having negligible suitability for bats.

Details of PRFs assessed are presented in Table 3.3 and Appendix A Figure 8.7.4.

Following the ground assessment, a tree climbing survey was caried out on 28 July and 15 August 2023[16].

[16] Peak Ecology (2023) *Tree Climbing Survey: Retford Circular Economy Project*. Peak Ecology Limited, Bakewell

Table 3.3: Trees with Potential Roosting Features

Tree No	Species and Location	Bat Roost Potential	Potential Roost Features
1	Oak species (SK 69872 85322)	Low	Knot hole, missing limbs.
2	Oak species (SK 69838 85307)	Low	Ivy cover, missing limbs, and spilt bark.
3	Oak species (SK 69688 85240)	Low	Dense ivy cover.
4	Oak species (SK 69713 85248)	Low	Rot hole and spilt bark.
5	Unidentified tree species (SK 69731 85109)	Moderate	Barn owl box present on the E elevation.
6	Ash (SK 68508 83435)	Moderate	Rot holes in N aspect 2.5 m high, single rot hole on S at 2 m.
7	Ash (SK 68539 83474)	Low	Dense ivy at all elevations.
10	Willow species (SK 68808 83928)	Low	Dead central stem, three woodpecker holes on E/S aspect. Open to elements at top/ hollow, provide little shelter.
11	Birch species (SK 68781 84203)	Low	Bark cavity on SE aspect. Small, only big enough for possibly single bat.
12	Willow species (SK 68541 83912)	Moderate	Two knot holes 1 and 2 m up, higher may lead to a larger cavity, W aspect. Tear out is superficial.
13	Oak species (SK 68545 83439)	Moderate	Mature tree with ivy cover, horizontal crack in tear out on SW elevation appear superficial, horizontal crack on torn off branch at NE elevation has most potential.
14	Oak species (SK68529 83438)	Low	Thick ivy stems (dead?) and several areas of peeling bark in the upper branches. Narrow horizontal branch split SW aspect 4 m high.
15	Oak species (SK 68539 83443)	Low	Ivy cover, no other visible features.
16	Oak species (SK 68582 83380)	Moderate	Knothole on SW aspect 4 m high and W aspect 4 m high, possible cavities.
17	Pine species (SK 68673 83236)	Low	Ivy cover.
18	Unidentified tree species (SK 69084 84079)	Low	Dead standing tree, potential limited to pealing bark. Knot hole is open at top leaving a large, exposed cavity.
19	Ash (SK 69276 84704)	Low	Young, with branch tear out on S aspect 2 m high.
20	Unidentified tree species (SK 69481 84823)	Low	Dead standing tree, pealing bark throughout. Splits present but appear superficial.
21	Willow species (SK 69235 85072)	Low	Thick ivy cover.

3.4.2 Badger

Suitable habitat for badgers (*Meles meles*) was recorded, however dense vegetation at the time of the survey prevented access in some areas. In accessible areas there were no new setts and no signs of recent activity (latrines, foraging). The findings of previous surveys are presented in ES, Volume 3, Confidential Technical Appendix 8.2[17].

3.4.3 Otter and Water Vole

The stretches of ditches within the survey area did not support otter holts or resting places and were considered unlikely to support fish populations. No signs (e.g. spraints, tracks) were recorded. Habitats likely to be of interest to otter lie in the areas around the survey area, including the River Idle and a number of other waterbodies in the river valley including in the Idle Valley Nature Reserve. Ditches crossing the survey area may be used by commuting otter, providing sheltered corridors connecting a network of more suitable habitat and waterbodies surrounding the survey area.

The suitability of the ditches for water vole (*Arvicola amphibius*) was limited, due to the absence of suitable bankside vegetation to provide shelter and foraging opportunities. No signs were observed during the survey.

3.4.4 Other Fauna Species

A barn owl next box was observed on a tree in the north of the survey area (SK 69731 85109), that had potential also to support roosting bats (see Table 3.3, Tree 5). During subsequent tree climbing surveys to assess bat roost potential, the nest box was checked by a suitably licenced surveyor and a dead barn owl chick was identified, indicating attempted breeding[18].

A single brown hare (*Lepus europaeus*), a species of principal importance, was observed in modified grassland fields to the north of the survey area.

Rabbits were observed during the survey, in the north of the Site within the modified grassland fields. Droppings and warrens were observed in most of the field margins within the survey area (see Appendix D TN 10).

No signs of amphibians or reptiles were observed during the survey. Although habitat suitable for Great Crested Newt (GCN) was present within the survey area, previous surveys including eDNA analysis of ponds within 500 m did not identify the presence of GCN.

Habitat for common and widespread reptile and amphibian species was present within the survey area. Records for grass snake (*Natrix natrix*) were identified from desk study and previous surveys (see ES Volume 3, Technical Appendix 8.1). However, no records of grass snake were observed during the survey.

3.5 Invasive Non Native Species

Japanese knotweed (*Reynoutria japonica*) was identified at one location in the south of the survey area, adjacent to an OHL wayleave (see Appendix A Figure 8.7.5 and Appendix D TN 39). Himalayan balsam was observed along drainage ditches and in an area of other broadleaved woodland in the survey area (see Appendix A Figure 8.7.5 and Appendix D TN 24, 25, 30, 37).

No records of invasive fauna species were identified during the survey.

[17] Retford Circular Economy Project (2023) *Environmental Statement Volume 3 Technical Appendix 8.2: Confidential Badger Annex*. RCEP. A report for Lound Hive Limited by Arcus Consultancy Limited (an ERM Group company).
[18] Peak Ecology (2023) *Tree Climbing Survey: Retford Circular Economy Project*. Peak Ecology Limited, Bakewell.

4. SUMMARY AND RECOMMENDATIONS

4.1 Summary of Findings

The habitats in the survey area comprised mainly grazed fields of modified grassland and species poor other neutral grassland. Woodland was largely other broadleaved plantation adjoining the fields. Species poor, gappy thorn hedgerows comprised field boundaries around cropland in the south, with a single hedge to the south of Lound Low Road, in the north of the survey area. Ditches in the north, centre and south of the survey area supported some standing water and within the 30 m buffer, one pond bordered the Site to the north, south of Lound Low Road. Ponds were also located in the surrounding area as part of Idle Valley Nature Reserve and to the south, but these were outside of the 30 m buffer and were not assessed. The condition of habitats within the survey area ranged from good to poor, however, the majority were moderate or poor.

No new signs of badgers were recorded and there was no evidence of use of the drainage ditches on the Site by otter, or water voles. Trees with low to moderate potential to support roosting bats were recorded in the survey area, but the buildings had negligible potential. Suitable habitat for commuting and foraging bats remained present throughout the survey area.

Habitats across the Site were assessed for their suitability to support invertebrate communities, using the rapid Invertebrate Habitat Potential assessment approach. Two areas, (IHP no's 4 and 7, see Section 3.3) comprising woodpiles, tall ruderals, scrub with clearings and nectar sources, were identified as potentially of value due to meeting or exceeding the minimum threshold of 1 B and 2 C's (BCCxxxxxxxx), and were subsequently assessed by a specialist who determined no further surveys were necessary (detailed in ESA Volume 3, Technical Appendix 8.9).

Suitable habitat for breeding birds remained present, but there was no evidence of protected species. The barn owl nest box, recorded on previous surveys, was still present, however, no signs of use were observed during the survey (Tree 5, Table 3.3). During subsequent tree climbing surveys to assess bat roost potential, the bat box was checked by a suitably licenced surveyor and a dead barn owl chick was identified, indicating attempted breeding[19].

A single brown hare (Priority Species) was observed in fields at the north of the survey area.

No signs of amphibians or reptiles were observed during the survey. GCN were not identified as being present within the survey area or ponds within a 500 m buffer (see ES Volume 3, Technical Appendix 8.1). However, habitat for common and widespread species was present and grass snake were identified during previous surveys (see ES Volume 3, Technical Appendix 8.1).

The invasive non-native species Japanese knotweed and Himalayan balsam were identified in several locations, mainly in the south of the survey area, associated with ditches and surrounding woodland.

4.2 Recommendations

Based on the survey findings and in line with the standing planning advice and species-specific survey methods[20,21], the recommendations listed below were made.

- A Biodiversity Net Gain Assessment should be undertaken, taking account of the habitat condition assessment findings (this has been completed and is detailed in ESA Volume 3 Technical Appendix 8.4);
- Focussed assessment of the trees to confirm the PRF status identified in this report. Where appropriate trees to be climbed and PRFs inspected further, to confirm status and record any

[19] Peak Ecology (2023) *Tree Climbing Survey: Retford Circular Economy Project*. Peak Ecology Limited, Bakewell.

[20] https://www.gov.uk/guidance/prepare-a-planning-proposal-to-avoid-harm-or-disturbance-to-protected-speciesv

[21] https://www.gov.uk/guidance/protected-species-how-to-review-planning-applications

evidence of use by bats. This work was undertaken in July / August 2023 and the findings are contained in a separate report (ESA Volume 3, Technical Appendix 8.8)[22];

- The barn owl nest box identified as having been used for attempted breeding should be checked for presence of barn owl and potential breeding by a suitably licenced and qualified surveyor prior to any works commencing. Should the nest box be found to be in use, the potential for disturbance or other impacts should be considered and mitigation implemented by a suitably qualified and licenced ecologist;
- No signs of amphibians or reptiles were observed during the surveys, however suitable habitat for common and widespread species is present and therefore individuals may also be present. Any works requiring clearance of vegetation should be subject to pre-commencement checks by a suitably qualified ecologist. If any individuals found, translocation to a safe location away from the works may be required;
- In terms of invertebrates, as per the review of the Site detailed in ESA Volume 3, Technical Appendix 8.9, no further surveys are necessary;
- The completed badger surveys do not change the conclusion of the ES (Volume 3, Technical Appendix 8.2), which recommended the production of a Badger Protection Plan. This would detail requirements for further survey, monitoring, and mitigation;
- Works within areas containing Himalayan balsam and Japanese knotweed would be subject to appropriate mitigation/safeguards to remove from Site and prevent spread. Mitigation would be incorporated into the final Construction and Environmental Management Plan (CEMP);
- Ragwort was observed in low abundance in several areas throughout the survey area and further assessment should be undertaken to assess the risk to livestock and to prevent its spread. This species is native and an important source of nectar for insects, but is potentially poisonous to livestock if ingested. Grazing animals will usually avoid eating ragwort and the most common pathway for ingestion is through contaminated forage (hay, haylage, silage). Eradication of ragwort is not necessary or advised, however the spread of ragwort is controlled by the Weeds Act 1959 and the Ragwort Control Act 2003 and its management should follow the Defra Code of Practice[23]; and
- It is likely that preconstruction checks for birds and other fauna will be required before any works (including preparatory works) are undertaken under the supervision of an Ecological Clerk of Works (ECoW).

[22] Peak Ecology (2023) *Tree Climbing Survey: Retford Circular Economy Project*. Peak Ecology Limited, Bakewell.

[23] Department for the Environment and Rural Affairs (2011) Cide of Practice on How to Prevent to the Spread of Ragwort, Defra, Ergon House, London

APPENDIX A FIGURES

List of Figures

Site Boundary
Study Area - 30 m Buffer of Site Boundary

0 100 200 300 400 500
Metres
N

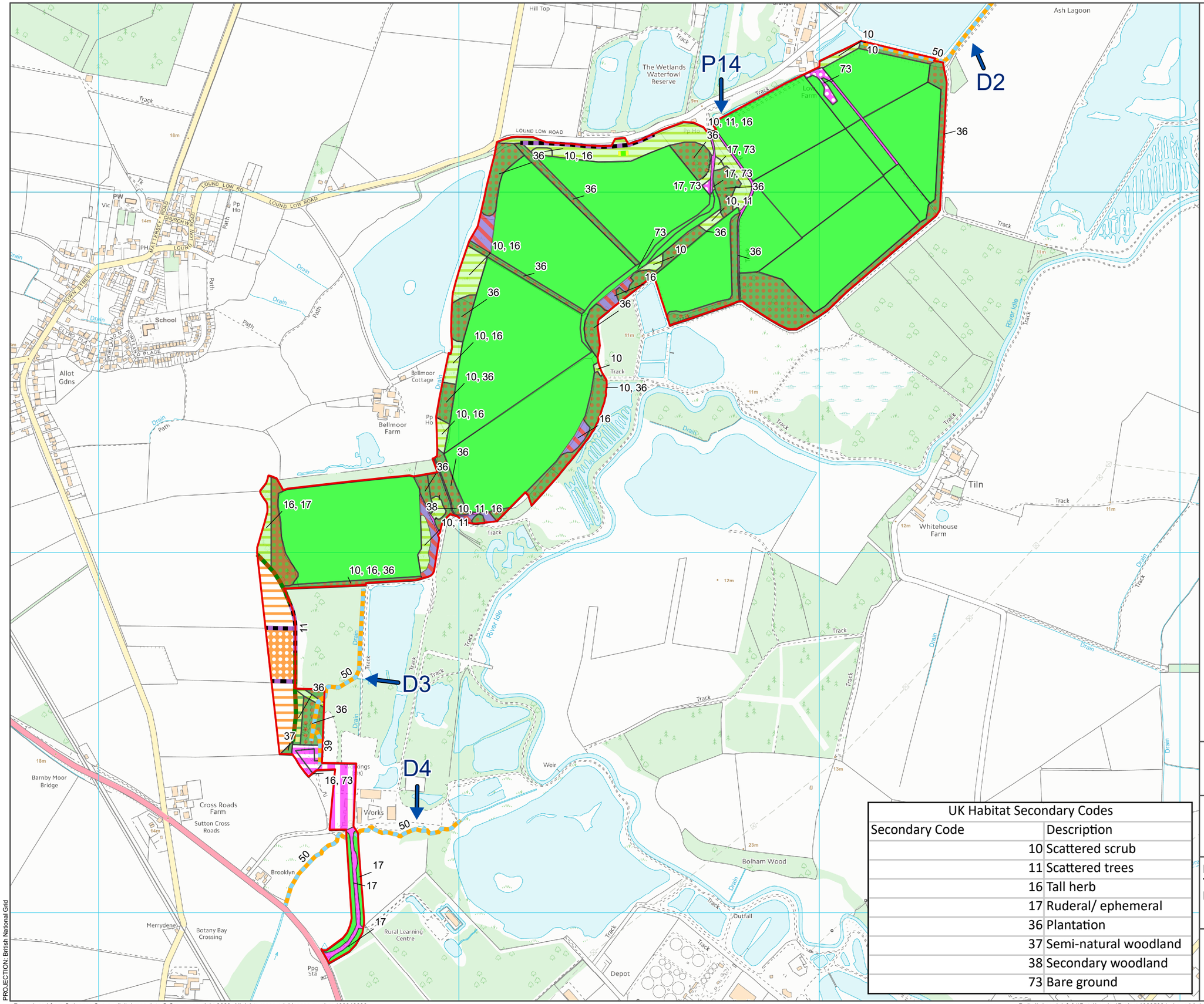
SCALE: See Scale Bar	VERSION: A01
SIZE: A3	DRAWN: DN
PROJECT: 0695864	CHECKED: CG
DATE: 20/10/2023	APPROVED: EB

Retford Circular Economy Project
Technical Appendix 8.7 Updated Habitat Data
Figure 8.7.1 : Site Location and Survey Area

ERM

PROJECTION: British National Grid

Path: \\uksprdgisfs01\Data\London\Projects\0695864 - Lound Ash Extraction\MAPS\0695864 - Lound Ash Extraction\0695864 - Lound Ash Extraction.aprx



UK Habitat Secondary Codes	
Secondary Code	Description
10	Scattered scrub
11	Scattered trees
16	Tall herb
17	Ruderal/ ephemeral
36	Plantation
37	Semi-natural woodland
38	Secondary woodland
73	Bare ground

SCALE: See Scale Bar	VERSION: A01
SIZE: A3	DRAWN: DN
PROJECT: 0695864	CHECKED: CG
DATE: 20/10/2023	APPROVED: EB

Retford Circular Economy Project
Technical Appendix 8.7 Updated Habitat Data
Figure 8.7.2: UKHab Classification Map

ERM

PROJECTION: British National Grid

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Site Boundary

Study Area - 30 m Buffer of Site Boundary

Invertebrate Habitat Potential

Further Action

- Yes
- No

0 100 200 300 400 500

Metres

N

SCALE: See Scale Bar	VERSION: A01
SIZE: A3	DRAWN: DN
PROJECT: 0695864	CHECKED: CG
DATE: 20/10/2023	APPROVED: EB

Retford Circular Economy Project
Technical Appendix 8.7 Updated Habitat Data
Figure 8.7.3: Invertebrate Habitat Potential Assessment

ERM

PROJECTION: British National Grid

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Site Boundary

Study Area - 30 m Buffer of Site Boundary

Bat Roost Assessment

Suitability

- Moderate
- Low

0 100 200 300 400 500

Metres

N

SCALE: See Scale Bar	VERSION: A01
SIZE: A3	DRAWN: DN
PROJECT: 0695864	CHECKED: CG
DATE: 20/10/2023	APPROVED: EB

Retford Circular Economy Project
Technical Appendix 8.7 Updated Habitat Data
Figure 8.7.4: Bat Preliminary Roost Assessment

ERM

PROJECTION: British National Grid

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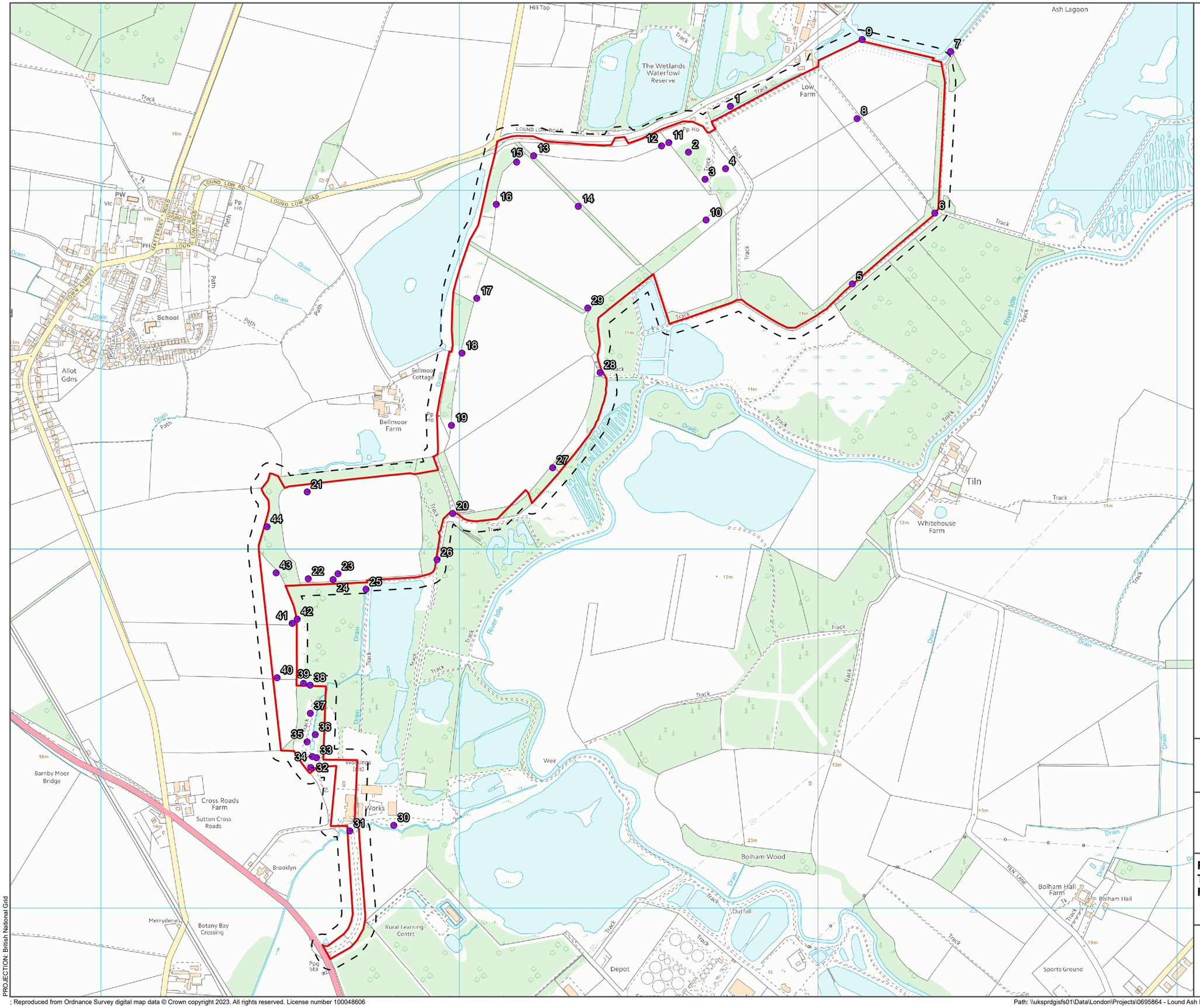

SCALE: See Scale Bar	VERSION: A01
SIZE: A3	DRAWN: DN
PROJECT: 0695864	CHECKED: CG
DATE: 20/10/2023	APPROVED: EB

Retford Circular Economy Project
Technical Appendix 8.7 Updated Habitat Data
Figure 8.7.5: Target Notes

ERM

PROJECTION: British National Grid

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APPENDIX B HABITAT CONDITION ASSESSMENT

Note:

This appendix presents a summary record of the Habitat Condition Assessment findings. Further details on the habitat condition assessment, including habitat condition assessment sheets can be found in the Biodiversity Net Gain Assessment Report (ESA Volume 3, Technical Appendix 8.4) for the project.

Following Biodiversity Metric 4.0 (BM 4.0) guidance[24], each habitat type has different questions and criteria which are required to be assessed. To present a concise summary of the findings, the results of the assessments have been aggregated into two tables. The letters A-M represent the assessment criteria and directly respond to the letters used in the BM 4.0 Condition Assessment Sheets. Different habitat types have different numbers of assessment criteria and where letters do not apply, this is represented by a dashed line in the table.

The condition assessment criteria use either a scored response (e.g. 1-3) or a yes/no response. This has been translated to a binary output in the summary table, i.e. responses corresponding to ‘yes’ are represented by the number 1, whereas responses corresponding to ‘no’ are represented by zero.

Hedgerows and hedgerows with trees are presented in a separate table to maintain ability to cross-reference with the habitat condition sheets as the data structure differs for these habitat types.

[24] Natural England (2023) *The Biodiversity Metric 4.0 (JP039)*. Natural England,

Table B.1: Habitat Condition Assessment Summary (Excluding Hedgerow Habitats)

Habitat Type	Habitat Parcel no.	Assessment Criteria													Total Score	Essential Criterion Passed	Condition Assessment Result
		A	B	C	D	E	F	G	H	I	J	K	L	M			
Grassland (low)	**5**	1	0	1	1	1	1	1	-	-	-	-	-	-	**6**	Yes	**Good**
	9	1	1	1	1	1	1	1	-	-	-	-	-	-	**7**	Yes	**Good**
	13	1	1	1	1	1	1	1	-	-	-	-	-	-	**7**	Yes	**Good**
	18	0	0	1	1	1	1	1	-	-	-	-	-	-	**5**	na	**Poor**
	22	0	0	1	1	1	1	1	-	-	-	-	-	-	**5**	na	**Poor**
	27	0	0	1	1	1	1	1	-	-	-	-	-	-	**5**	na	**Poor**
	45	0	0	1	1	1	1	1	-	-	-	-	-	-	**5**	na	**Poor**
Grassland (medium, high and very high)	**3**	1	0	1	1	0	0	-	-	-	-	-	-	-	**3**	No	**Moderate**
	7	1	0	1	1	0	0	-	-	-	-	-	-	-	**3**	No	**Moderate**
	11	1	1	1	1	1	0	-	-	-	-	-	-	-	**5**	No	**Moderate**
	12	1	1	1	0	1	0	-	-	-	-	-	-	-	**4**	No	**Moderate**
	14	1	1	1	1	1	0	-	-	-	-	-	-	-	**5**	No	**Moderate**
	16	0	0	1	0	1	0	-	-	-	-	-	-	-	**2**	No	**Poor**
	21	0	0	1	0	1	0	-	-	-	-	-	-	-	**2**	No	**Poor**
	24	0	1	1	0	1	0	-	-	-	-	-	-	-	**3**	No	**Poor**
	26	1	1	1	0	1	0	-	-	-	-	-	-	-	**4**	No	**Moderate**
	30	0	1	1	0	1	0	-	-	-	-	-	-	-	**3**	No	**Poor**
	32	1	1	1	1	1	0	-	-	-	-	-	-	-	**5**	Yes	**Moderate**
	35	1	1	1	1	1	0	-	-	-	-	-	-	-	**5**	Yes	**Moderate**
	42	1	1	1	1	1	1	-	-	-	-	-	-	-	**6**	Yes	**Good**

Habitat Type	Habitat Parcel no.	Assessment Criteria													Total Score	Essential Criterion Passed	Condition Assessment Result
		A	B	C	D	E	F	G	H	I	J	K	L	M			
	47	0	0	0	1	1	0	-	-	-	-	-	-	-	**2**	No	**Poor**
	51	0	1	0	0	1	0	-	-	-	-	-	-	-	**2**	No	**Poor**
	60	0	1	0	1	0	0	-	-	-	-	-	-	-	**2**	No	**Poor**
Woodland	**1**	2	3	3	3	3	2	1	2	1	1	1	1	2	**25**	na	**Poor**
	2	2	3	3	3	3	2	1	3	1	1	1	1	2	**26**	na	**Moderate**
	3	2	3	3	3	3	3	2	3	1	2	1	1	2	**29**	na	**Moderate**
	8	2	3	2	2	3	3	2	3	3	1	1	1	1	**27**	na	**Moderate**
	10	1	3	3	3	3	3	2	3	1	2	1	1	2	**28**	na	**Moderate**
	17	2	2	3	3	3	3	2	3	1	1	1	1	2	**27**	na	**Moderate**
	19	2	2	3	2	3	3	2	3	1	1	1	1	2	**26**	na	**Moderate**
	23	2	3	3	3	3	3	2	3	1	2	1	1	3	**30**	na	**Moderate**
	25	2	3	3	3	3	3	2	3	1	1	1	1	2	**28**	na	**Moderate**
	28	2	3	3	3	3	1	2	2	3	2	1	2	3	**30**	na	**Moderate**
	29	1	1	1	2	3	2	2	3	1	2	1	2	2	**23**	na	**Poor**
	31	1	3	3	1	3	3	2	3	1	1	1	1	3	**26**	na	**Moderate**
	33	2	3	3	3	3	3	2	3	1	2	1	1	3	**30**	na	**Moderate**
	34	2	1	2	2	3	3	1	3	1	2	1	1	1	**23**	na	**Moderate**
	38	2	3	3	3	3	3	2	3	1	2	1	1	2	**29**	na	**Moderate**
	40	2	3	3	3	3	3	2	3	1	2	1	1	3	**30**	na	**Moderate**
	43	2	2	3	3	3	3	2	3	1	2	2	3	2	**31**	na	**Moderate**
	44	2	3	3	3	3	3	2	3	3	2	1	1	2	**31**	na	**Moderate**
	46	2	3	3	5	3	3	2	3	2	2	1	1	3	**33**	na	**Good**

Habitat Type	Habitat Parcel no.	Assessment Criteria													Total Score	Essential Criterion Passed	Condition Assessment Result
		A	B	C	D	E	F	G	H	I	J	K	L	M			
	50	1	3	3	2	3	3	2	3	1	1	1	3	3	**29**	na	**Moderate**
	52	2	3	2	2	3	2	2	3	1	2	2	2	2	**28**	na	**Moderate**
	53	2	3	2	3	3	3	2	3	1	2	1	2	1	**28**	na	**Moderate**
	61	2	3	2	3	3	3	2	2	3	2	2	3	2	**32**	na	**Moderate**
Line of Trees	**15**	1	1	0	1	1	-	-	-	-	-	-	-	-	**4**	na	**Moderate**
	54	1	1	1	0	1	-	-	-	-	-	-	-	-	**4**	na	**Moderate**
	59	1	1	1	0	1	-	-	-	-	-	-	-	-	**4**	na	**Moderate**
Scrub	**20**	1	1	0	0	1	-	-	-	-	-	-	-	-	**3**	na	**Moderate**
	36	1	1	1	1	0	-	-	-	-	-	-	-	-	**4**	na	**Moderate**
	37	1	1	1	0	0	-	-	-	-	-	-	-	-	**3**	na	**Moderate**
	39	1	1	1	0	0	-	-	-	-	-	-	-	-	**3**	na	**Moderate**
	41	1	1	1	0	0	-	-	-	-	-	-	-	-	**3**	na	**Moderate**
	45	1	1	1	0	0	-	-	-	-	-	-	-	-	**3**	na	**Moderate**
Sparsely Vegetated Land	**48**	1	1	0	0	1	-	-	-	-	-	-	-	-	**3**	No	**Moderate**
Ditches	**D2**	0	0	1	0	1	0	0	1	-	-	-	-	-	**3**	na	**Poor**
	D3	0	0	1	0	1	0	0	0	-	-	-	-	-	**2**	na	**Poor**
	D4	0	0	1	0	1	0	0	0	-	-	-	-	-	**2**	na	**Poor**

Table B.2: Hedgerow and Hedgerow with Trees Habitat Condition Assessment Summary

Habitat Type	Habitat Parcel no.	Assessment Criteria										Total Score	Essential Criterion Passed	Condition Assessment Result
		A1	A2	B1	B2	C1	C2	D1	D2	E1	E3			
Hedgerow	**1**	0	0	1	1	1	1	1	0	na	na	5	na	Moderate
	56	0	0	0	0	0	0	1	0	na	na	1	na	Poor
	57	1	1	1	0	0	0	1	1	na	na	5	na	Moderate
	58	0	1	1	1	1	0	1	0	na	na	5	na	Moderate
Hedgerow with Trees	**55**	0	0	1	0	1	1	1	0	1	1	6	na	Good

APPENDIX C INVERTEBRATE HABITAT POTENTIAL ASSESSMENT

Invertebrate Habitat Potential Assessment Detailed Results

*Note: **Habitat Elements:** HE1 Decaying Wood, HE2, Rotational Management, HE3 Nectar Resources, HE4 Wet Substrates, HE5 Open Water Habitats, HE6 Structural Patchwork, HE7 Still Air (S), HE8 Still Air (H), HE9 Connectivity, HE10 Ecoclines, HE11 Bare Earth. **Grading system:** A Exceptional, B Major, C Moderate, D Minor, E Negligible/Absent. **Thresholds:** 1x A, or 2x B's, or 1x B and 2x C's (i.e. Axxxxxxxxxx, or BBxxxxxxxxx, or BCCxxxxxxxx).*

Parcel no.	Central Grid Reference	Parcel description	Letter Grades											Further Action
			HE1	HE2	HE3	HE4	HE5	HE6	HE7	HE8	HE9	HE10	HE11	
1	SK 70119 85412	Woodland strip adjacent lake and seasonally inundated drainage ditch, some deadwood and stone piles and a lot of litter. Ditch, banks provide low levels of still air.	D	E	D	D	C	D	D	D	C	D	E	No
2	SK 70320 84955	Immature plantation woodland with scrub boundary. No dead wood (standing or on ground). Limited understory, leaf litter covers floor. Small pockets of standing air created by tree stands.	E	E	D	E	E	D	D	E	D	D	E	No
3	SK 69739 85020	Mound (orchids previously identified) gorse also have pollen opportunities, high levels of dead wood including large brash pile and scattered cut trunks, in clearing between plantation woodland. Low levels of connectivity through adjacent woodland. Reduced deadwood potential lowers to 'no further action" required compared to 2021.	C	D	C	E	E	D	C	E	D	D	E	No
4	SK 68931 84159	Large pile of wood surrounded by scrub and tall ruderals, this graduates to plantation woodland. Several small wood piles and one larger. Some small clearings likely to get sun. Likely to be ample nectar resource in summer months.	B	E	C	E	E	D	D	E	C	D	E	**Yes**

Parcel no.	Central Grid Reference	Parcel description	Letter Grades											Further Action
			HE1	HE2	HE3	HE4	HE5	HE6	HE7	HE8	HE9	HE10	HE11	
5	SK 68990 84547	Dense gorse adjacent improved field. Grassy clearings in scrub, grasses into woodland toward lake offsite. Likely high pollen resource in summer from ruderals and gorse.	D	D	D	E	E	D	D	D	D	D	E	No
6	SK 69911 84632	Deciduous woodland (willow dominated), leaf litter. Some pollen availability (orchids previously noted). Connected to similar habits and fenced so eco tone absent. understory with brash and grass cuttings and small stacks of decaying wood.	C	E	C	E	E	E	D	E	D	D	E	No
7	SK 68916 84023	Area of dense scrub at base of embankment. Good connectivity to woodland and scrub adjacent. Large woodpile surrounded by scrub and ruderal vegetation within dip, sheltering the area and making section of still air. Woodpiles likely created due to woodland management.	B	E	C	E	E	D	C	E	C	D	E	**Yes**
8	SK 68567 83533	Area of plantation coniferous woodland. Limited pollen resource, lot of dead wood on floor (otherwise understory limited). Still air created by shelter from bank and trees. Good connectivity to woodland and scrub (but not on Breedon site side).	C	E	D	E	E	E	C	D	D	D	E	No
9	SK 69659 85079	Plantation (young) woodland upon top of embankment. Areas of scrub, grassland and ruderals for pollen. Piles of brash and old hay bales, open grassland sections and unshaded areas of bare ground. Trees may provide wind break.	C	E	C	E	E	C	D	E	D	D	C	No
10	SK 69549 84801	Clearing in woodland with scattered scrub over SI grassland. Embankment creates still air. Bare ground around rabbit warrens.	E	E	D	E	E	D	D	D	D	D	D	No

Parcel no.	Central Grid Reference	Parcel description	Letter Grades											Further Action
			HE1	HE2	HE3	HE4	HE5	HE6	HE7	HE8	HE9	HE10	HE11	
11	SK 70082 85203	Cut logs and brash pile in field. Large amount of deadwood but signs of recent/regular log cutting, presumed for firewood. Limited connectivity, structural patchworks, or mosaic habitats. Not present during 2021 surveys (may be wood cleared from parcel 3).	C	E	D	E	E	E	D	D	E	E	E	No

Invertebrate Habitat Potential Parcel Photographs

Parcel no.	Central Grid Reference	Photographs
1	SK 70119 85412	  

Parcel no.	Central Grid Reference	Photographs
2	SK 70320 84955	 
3	SK 69739 85020	  

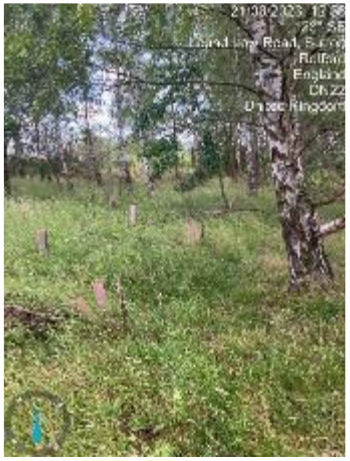
Parcel no.	Central Grid Reference	Photographs
4	SK 68931 84159	 
5	SK 68990 84547	  

Parcel no.	Central Grid Reference	Photographs
6	SK 69911 84632	No photos
7	SK 68916 84023	  

Parcel no.	Central Grid Reference	Photographs
8	SK 68567 83533	  
9	SK 69659 85079	 

Parcel no.	Central Grid Reference	Photographs
10	SK 69549 84801	 
11	SK 70082 85203	

APPENDIX D TARGET NOTES

No.	OS Grid Ref	Feature / Description	Photograph
1	SK 69755 85232	Pond 14. Limited visibility and no direct access due to emergent and bankside vegetation.	  
2	SK 69638 85104	Young broadleaved plantation woodland. Invertebrate habitat potential (IHP) parcel 9.	 

No.	OS Grid Ref	Feature / Description	Photograph
3	SK 69684 85028	Area of bare ground which is subject to disturbance and periodic inundation. Appears to be used for storage, e.g. bales of silage.	
4	SK 69742 85058	Area of bare and/or sparsely vegetated land with ruderal and scrub vegetation, and a large wood pile. Part of IHP parcel 3.	 

No.	OS Grid Ref	Feature / Description	Photograph
5	SK 70095 84737	Broadleaved woodland strip, viewed from within the 30 m survey buffer.	
6	SK 70325 84934	Broadleaved woodland and scrub, viewed from within the 30 m survey buffer. Part of IHP parcel 2.	  

No.	OS Grid Ref	Feature / Description	Photograph
7	SK 70369 85384	Ditch D2.	  
8	SK 70108 85197	Wood pile in corner of modified grassland field. IHP parcel 11.	

No.	OS Grid Ref	Feature / Description	Photograph
9	SK 70122 85418	Ditch D2 and associated broadleaved woodland strip. Part of IHP parcel 1.	  
10	SK 69687 84915	Rabbit warren in modified grassland field margin.	 

No.	OS Grid Ref	Feature / Description	Photograph
11	SK 69583 85131	Modified grassland.	 
12	SK 69563 85121	Embankment with other neutral grassland. Species poor hedgerow to the south of Lound Low Road in the background right.	

No.	OS Grid Ref	Feature / Description	Photograph
13	SK 69206 85094	Modified grassland and fenced broadleaved woodland strip, separating fields.	 
14	SK 69331 84953	Modified grassland and broadleaved woodland strip.	 

No.	OS Grid Ref	Feature / Description	Photograph
15	SK 69159 85076	Broadleaved woodland.	 
16	SK 69102 84958	Mixed scrub.	  

No.	OS Grid Ref	Feature / Description	Photograph
17	SK 69048 84696	Broadleaved woodland.	 
18	SK 69007 84544	Scattered mixed scrub within other neutral grassland.	  

No.	OS Grid Ref	Feature / Description	Photograph
19	SK 68977 84342	Other neutral grassland comprising ruderals and forbs with scattered mixed scrub.	 
20	SK 68981 84097	Early stage broadleaved woodland and scrub. Part of IHP parcel 4.	 

No.	OS Grid Ref	Feature / Description	Photograph
21	SK 68575 84157	Modified grassland.	
22	SK 68578 83915	Broadleaved woodland with mature and veteran trees.	

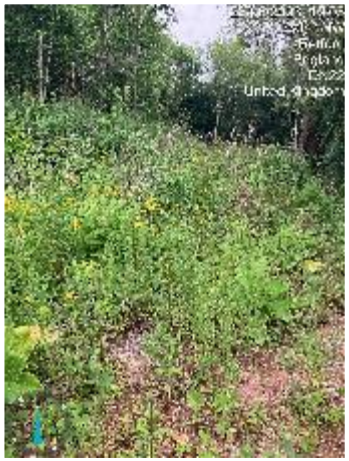
No.	OS Grid Ref	Feature / Description	Photograph
23	SK 68661 83929	Broadleaved woodland with mature and veteran trees.	
24	SK 68647 83912	Invasive non native species: Himalayan balsam.	

No.	OS Grid Ref	Feature / Description	Photograph
25	SK 68739 83885	Invasive non native species: Himalayan balsam.	 
26	SK 68937 83968	Broadleaved scrub, part of IHP 7.	 

No.	OS Grid Ref	Feature / Description	Photograph
27	SK 69260 84224	Broadleaved woodland edge from modified grassland fields. Part of Sutton and Lound Gravel Pits SSSI.	 
28	SK 69392 84489	Other neutral grassland, part of Sutton and Lound Gravel Pits SSSI. Displaying more floristic diversity than grazed grasslands within fields.	 

No.	OS Grid Ref	Feature / Description	Photograph
29	SK 69357 84669	Modified grassland. Fenced-off area used by North Notts. Model Flying Club for caravans and campervans and a mown take-off/landing strip.	
30	SK 68816 83227	Invasive non native species: Himalayan balsam.	no photo
31	SK 68694 83212	Ditch D4 at culvert under access road to Nottinghamshire Wildlife Trust's Idle Valley visitor centre.	  

No.	OS Grid Ref	Feature / Description	Photograph
32	SK 68585 83389	Area of hardstanding at Breedon Retford Concrete Plant.	 
33	SK 68601 83416	Ditch D3.	

No.	OS Grid Ref	Feature / Description	Photograph
34	SK 68589 83419	Area of bare ground and sparsely vegetated ground, including mounds of earth/aggregate and ruderal vegetation. Being used for HGV trailer storage at time of survey, with signs of heavy access and vehicle tracking. subject to periodic inundation, with ephemeral pools/puddles.	  
35	SK 68575 83460	Area of bare ground and sparsely vegetated ground, including ruderal vegetation.	  

No.	OS Grid Ref	Feature / Description	Photograph
36	SK 68597 83480	Ditch D3.	
37	SK 68584 83540	Invasive non native species: Himalayan balsam.	

No.	OS Grid Ref	Feature / Description	Photograph
38	SK 68583 83618	OHL Wayleave. Previously afforested but recently felled at time of the November 2022 survey, now revegetating with ruderal and forb vegetation.	 
39	SK 68565 83623	Invasive non native species: Japanese knotweed.	

No.	OS Grid Ref	Feature / Description	Photograph
40	SK 68491 83639	Gappy, species poor hedgerow.	 
41	SK 68533 83791	Gappy, species poor hedgerow.	

No.	OS Grid Ref	Feature / Description	Photograph
42	SK 68547 83802	Hedgerow with gaps, filled with bracken. Line of mixed trees in the background.	
43	SK 68488 83931	Line of mixed trees. Field margin with wildflower and meadow grassland species.	  

No.	OS Grid Ref	Feature / Description	Photograph
44	SK 68463 84060	OHL wayleave, revegetating with other neutral grassland, comprising mainly ruderal and early colonising species.	 

APPENDIX E SPECIES LIST

Common name	Scientific Name
alder	*Alnus glutinosa*
ash	*fraxinus excelsior*
bee orchid	*Ophyris apifera*
black medic	*Melilotus indicus*
blackthorn	*Prunus spinosa*
bracken	*Pteridium aquilinium*
bramble	*Rubus fruticosus*
broad leaved dock	*Rumex obtusifolius*
broom	*Cytisus scoparius*
cleavers	*Galium aparine*
cock's-foot	*Dactylis glomerata*
common nettle	*Urtica dioica*
creeping thistle	*Cirsium arvense*
crested dog's tail	*Cynosurus cristatus*
daffodil	*Narcissus pseudonarcissus*
dandelion	*Taraxicum officionale agg.*
dog rose	*Rosa canina*
elder	*Sambucus nigra*
pedunculate oak	*Quercus robur*
foxglove	*Digitalis purpurea*
goatsbeard	*Tragopogon pratensis*
gorse	*Ulex europaeus*
great reedmace	*Typha latifoli*
hawthorn	*Crataegus monogyna*
hazel	*Corylus avellana*
herb Robert	*Geranium robertianum*
Himalayan balsam	*Impatiens galndulifera*
hogweed	*Heracleum sphondulium*
oxeye daisy	*Leucanthemum vulgare*
meadow buttercup	*Ranunculus acris*
meadow cranesbill	*Geranium praetense*
perennial rye	*Lolium perenne*
perforate St. John's wort	*Hypericum perforatum*

poplar sp.	*Populus sp.*
ragwort	*Senecio jacobaea*
ribwort plantain	*Plantago lanceolata*
Scots pine	*Pinus sylvestris*
self heal	*Prunella vulgaris*
silver birch	*Betula pendula*
smooth meadowgrass	*Poa praetensis*
soft brome	*Bromus hordaeceus*
spear thistle	*Cirsium vulgare*
tufted vetch	*Vica cracca*
white clover	*Trifolium repens*
wild cherry	*Prunus avium*
yarrow	*Achillea millefolium*
Yorkshire fog	*Holcus lanatus*

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