# Appendix 13A: Ecological Baseline Report

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**TECHNICAL APPENDIX 13A**

# ECOLOGY AND NATURE CONSERVATION BASELINE DESCRIPTION

**HUMBER ZERO PHASE 1**

**FINAL**

**JANUARY 2023**

## DOCUMENT CONTROL

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# ECOLOGICAL BASELINE DESCRIPTION. HUMBER ZERO PHASE 1.

## 1 INTRODUCTION

1.1 This document provides an ecological baseline for the identification and assessment of potential impacts of the first phase of the Humber Zero project, namely: the proposed Post-Combustion Carbon Capture (PCC) developments located at VPI Immingham's Combined Heat and Power (CHP) Power Station Plant and Phillips 66 Ltd's Humber Refinery (hereafter referred to as 'the Proposed Development').

1.2 A single Environmental Statement is being prepared for two planning applications, one for Phillips66 and a second for VPI. There is a small degree of overlap between the two application areas but otherwise, they are described separately. The 'red-line boundary' for each is hereafter referred to as the 'Site'.

1.3 This document describes the survey methods used in determining the baseline followed by the results of the surveys together with an assessment of the ecological importance of each habitat/ species/community in relevant geographical contexts. The surveys have been designed to take particular account of habitats and species that are:

- Listed in Schedules 1, 5 and 9 of the Wildlife and Countryside Act 1981 (as amended).
- Covered by the Hedgerows Regulations 1997.
- Listed as Habitats and Species of Principal Importance by the Secretary of State in accordance with (S41) of the Natural Communities and Rural Environment Act 2006 (NERC).
- Listed in the Schedules of the Conservation of Habitats and Species Regulations 2017.

1.4 English names for species are used throughout the text with a full list of all species recorded from the Site, together with their scientific names, given in Appendix 13A.1. English and scientific names for higher plants are given according to Stace (Stace, 2019).

1.5 This document has been compiled by ESL (Ecological Services) Limited (ESL).

## 2 DESK STUDY

### 2.1 METHODS

2.1.1 The Natural England 'MAGIC' and 'Nature on the Map' websites were consulted to obtain information on any internationally protected sites and for citations of any Sites of Special Scientific Interest (SSSI) or National Nature Reserves (NNR) within 5km of the Site. Information was also sought on any Local Nature Reserves (LNR) within a 2km radius of the Site.

2.1.2 The Lincolnshire Environmental Records Centre (LERC) was asked to provide a data report on local sites of conservation interest including Local Wildlife Sites (LWS) and notable species within a 2km search area.

2.1.3 The desk study is common to both planning applications.

## 2.2 RESULTS

2.2.1 The LERC data search was provided on 20 July 2021 and is given as Appendix 13A.2. The results are summarised in Tables 1 and 2 below. Pre-2000 records have been screened out, as have records of such low resolution as to be of no use. For the purposes of this report, 'Important Species' are those:

- Having statutory protection under European or UK legislation.
- That are Species of Principal Importance listed in Section 41 of the NERC (formerly UK BAP species).
- Listed in the Vascular Plant Red List for England (Stroh *et al*., 2014).
- Listed within the Lincolnshire Biodiversity Action Plan (Greater Lincolnshire Nature Partnership, Revised 2015).

**TABLE 1. Designated sites within the search area.**

| Site Name/ Designation | Features of Interest | Distance from the Site |
|---|---|---|
| Humber Estuary European Marine Site (EMS), Special Protection Area (SPA), Special Area of Conservation (SAC) and Ramsar site. | A range of coastal habitats including mud and salt flats, lagoons, salt marshes and coastal sand dunes, which provide feeding and roosting opportunities for important numbers of waterbirds in non-breeding season. | 1.4 km east of the Site (at its nearest point). |
| North Killingholme Haven Pits SSSI, Lincolnshire Wildlife Trust (LWT) site. | A complex of flooded clay pits; it is an important saline lagoon supporting several rare invertebrate and bird species. | 2.4 km north of the Site. |
| Rosper Road Pools LWS. | A large area of open water and associated edge habitat, possessing recently constructed islands, it supports many breeding and wintering birds. | 75m to the east of the Site (at its nearest point). |
| Station Road Field LWS. | A long, narrow site comprising mainly grazed grassland with an abundance selection of neutral and calcareous herbs, together with a couple of ponds. | 4.7km northwest. |
| Burkinshaw's Covert LWS. | A large area of woodland comprising older and more recent areas of plantation. Open and/or wet habitats provide good botanical interest. | 660m northwest. |
| Homestead Park Pond LWS. | A large angling pond surrounded by scrubby embankments that also provides neutral grassland interest. | 1.49m southeast. |
| Mayflower Wood Meadow LWS. | A small area of ridge-and-furrow unimproved neutral grassland. | 1.68km southwest. |

| Site Name/ Designation | Features of Interest | Distance from the Site |
|---|---|---|
| Eastfield Road Railway Embankment LWS, LWT. | A small nature reserve on the northern side of the railway line with sheltered, botanically-rich woodland glades. | 1.6km west. |
| Chase Hill Wood LWS. | Woodland comprising mainly semi-mature, even-aged canopy trees but a rich ground flora provided by the minimal ride system and glades. | 1.87km northwest. |

**TABLE 2. Important species within the search area.**

| Species/Group | Proximity to the Site |
|---|---|
| 31 records for great crested newt, 2000-2020. | Populations recorded over 1km to the northwest in North Killingholme and southwest around Mayflower wood. |
| Nine records for common toad, 2007-2016. | Closest records being from Rosper Road Pools. |
| 27 records for badger, 2002-2020. | Regular records from Burkinshaw's Covert. Closest sett record from 2009 within same 1km grid square as the Site (exact location not provided). |
| 50 records for water vole, 2000-2018. | Regular records from Rosper Road Pools and occasional from various drains along the south, east and west of the Site provided until 2011. |
| 37 records for four species of bat and one roost record for common pipistrelle, 2009-2018. | Roost record from South Killingholme. Occasional records of common pipistrelle and noctule within the vicinity and south of the Site. |
| 643 records for 50 bird species, 2000-2019. | Large number of records for various protected and priority species provided for Rosper Road Pools. |
| 18 records for protected and priority invertebrates, consisting of six species of butterflies and moths, 2000-2016. | Closest records being small heath and wall from Rosper Road Pools. White-letter hairstreak recorded at Station Road Field. |

## 2.3 ASSESSMENT OF IMPORTANCE

2.3.1 The importance of sites with statutory or non-statutory protection and of species pertinent to each Proposed Development is discussed in in the following sections.

## 2.4 SURVEY SCOPE

**Local authority scoping opinion.**

2.4.1 A scoping opinion was received from North Lincolnshire Council on 22 March 2022, which states with regard to ecology and nature conservation that:

'*Having considered this section of the report, the Natural Environment Policy Specialist has been consulted. In summary, the approach is broadly supported. As described in the report, the applicant(s) should provide the information reasonably required for a Habitats Regulations Assessment. In this case, the information required will include, but not be limited to*':

- A plan, in Shapefile, PDF or JPEG format, showing the location of the proposals in relation to the boundaries of the Humber Estuary SAC, SPA and Ramsar site.
- A habitat survey of the application site and surrounding areas, with particular reference to habitat features that may support breeding, wintering or passage birds associated with the Humber Estuary SPA and Ramsar site.
- Recent wintering and passage survey information sufficient to assess the usage of the application site, surrounding area and adjacent SSSI units by birds associated with the Humber Estuary SPA and Ramsar site.
- Details of any aerial or waterborne emissions and any impact pathways in relation to the Humber Estuary SAC, SPA and Ramsar site.

2.4.2 The opinion goes on to state that '*Furthermore, the EA agree that ecology and nature conservation should be scoped into the assessment and welcome the commitment to providing 10% biodiversity net gain. We have no further comments at this stage'*.

**Phillips 66 site.**

2.4.3 Having reviewed the scoping response, desk study information and undertaken a walkover of the Site, the only topics considered a material consideration are:

- Habitats and plant species (including non-native invasive species).
- Breeding birds.

**VPI site.**

2.4.4 The VPI site comprises a mosaic of habitats suitable for use by a range of species. Potential use of the Site by wintering birds is considered in the Habitats Regulations Assessment (HRA). Having reviewed the scoping response, desk study information and undertaken a walkover of the Site, the only topics considered a material consideration are:

- Habitats and plant species (including non-native invasive species).
- Invertebrates.
- Great crested newts.
- Reptiles.
- Breeding birds.
- Wintering and passage birds.
- Bats.
- Badgers.
- Water voles.
- Otters.

2.4.5 For both Sites, all other groups/species have been scoped out of the assessment due to:

- An absence of suitable habitat to support a viable population.
- The Site being beyond their known distribution range.

- The species, even if present, being likely resilient to any effects of the scheme or any effect being negligible.

2.4.6 Where the two application areas overlap along the wooded railway corridor, there is the potential for each scheme to have an adverse effect on the same breeding bird assemblage. For assessment purposes, the species assemblage recorded using this habitat is considered an important ecological feature of both Sites.

# 3 HABITATS, PLANT COMMUNITIES AND SPECIES

## 3.1 METHODS

3.1.1 A Preliminary Ecological Appraisal (PEA) was undertaken in June 2021 and was updated in November 2021 by ESL Senior Ecologist Luke Hartley ACIEEM. All habitats and plant communities within the Site were mapped and characterised by identifying the dominant and typical species; they are described using the UK Habitat Classification System (Butcher *et al.,* 2020). All hedgerows were assessed for importance as defined by the Hedgerow Regulations and all habitats present were also assessed for their suitability for use by a range of protected species. Photographs were taken of representative habitats and features of interest.

3.1.2 The PEA was updated on subsequent visits with a focus on identifying important plant species and communities (especially within the grassland habitats) and the update included small additional areas in response to changes to the Site boundary. A search was also made for any non-native invasive plant species such as Japanese knotweed.

3.1.3 A qualitative assessment of the habitat condition was made using the data collected for the assessment of Biodiversity Net Gain (BNG). The assessments are presented as standalone reports.

## 3.2 RESULTS - PHILLIPS 66 SITE

**Overview.**

3.2.1 Most of the Site lies within current operational areas. There is overlap with the VPI site on the northeast side of the railway corridor, which is described in Section 3.3. Habitats are illustrated in Figure 13.1.

**Developed land; sealed surface (u1b).**

3.2.2 Operational areas are dominated by buildings, refinery infrastructure and hardstanding. Limited disturbed ground vegetation such as bramble scrub and very young self-set saplings is present around the periphery of the Site and in areas used for temporary materials storage.

**Artificial unvegetated, unsealed surface (u1c): Ruderal/ephemeral [17].**

3.2.3 The northern edge of the operational areas is bound by the railway corridor, which contains areas of ballast with sparse, low-growing ruderals.

**Other woodland; broadleaved (w1g).**

3.2.4 Along either side of the railway, on the railway embankments, is a broadleaved woodland with a canopy dominated by ash. Occasional elder are also present, with very sparse ground flora.

**Hedgerow (priority habitat) (h2a).**

3.2.5 The western Site boundary along Eastfield Road comprises an unmanaged hawthorn hedgerow approximately 4m wide and 4m tall featuring abundant hawthorn with occasional cherry and dog rose. Bramble runs along the road-verge side of the hedgerow.

**Non-native invasive plants.**

3.2.6 No invasive, non-native plant species were recorded on the Site.

## 3.3 RESULTS – VPI SITE

**Overview.**

3.3.1 The VPI scheme comprises the VPI operational facility and a large area to the south, which comprises a mosaic of habitat types as illustrated in Figure 13.2 (Photographs 1 and 2).

**Photograph 1.** Drone capture of the Site looking east with VPI on the left and the Site to the right. The habitat mosaics and Internal Drainage Board (IDB) drain through the Site are clearly visible (the lighter band is a mown access track alongside the southern side of IDB drain).

**Photograph 2.** Drone capture of the area south of VPI looking northwest towards the tree-lined railway corridor that separates the two Sites with Phillips 66 beyond.

**Modified grassland (g4).**

3.3.2 The most abundant habitat on the Site is nutrient-rich and species-poor grassland dominated by coarse grasses and rushes (Photograph 3). This includes areas of false oat-grass grassland, tufted hair-grass grassland, stands of common reed, mosaics of dominant club rush, hard rush or common spike rush and tall herb dominated areas that include species such as great willowherb, creeping thistle and common nettle.

3.3.3 Towards the south, the sward is more open and supports Yorkshire fog, tufted hair-grass, teasel, creeping thistle, creeping buttercup and silverweed, together with occasional other fine grasses, common herbs and patches of bare ground.

**Other neutral grassland (g3c).**

3.3.4 Along the south-eastern boundary of the Site, where more recent disturbance has likely occurred during the construction of the adjacent road, the grassland is relatively open, free-draining and diverse, with grasses such as frequent Yorkshire fog and occasional crested dog's-tail and cock's-foot. Herbs include frequent black medic, oxeye daisy and common bird's-foot trefoil, together with occasional yarrow, common knapweed, selfheal, lady's bedstraw, common daisy, common spotted orchid and yellow-wort (Photograph 4).

**Photograph 3.** Typical view of single-species dominated grassland.

**Photograph 4.** More open and herb-rich sward towards the south of the Site.

**Open Mosaic Habitats on Previously Developed Land (u1a).**

3.3.5 Immediately to the south of the VPI facility is a large area of broken ground that is developing a range of early successional habitats (Photograph 5). For the most part, this area comprises an unvegetated gravelled substrate but areas of floral interest include species such common spotted orchid, southern marsh orchid, yellow-wort, mouse-ear hawkweed, common centaury, hare's-foot clover and fern grass, as well as frequent non-natives such as narrow-leaved ragwort. Self-set silver birch and willow scrub is present in the south-eastern corner (Photograph 6).

3.3.6 The topography is flat with little-to-no variation, which limits the availability of niches associated with more ecologically valuable brownfield land. As a result, areas of standing water or wet ground are likely to be transient.

**Photograph 5.** Typical view of the open mosaic habitat (OMH), showing much bare substrate and flat topography.

**Photograph 6.** Area of OHM with young scrub, and early successional communities.

**Bramble scrub (h3d).**

3.3.7 Another dominating feature is bramble scrub, which forms large areas of homogenous coverage as well as being a common secondary feature of other habitat types (Photograph 7 below).

**Mixed scrub (h3h).**

3.3.8 Small parcels of species-poor mixed scrub are scattered throughout the Site and comprise predominantly hawthorn and bramble with occasional dog rose and goat willow (Photograph 8).

**Photograph 7.** Low-growing dominant bramble scrub areas.

**Photograph 8.** Transition between dominant rushes, bramble and scattered hawthorn scrub.

**Other woodland; broadleaved (w1g).**

3.3.9 A strip of broadleaved woodland comprising young hawthorn, ash, goat willow and elder runs along the railway (Section 3.2.5), encroaching into the southwest of the VPI site.

**Eutrophic standing waters (r1a): Freshwater – man-made [39], Ditch [191].**

3.3.10 An open IDB drain runs through the Site west to east and is culverted under Rosper Road (Photograph 9). The drain carries waste effluent from the adjacent operational facilities and is highly nutrient-enriched. Aquatic and marginal vegetation is limited to fennel-leaved pondweed and fool's watercress. Bankside vegetation comprises tall herbs to both banks and mixed scrub on the north bank (Photograph 10).

**Photograph 9.** View of the IDB drain from Rosper Road looking west.

**Photograph 10.** IDB drain section with scrub-lined northern bank.

**Developed land; sealed surface (u1b).**

3.3.11 VPI operational areas comprise buildings, process infrastructure and hardstanding.

**Non-native invasive plants.**

3.3.12 No invasive, non-native plant species were recorded on Site.

### 3.4 ASSESSMENT OF IMPORTANCE

**Both sites.**

3.4.1 No nationally rare or nationally scarce plant species, defined by Wigginton (1999) and Stewart, Pearman and Preston (1994) respectively and no S41 Species or Lincolnshire Biodiversity Action Plan Priority Species were recorded from the Site. No non-native invasive plant species was recorded on either Site.

**Phillips 66 site.**

3.4.2 The hedgerow on Eastfield Road does not qualify as 'Important' under the Hedgerow Regulations 1997 but all non-ornamental hedgerows are designated as S41 Habitats of Principle Importance under NERC.

**VPI site.**

3.4.3 The only plant species recorded on Site listed above the 'Least Concern' threat level in the British Red Data Book (Stroh *et al*., 2014) is common cudweed. This is found in two general locations south of the VPI operational facility: along the fence-line that separates the area of open mosaic habitats on previously developed land with further habitat to the south and within the gravelled track that runs parallel with the IDB drain.

## 4 INVERTEBRATES

### 4.1 DESK STUDY

4.1.1 Eighteen records were provided for protected and priority invertebrates, the most notable being for small heath and wall butterflies from Rosper Road Pools and white-letter hairstreak recorded at Station Road Field.

### 4.2 METHODS

**Invertebrate scoping assessment.**

4.2.1 An invertebrate scoping assessment was undertaken by experienced entomologist Andy Jukes MCIEEM FRES of Conops Entomology Ltd. The aim of the assessment was to appraise the key habitats and/or features of the Site and to assess their suitability and quality to support:

- Rich and varied invertebrate assemblages.
- Species of Principal Importance.

- Species with a nationally-significant status such as those listed in the Red Data Book.

4.2.2 All areas of the Site were walked-over on 9 July 2021 in sunny weather (ca.20–22°C) and appraised for features of potential value for supporting key species (including NERC, S41, Red Data Book or nationally scarce and species of interest) or rich assemblages of invertebrates. Any such areas were photographed and used as evidence in the evaluation. The Site was also assessed based on the quality, frequency and footprint of the key features or the juxtaposition of any features to one another (mosaics).

**Dingy skipper and wall brown butterfly assessment.**

4.2.3 As a result of the initial scoping assessment, a follow-up site visit was made on 23 May 2022 in warm and sunny conditions (16–18°C) to determine whether habitats on Site supported colonies of dingy skipper and wall brown butterflies, both of which are S41 species. The survey comprised an initial walkover of all areas to locate any new suitable breeding habitat for the dingy skipper and wall brown. Following the identification of key areas, a series of transect walks covering each area was conducted at least twice during the visit. Any other notable (S41) butterfly species were also noted during the transect walks.

## 4.3 RESULTS

**Invertebrate scoping assessment.**

4.3.1 The Site is described as three compartments as shown on Photograph 11:

- Northern Compartment.
- Southern Compartment (West).
- Southern Compartment (East).

4.3.2 The Northern Compartment is primarily an area of open gravels over compacted substrates that have been partly succeeded by early successional vegetation. There are areas of scrub around the boundary of the compartment. This boundary scrub is dominated by goat willow with lesser amounts of hawthorn. The ground flora is varied and extensive including ragworts, yellow composites and trefoils. There are small areas of inundation creating shallow ephemeral pools with muddy margins.


**Photograph 11.** Aerial photograph showing the invertebrate survey compartments.

4.3.3 The Southern Compartment (West) is dominated by tall grassland comprising tufted hair-grass both south and north of the drain. This sward is dense and is therefore not diverse with other flora, particularly flowering plants, other than stands of bramble and ruderals. There is a small area of short sward and bare ground at the western boundary of the compartment. This is complimented by a scrub fringe and an elevated microclimate created by the tall scrub. The drain appears trapezoidal in cross-section, straight and although it has aquatic plants, there are external influences entering the water causing nutrient enrichment (Photograph 12). North of the drain, the habitat is similar to the rest of the compartment, being dominated by tufted hair-grass but with more scrub than the grassland south of the drain.

4.3.4 The Southern Compartment (East) consists of what appears to be a former track and area of recent disturbance, which has given rise to short, sparse vegetation. It is represented by species typical of well-drained and low nutrient sites such as common bird's-foot trefoil. Other plants present include common fleabane, silverweed, yellow-wort and yellow composites. Patchy bare ground and fine-leaved grasses contribute to the overall mosaic in this compartment. Adding to this mosaic are areas of mature goat willow scrub fringe, hawthorn, bramble thickets and on damper ground, club-rush (Photograph 13).

**Photograph 12.** View of drain showing straight character.

**Photograph 13.** View showing interfaces between features on Southern Compartment (West).

**Dingy skipper and wall brown butterfly assessment.**

4.3.5 The visit on 23 May 2022 during optimal dingy skipper and wall butterfly flight conditions did not identify any individuals in either compartment.

4.3.6 The Southern Compartment (East) has matured since an initial scoping visit in 2021 and no longer offers open, patchy bare ground, short, fine-leaved swards or bird's-foot trefoil, indicative of a wall and dingy skipper habitat. Furthermore, suitable habitat for dingy skipper in the Northern Compartment is very small and partly dependent on the Southern Compartment (East).

4.3.7 Habitat for the wall butterfly is evident in the Southern Compartment (East), in that it comprises grassland with noted larval plant preferences but the general closed-sward character of the grassland is not optimal for the species. The Northern Compartment has few grasses and is not conducive for the larval stages of this butterfly.

4.3.8 Other species recorded during the May 2022 visit are listed in Table 3.

**TABLE 3. Invertebrate species recorded during the site visit on 23 May 2022.**

| Vernacular name | Scientific name | UK Status |
|---|---|---|
| Cinnabar moth | *Tyria jacobaeae* | NERC S41 (research only). |
| Common blue | *Polyommatus icarus* | |
| Drinker moth (caterpillar) | *Euthrix potatoria* | |
| Lackey moth (caterpillar) | *Malacomsoma neustria* | |
| Mother Shipton | *Callistege mi* | |
| Painted lady | *Vanessa cardui* | |
| Peacock | *Aglais io* | |
| Small heath | *Coenonympha pamphilus* | NERC S41. |

| Vernacular name | Scientific name | UK Status |
|---|---|---|
| Small tortoiseshell | *Aglais urticae* | |
| Small white | *Pieris rapae* | |

### 4.4 ASSESSMENT OF IMPORTANCE

4.4.1 Although no site is devoid of invertebrate interest, owing to a lack of niches and variation in habitat and features, the Southern Compartment (West), being a largely homogenous sward, holds few opportunities for a rich invertebrate assemblage or scarce species.

4.4.2 The rest of the site, both the Northern Compartment and Southern Compartment (East), comprise mosaics that suggest at least a moderate invertebrate assemblage could be present, although it is considered unlikely the Site supports permanent colonies of either dingy skipper or wall butterfly.

4.4.3 The only species of particular note is the small heath butterfly (an S41 species), which appears to be doing well on the Site, specifically in the Southern Compartment (East). Due to its S41 status, small heath is considered an important ecological feature of the Site.

## 5 AMPHIBIANS GREAT CRESTED NEWT

### 5.1 DESK STUDY

5.1.1 Greater Lincolnshire Nature Partnership (GLNP) provided almost 280 records for amphibians within the search area, including over 100 for great crested newt (GCN), many in the last 10 years. Whilst the resolution of these records was low, it is clear that when overlaid on an OS map, many are duplicate entries for the same ponds, often in multiple different years.

5.1.2 The closest records for GCN were from ponds off Station Road, approximately 1.1km north of the Site however, in 2015, the population was translocated to a new receptor area in a small triangular portion of land off Rosper Road adjacent to Chase Hill Wood, 2.2km northwest of Site, under Natural England licence number 2014-1559-EPS-MIT GCN.

5.1.3 On 16 April 2018, AECOM ecologists sent water samples from five waterbodies on the VPI site to a laboratory to test for the presence of GCN eDNA as part of an unrelated project. All samples returned a negative result for GCNs. A sixth pond (Pond 3) cited as '*a TLOR settling pond for contaminated run-off*' was scoped out of the assessment. The results are given in Table 4 and are shown on Figure 13.3.

**TABLE 4. GCN eDNA and HSI survey results of waterbodies on or near VPI land in 2018.**

| Pond Ref | Pond Type | Grid Reference | HSI Score | eDNA Result |
|---|---|---|---|---|
| 1 | Flooded part of Site. | TA 167 175 | Excellent. | Negative. |
| 2 | Flooded part of Site. | TA 168 174 | Good. | Negative. |
| 3 | TLOR process lagoon. | TA 164 173 | Good. | Not sampled. |
| 4 | Flooded part of Site. | TA 166 174 | Average. | Negative. |
| 5 | Flooded archaeology trial trench. | TA 166 174 | Below average. | Negative. |
| 6 | Flooded archaeology trial trench. | TA 165 173 | Poor. | Negative. |

5.1.4 There are numerous records for toads (an S41 species), the closest being Rosper Road Pools 100m east of the Site from 2009.

## 5.2 CONSERVATION STATUS

5.2.1 In England, Scotland and Wales, GCNs are fully protected under the Wildlife and Countryside Act 1981 (as amended), including by the Countryside and Rights of Way Act, 2000 (CRoW). They are also protected under European legislation, being included on Schedule 2 of the Conservation of Habitats and Species Regulations 2017. Taken together, this legislation makes it illegal, *inter alia*, to:

- Intentionally or recklessly kill, injure or capture a GCN.
- Damage or destroy habitat that a GCN uses for shelter or protection.
- Deliberately disturb a GCN when it is occupying a place it uses for shelter and protection.

5.2.2 These provisions apply to all life-stages of protected animals and in the case of amphibians, to both their terrestrial and aquatic habitats.

5.2.3 GCNs have been adopted as a Species of Principal Importance in England under Section 41 NERC.

## 5.3 METHODS

5.3.1 Aerial imagery and Ordnance Survey maps were used to identify the locations of any waterbodies with suitable habitat connectivity to the Site. Each waterbody was then located on the ground and assessed for its potential to support amphibians. Process lagoons within operational areas of the Phillips 66 Humber Refinery were scoped out of the assessment due to their water chemistry being incompatible with higher forms of aquatic life (J Sutcliffe, *pers. comm.*).

5.3.2 At the time the survey scope was being designed, land to the east of Rosper Road was under consideration for a separate project and although some of the waterbodies could have been scoped out of the Humber Zero assessment, they have been left in to provide confidence in the

results over a wider area. The waterbody locations are shown on Figure 13.3. As there are no suitable waterbodies on the Site, the amphibian assessment was limited to determining the presence of GCNs.

**Habitat Suitability Index.**

5.3.3 A quantitative measure of all waterbodies' suitability for GCNs was made using the Habitat Suitability Index (HSI) endorsed by Natural England (Oldham *et al*., 2000). The ten variables evaluated take into account the aquatic habitat, the surrounding terrestrial habitat and local pond density, providing a score considered likely to reflect overall habitat quality. The HSI was undertaken on 17 May 2021.

**eDNA screening for GCN.**

5.3.4 Water samples were taken from six waterbodies on 17 May 2021 by David Hughes Natural England GCN survey licence No. 2015-17306-CLS-CLS (CL08) in strict accordance with the field protocol approved by Natural England (Biggs *et al*., 2014). The samples were sent to SureScreen Scientific to be analysed for the presence of GCN eDNA.

## 5.4 RESULTS

**HSI and eDNA screening for GCN.**

5.4.1 All six water samples passed the quality assurance thresholds for testing and all six returned a negative result for GCN eDNA. The full Technical Report from SureScreen is provided in Appendix 13A.3. The waterbody numbers, types, locations and HSI for each are given in Table 5.

**TABLE 5. GCN eDNA and HSI survey results of waterbodies in 2021.**

| Pond Ref. | Pond Type | Grid Reference | HSI Score | eDNA Result |
|---|---|---|---|---|
| 1 | Highway surface water attenuation pond. | TA 17182 16876 | Average. | Negative. |
| 2 | Pond in Rosper Road Pools complex. | TA 17240 16920 | Excellent. | Negative. |
| 3 | Pond in Rosper Road Pools complex. | TA 17269 16908 | Excellent. | Negative. |
| 4 | Non-flowing ditches (effectively linear ponds). | TA 17353 17145 | Average. | Negative. |
| 5 | Non-flowing ditches (effectively linear ponds). | TA 17614 17179 | Average. | Negative. |
| 6 | Phillips 66 process waterbody on Marsh Lane. | TA 17737 17492 | Poor. | Negative. |

### 5.5 ASSESSMENT OF IMPORTANCE

5.5.1 The majority of GCN records in the search area have probably originated from ecological consultants undertaking surveys in accordance with published guidelines to inform planning applications. As a result, they are likely reliable and provide an accurate indicator of GCN distribution in the local area.

5.5.2 The eDNA results from 2021 (and 2018) confirm GCNs are absent from all suitable waterbodies with habitat connectivity to the Site. GCNs are therefore not considered an important ecological feature of the Site.

## 6 REPTILES

### 6.1 DESK STUDY

6.1.1 GLNP provided four reptile records for the search area; three for grass snake and one for slow worm, all from 1977 and at 1km resolution.

6.1.2 No reptiles were recorded during a standard seven-visit presence/absence reptile survey of the adjacent VPI site by AECOM ecologists in 2018.

### 6.2 CONSERVATION STATUS

6.2.1 All four of the more widespread species of native reptiles, that is, common lizard, grass snake, slow worm and adder are given partial protection under the Wildlife and Countryside Act 1981 (as amended), which prohibits, *inter alia*, the intentional killing, injuring or taking of any of these species. The habitats of common reptile species are not protected under this Act and the animals are also not protected from disturbance whilst occupying their habitat.

6.2.2 There is no provision in the Act for licensing works that could give rise to an offence but it does provide a defence where it can be shown that the otherwise unlawful act was the incidental result of a lawful operation and that it could not reasonably have been avoided. Permitted development or a development that has received planning permission is clearly a lawful activity but the law thus requires that a reasonable effort be made to avoid killing or injuring protected animals in the course of implementing this permission.

6.2.3 Releasing reptiles into unsuitable habitat could constitute an offence under the Animal Welfare Act 2006.

## 6.3 METHODS

**Artificial Cover Objects and direct observation.**

6.3.1 One-hundred and eleven Artificial Cover Objects (0.5m² black corrugated bitumen sheets often called 'tins') were placed in areas of suitable reptile habitat to determine the presence of any reptiles on the Site, with the distribution illustrated on Figure 13.4. Reptiles will use both the upper surface of the tins and the space underneath them as part of their thermoregulatory behaviour, absorbing heat either directly or by conduction. The tins were placed in both exposed and more sheltered locations including the banks of the IDB drain, the pipe-racks and areas of bramble scrub in order to sample various habitat types under different conditions (Gent and Gibson, 2003).

6.3.2 Each tin was inspected seven times in weather conditions when any reptile species present could reasonably be expected to be active (English Nature, 1994). In addition, direct observation of areas of suitable habitat was carried out on subsequent site visits in an attempt to locate any reptiles basking or foraging in open areas (HGBI, 1998). The survey dates and weather conditions are given in Table 6.

**TABLE 6. Survey dates and weather conditions.**

| Visit No. | Date | Survey times | Weather Conditions |
|---|---|---|---|
| 1 | 22/06/2021 | 07:00-07:50 | Dry, sunny, moderate breeze 1/3 cloud, 12°C. |
| 2 | 29/06/2021 | 07:00-08:00 | Overcast but warm, c.14°C with light drizzle. |
| 3 | 09/07/2021 | 09:00-10:30 | Dry, sunny spells ca.17-20°C. |
| 4 | 21/07/2021 | 09:15-10:05 | Dry warm light breeze, ca.20°C. |
| 5 | 24/08/2021 | 13:00-14:10 | Dry warm but overcast, ca.21°C. |
| 6 | 17/09/2021 | 12;30-13:45 | Dry warm, ca.17°C. |
| 7 | 24/09/2021 | | Dry warm but breezy, ca.19°C. |

## 6.4 RESULTS

6.4.1 No reptiles were found on or under any tin and none was seen by direct observation.

## 6.5 ASSESSMENT OF IMPORTANCE

6.5.1 The Site survey in 2022 and the survey on VPI land in 2018 were both undertaken using the same standard methods and in suitable weather conditions; both failed to detect any reptiles. This, combined with the absence of local records, indicates reptiles are not an important ecological feature of the Site.

# 7 BREEDING BIRDS

## 7.1 DESK STUDY

7.1.1 GLNP provided 10,449 bird records for the search area from 1997-2017. Considering the amount of commercial survey work that has been undertaken in the area since 2017, more records are likely to exist. The majority of records are associated with statutory sites including The Humber Estuary EMS, Killingholme Haven Pits SSSI and Rosper Road Pools LWS but others originate from commercial survey work.

## 7.2 CONSERVATION STATUS

7.2.1 The Wildlife and Countryside Act 1981 (as amended) protects all wild birds, their nests and eggs. Under this Act it is an offence to:

- Kill, injure or take any wild bird.
- Take, damage or destroy the nest of any wild bird while it is in use or being built.
- Take or destroy the egg of any wild bird.

7.2.2 Bird nesting sites are not themselves protected when not in use and the common species are not protected from disturbance whilst occupying their nest-sites however, certain rare breeding birds, listed on Schedule-1 of the Act (e.g., barn owls) are also protected against disturbance whilst building a nest or on or near a nest containing eggs or young.

7.2.3 A number of species are listed as Species of Principal Importance in England under Section 41 of NERC.

## 7.3 METHODS

7.3.1 Six breeding bird survey visits were made to all the different habitats on Site by experience ornithologist Brian Hedley MCIEEM CEnv during spring/early summer 2022 to record and map all birds seen or heard, using Common Bird Census (CBC) species codes and activity symbols (Marchant, 1983). Survey start and finish times varied but all surveys were carried out in the period 05:50-09:00hrs. Survey route, direction walked and sources of disturbance were recorded on the fieldwork maps to aid analysis. Species using the boundary features of the Site are included within the totals as they could be affected by the development proposals. Survey dates, times and weather conditions are shown in Table 7 (below).

7.3.2 Casual records of notable bird species were made on other Site visits including any barn owl sightings during the evening bat surveys.

**TABLE 7. Breeding bird survey dates, times and weather conditions.**

| Visit No. | Date | Survey times (sunrise) | Weather Conditions |
|---|---|---|---|
| 1 | 11/04/2022 | 06:55-10:00 (06:11) | Mainly sunny (2/8-3/8 cloud), dry, 6-8ºC. F2-3 E-SE wind. |
| 2 | 22/04/2022 | 06:40-10:00 (05:46) | Mainly sunny (2/8-4/8 cloud), dry, 9-12ºC. F2-3 NE wind. |
| 3 | 09/05/2022 | 06:00-09:05 (05:13) | Sunny (2/8 cloud), dry, 7-12ºC. F2-3 S wind. |
| 4 | 25/05/2022 | 05:45-09:10 (04:46) | Mainly overcast (6/8-7/8 cloud), occ. light rain, 10-14ºC. F3 SW wind. |
| 5 | 08/06/2022 | 05:30-08:40 (04:33) | Mainly overcast (7/8-8/8 cloud), frequent light rain, occ. sunny spells, 13-14ºC. F2 S-SE wind. |
| 6 | 20/06/2022 | 05:30-09:00 (04:31) | Overcast at first then sunny (1/8-7/8 cloud), dry, 10-15ºC. F2-3 NW wind. |

## 7.4 RESULTS

7.4.1 Thirty-six bird species were recorded using the Site during the six breeding bird survey visits in 2022, which reflects the variety of habitats present. This list included two Schedule-1 species: little ringed plover (which was recorded breeding on Site) and fieldfare (a winter visitor), which was using the Site for foraging.

7.4.2 Seven S41 Species of Principal Importance were recorded, namely lapwing, skylark, song thrush, dunnock, bullfinch, linnet and reed bunting. There is suitable breeding habitat within the Site for all seven species.

7.4.3 Six Red List species (Eaton *et al*., 2015) were recorded during the surveys, namely lapwing, skylark, fieldfare, song thrush, bullfinch and linnet. Fourteen Amber List species were recorded, namely mallard, stock dove, wood pigeon, snipe, sparrowhawk, kestrel, sedge warbler, whitethroat, wren, wheatear, dunnock, grey wagtail, meadow pipit and reed bunting. Some/most of these Red and Amber listed species have suitable nesting habitat within the Site.

7.4.4 The numbers of each species considered as confirmed, probable or possible breeders recorded on each visit are given in Table 8. Some species considered to be using the Site for feeding or simply passing through as migrants are omitted from this table.

**TABLE 8. Numbers of confirmed, probable or possible breeding birds recorded on Site during the 2022 breeding bird survey.**

| Species | Survey dates | | | | | | Likely No. of pairs |
|---|---|---|---|---|---|---|---|
| | Visit 1 11/04/'22 | Visit 2 22/04/'22 | Visit 3 09/05/'22 | Visit 4 25/05/'22 | Visit 5 08/06/'22 | Visit 6 20/06/'22 | |
| Mallard** | 0 | 4 | 1 | 0 | 0 | 0 | 1 |
| Kestrel** | 1 | 0 | 0 | 1 | 1 | 0 | 0 |

| Species | Survey dates | | | | | | Likely No. of pairs |
|---|---|---|---|---|---|---|---|
| | Visit 1 11/04/'22 | Visit 2 22/04/'22 | Visit 3 09/05/'22 | Visit 4 25/05/'22 | Visit 5 08/06/'22 | Visit 6 20/06/'22 | |
| Little egret | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Sparrow hawk** | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Pheasant | 1 | 1 | 0 | 2 | 2 | 3 | 1 |
| LITTLE RINGED PLOVER | 0 | 2 | 1 | 1 | 0 | 0 | 1 |
| **Lapwing*** | 3 | 4 | 4 | 3 | 2 | 3 | 2 |
| Snipe** | 5 | 2 | 0 | 0 | 0 | 0 | 0 |
| Woodpigeon** | 3 | 2 | 2 | 1 | 0 | 7 | 2-3 |
| Stock dove** | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Skylark*** | 0 | 0 | 2 | 0 | 1 | 2 | 1-2 |
| Meadow pipit** | 2 | 0 | 0 | 1 | 0 | 0 | 1? |
| Chaffinch | 0 | 1 | 0 | 1 | 0 | 0 | 0 |
| Pied wagtail | 1 | 1 | 1 | 1 | 0 | 1 | 1 |
| Grey wagtail** | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Wren** | 9 | 4 | 5 | 9 | 7 | 8 | 6-8 |
| **Dunnock**** | 4 | 1 | 3 | 3 | 2 | 1 | 1-2 |
| Robin | 1 | 0 | 0 | 1 | 1 | 0 | 1 |
| Wheatear** | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Blackbird | 2 | 1 | 0 | 1 | 0 | 3 | 1-2 |
| **Song thrush*** | 0 | 1 | 0 | 1 | 0 | 0 | 1? |
| Blackcap | 1 | 0 | 1 | 0 | 1 | 1 | 1 |
| Lesser whitethroat | 0 | 0 | 0 | 1 | 0 | 2 | 1 |
| Whitethroat** | 0 | 1 | 5 | 3 | 2 | 5 | 2 |
| Chiffchaff | 4 | 1 | 1 | 1 | 0 | 0 | 1 |
| Reed warbler | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Sedge warbler** | 0 | 3 | 5 | 6 | 3 | 5 | 2-3 |
| Long-tailed tit | 0 | 2 | 0 | 3 | 0 | 0 | 1? |
| Great tit | 3 | 0 | 0 | 0 | 0 | 2 | 0 |
| Blue tit | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Carrion Crow | 1 | 3 | 1 | 2 | 1 | 0 | 1? |
| Magpie | 0 | 0 | 1 | 2 | 2 | 1 | 1 |
| Goldfinch | 1 | 6 | 0 | 0 | 0 | 3 | 1 |
| **Linnet*** | 4 | 5 | 4 | 5 | 3 | 7 | 2-3 |
| **Bullfinch*** | 0 | 0 | 0 | 0 | 2 | 0 | 0 |

| Species | Survey dates | | | | | | Likely No. of pairs |
|---|---|---|---|---|---|---|---|
| | Visit 1 11/04/'22 | Visit 2 22/04/'22 | Visit 3 09/05/'22 | Visit 4 25/05/'22 | Visit 5 08/06/'22 | Visit 6 20/06/'22 | |
| **Reed bunting**** | 2 | 5 | 4 | 3 | 1 | 2 | 2 |

KEY: Species names shown in bold are S41 Species of Principal Importance. Those in capitals are birds on Schedule-1 of the WCA. Red List species shown with * and Amber List species with ** (Birds of Conservation Concern, 2015).

### 7.5 ASSESSMENT OF IMPORTANCE

**Breeding birds.**

7.5.1 All the recorded birds are common, widespread and typical of the habitats on Site. The assemblage of S41, Red- and Amber-listed species is considered relatively good and is attributed to the range of habitats present and overall size of the Site. The key habitats for most nesting birds are the tall ruderal/scrub, railway corridor tree belt woodland strips and areas of scrub (for warblers, thrushes, tits and finches); reed-fringed areas are also of importance for species such as reed buntings. The more open rough grassland areas are important nesting habitats for species such as skylark.

7.5.2 Of particular note is the area of broken, stony ground with patches of tufty grassland immediately south of the VPI plant, which supported a pair of breeding little ringed plover and two pairs of breeding lapwing.

7.5.3 Overall, the breeding bird assemblage is considered an important ecological feature of the Site.

## 8 WINTERING AND PASSAGE BIRDS

### 8.1 DESK STUDY

8.1.1 A summary of bird records provided by the data search is included in Section 7.1. A considerable amount of additional, detailed ornithological data have also been collated from surveys undertaken to inform a number of planning applications within the zone of influence. These data are presented in the HRA that accompanies each application and are not repeated here.

### 8.2 METHODS

8.2.1 Monthly bird surveys (terrestrial) were undertaken in two visits per month between October 2021 and March 2022 inclusive covering the period two hours either side of high-tide. The survey scope included the Proposed Development, Rosper Road Pools and terrestrial fields to the east of Rosper Road that had the potential to be functionally linked to the Humber Estuary SPA/Ramsar site.

8.2.2 Monthly bird surveys (coastal) were undertaken in two visits per month between October 2021 and March 2022 inclusive covering the period two hours either side of high-tide for the section of North Killingholme Marshes (NKM) mudflats closest to the Proposed Development. Survey dates, times and weather conditions are shown in Table 9.

**TABLE 9. Wintering and passage bird survey dates, tide times and weather conditions.**

| Visit No. | Date | Tide Times (height) | Weather Conditions |
|---|---|---|---|
| 1 | 15/10/2021 | LT 08:38 (2.45m) HT 15:08 (5.85m) | 8-12°C 3/8 F1-2 NW. |
| 2 | 29/10/2021 | LT 06:06 (2.8m) HT 12:39 (5.39m) | 13°C 6/8 F6 SE. |
| 3 | 12/11/2021 | HT 12:22 (5.85m) LT 18:09 (2.99m) | 11°C 8/8 F4-5 SSW. |
| 4 | 26/11/2021 | HT 09:52 (5.84m) LT 15:50 (2.66m) | 6°C 4/8 F2-3 WSW. |
| 5 | 03/12/2021 | LT 10:58 (1.07m) HT 17:02 (7.16m) | 3°C 7/8 F2 SSE. |
| 6 | 17/12/2021 | LT 10:48 (1.78m) HT 16:59 (6.65m) | 4°C F0-1 NNW. |
| 7 | 07/01/2022 | HT 09:22 (6.78m) LT 15:18 (1.73m) | 2°C 3/8 F3-4 WSW. |
| 8 | 27/01/2022 | LT 06:41 (2.12m) HT 13:00 (5.86m) | 11°C 1-7/8 F6-7 WNW. |
| 9 | 11/02/2022 | LT 07:24 (2.87m) HT 14:04 (5.48m) | 1°C 1/8 F1 SW. |
| 10 | 25/02/2022 | LT 06:06 (2.39m) HT 12:20 (5.69m) | 7°C 1/8 F3-4 WNW. |
| 11 | 11/03/2022 | LT 05:15 (2.8m) HT 11:27 (5.38m) | 11°C 3/8 F6 SE. |
| 12 | 30/03/2022 | HT 05:59 (6.76m) LT 11:51 (1.62m) | 4°C 8/8 F4-5 NE/E Light Rain. |

## 8.3 RESULTS

8.3.1 The raw data from the wintering and passage waterbird surveys is provided in Tables 10 to 25 below and field numbers are detailed on Figure 13.5. Counts are provided per survey and per field for completeness, with records split into feeding, roosting and loafing behaviour by SPA/Ramsar species where this was able to be determined by the surveyor. Non-SPA/Ramsar species are excluded from the results tables as these are not pertinent.

8.3.2 No SPA/Ramsar waterbirds were recorded in Fields 4, 11 and 12 and therefore, these fields are excluded from the results tables.

**TABLE 10. Field 1 – Winter 2021/22 survey peak counts.**

| Species | Visit No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | **Loafing** | | | | | | | | | | | |
| Lapwing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 |
| | **Roosting** | | | | | | | | | | | |
| Lapwing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | **Undetermined** | | | | | | | | | | | |

| Species | Visit No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Lapwing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |

**TABLE 11. Area 2, Rosper Road Pools – Winter 2021/22 survey peak counts.**

| Species | Visit No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | **Feeding** | | | | | | | | | | | |
| Lapwing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 47 | 11 | 21 |
| Redshank | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 8 | 0 | 8 | 8 |
| Black-tailed godwit | 353 | 0 | 0 | 0 | 0 | 2 | 5 | 34 | 37 | 70 | 38 | 68 |
| Shelduck | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 8 | 2 | 4 |
| Wigeon | 0 | 0 | 0 | 0 | 11 | 0 | 0 | 42 | 0 | 0 | 0 | 0 |
| Gadwall | 0 | 0 | 0 | 0 | 94 | 30 | 0 | 18 | 0 | 0 | 0 | 0 |
| Pintail | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **Loafing** | | | | | | | | | | | |
| Lapwing | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 16 | 0 | 66 | 55 | 0 |
| Black-tailed godwit | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 80 | 133 | 123 |
| Bar-tailed godwit | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 6 | 0 |
| Black-headed gull | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 | 0 | 0 | 0 |
| Shelduck | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 |
| Wigeon | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 | 0 | 0 |
| Gadwall | 0 | 0 | 0 | 0 | 18 | 16 | 8 | 0 | 0 | 0 | 0 | 0 |
| Pintail | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 4 | 0 | 0 |
| | **Roosting** | | | | | | | | | | | |
| Redshank | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lapwing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46 | 7 | 2 | 0 |
| | **Undetermined** | | | | | | | | | | | |
| Redshank | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Lapwing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Black-tailed godwit | 480 | 40 | 79 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Gadwall | 0 | 0 | 0 | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Pintail | 4 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Shelduck | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

| Species | Visit No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Wigeon | 92 | 126 | 0 | 26 | 11 | 42 | 0 | 42 | 7 | 0 | 0 | 0 |

**TABLE 12. Field 3 – Winter 2021/22 survey peak counts.**

| Species | Visit No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Loafing | | | | | | | | | | | |
| Curlew | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

**TABLE 13. Field 5 – Winter 2021/22 survey peak counts.**

| Species | Visit No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Feeding | | | | | | | | | | | |
| Curlew | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 0 |
| | Loafing | | | | | | | | | | | |
| Curlew | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 | 0 |

**TABLE 14. Field 6 – Winter 2021/22 survey peak counts.**

| Species | Visit No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Feeding | | | | | | | | | | | |
| Curlew | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 50 | 0 | 0 |
| | Loafing | | | | | | | | | | | |
| Curlew | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 1 |

**TABLE 15. Field 7 – Winter 2021/22 survey peak counts.**

| Species | Visit No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Loafing | | | | | | | | | | | |
| Curlew | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 0 | 24 | 4 | 0 |
| Wigeon | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 |

**TABLE 16. Field 8 – Winter 2021/22 survey peak counts.**

| Species | Visit No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Feeding | | | | | | | | | | | |
| Pink-footed goose | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**TABLE 17. Field 9 – Winter 2021/22 survey peak counts.**

| Species | Visit No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Feeding | | | | | | | | | | | |
| Curlew | 0 | 0 | 0 | 0 | 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Black-tailed godwit | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Loafing | | | | | | | | | | | |
| Curlew | 0 | 0 | 0 | 0 | 0 | 0 | 31 | 0 | 0 | 35 | 0 | 0 |
| Lapwing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |

**TABLE 18. Field 10 – Winter 2021/22 survey peak counts.**

| Species | Visit No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Feeding | | | | | | | | | | | |
| Curlew | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 | 64 | 0 | 74 | 0 |
| Black-tailed godwit | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 0 |

**TABLE 19. Field 13 – Winter 2021/22 survey peak counts.**

| Species | Visit No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Feeding | | | | | | | | | | | |
| Curlew | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 15 | 0 | 0 | 0 |

**TABLE 20. Field 14 – Winter 2021/22 survey peak counts.**

| Species | Visit No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Feeding | | | | | | | | | | | |
| Curlew | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 | 0 | 28 | 0 |

**TABLE 21. Field 15 – Winter 2021/22 survey peak counts.**

| Species | Visit No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Feeding | | | | | | | | | | | |
| Curlew | 0 | 0 | 0 | 0 | 2 | 35 | 0 | 0 | 0 | 0 | 0 | 4 |
| Lapwing | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |

**TABLE 22. Field 16 – Winter 2021/22 survey peak counts.**

| Species | Visit No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Feeding | | | | | | | | | | | |
| Curlew | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 |

**TABLE 23. Field 17 – Winter 2021/22 survey peak counts.**

| Species | Visit No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Feeding | | | | | | | | | | | |
| Curlew | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |

**TABLE 24. Area 18 – Winter 2021/22 survey peak counts.**

| Species | Visit No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | Feeding | | | | | | | | | | | |
| Curlew | 26 | 8 | 31 | 0 | 11 | 1 | 12 | 39 | 1 | 0 | 2 | 0 |
| Redshank | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| | Loafing | | | | | | | | | | | |
| Curlew | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Roosting | | | | | | | | | | | |
| Curlew | 0 | 0 | 0 | 0 | 0 | 0 | 79 | 34 | 0 | 0 | 0 | 0 |
| Redshank | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 | 0 | 0 | 0 |
| Lapwing | 0 | 18 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Black-tailed godwit | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Undetermined | | | | | | | | | | | |
| Curlew | 0 | 0 | 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**TABLE 25. Area 19, North Killingholme Marshes Mudflats – Winter 2021/22 survey peak counts.**

| Species | Visit No. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| | **Feeding** | | | | | | | | | | | |
| Dunlin | 0 | 0 | 0 | 0 | 0 | 105 | 12 | 125 | 136 | 6 | 0 | 0 |
| Curlew | 1 | 7 | 0 | 0 | 0 | 2 | 8 | 50 | 9 | 14 | 2 | 5 |
| Redshank | 0 | 0 | 0 | 3 | 8 | 6 | 67 | 52 | 69 | 69 | 8 | 0 |
| Lapwing | 0 | 0 | 0 | 0 | 176 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| Oystercatcher | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 |
| Black-tailed godwit | 0 | 0 | 0 | 0 | 0 | 0 | 35 | 18 | 1 | 0 | 0 | 0 |
| Shelduck | 0 | 2 | 0 | 8 | 0 | 0 | 0 | 0 | 7 | 28 | 0 | 13 |
| | **Loafing** | | | | | | | | | | | |
| Curlew | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 3 | 0 |
| Shelduck | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 2 | 0 | 0 | 0 |
| Wigeon | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| | **Roosting** | | | | | | | | | | | |
| Dunlin | 0 | 0 | 0 | 205 | 120 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Curlew | 0 | 0 | 0 | 32 | 18 | 8 | 0 | 68 | 48 | 108 | 76 | 3 |
| Redshank | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | 8 | 2 | 2 |
| Lapwing | 1 | 0 | 0 | 38 | 0 | 85 | 0 | 665 | 260 | 90 | 0 | 0 |
| Black-tailed godwit | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 | 0 | 10 | 0 | 0 |
| Shelduck | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 17 | 4 | 15 |
| | **Undetermined** | | | | | | | | | | | |
| Dunlin | 0 | 0 | 0 | 0 | 311 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Curlew | 0 | 0 | 38 | 7 | 3 | 0 | 7 | 0 | 0 | 0 | 0 | 0 |
| Lapwing | 0 | 0 | 2 | 2 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Shelduck | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## 8.4 ASSESSMENT OF IMPORTANCE

8.4.1 The importance of the wintering and passage bird data are presented in context with the results of the wider desk study in the HRA that accompanies each application.

# 9 BATS

## 9.1 DESK STUDY

9.1.1 The desk study produced 37 records for four species of bats between 2009-2018, including one roost record for common pipistrelle in South Killingholme 1.8 km southwest of the site.

9.1.2 There are also anecdotal records of a noctule maternity roost in Burkinshaw's Covert ca.900m northwest of the Site (Alan Jones, Humber Nature Partnership, *pers. comm.*).

## 9.2 CONSERVATION STATUS

9.2.1 In England, Scotland and Wales, all species of bats are fully protected under the Wildlife and Countryside Act 1981 (as amended), including by CRoW. They are also protected under European legislation, being included on Schedule 2 of The Conservation of Habitats and Species Regulations 2017. Taken together, this legislation makes it illegal, *inter alia*, to:

- Intentionally or recklessly kill, injure or capture a bat.
- Deliberately disturb a bat when it is occupying a roost.
- Damage, destroy or obstruct access to a bat roost.

9.2.2 A bat roost is defined as being any structure or place that is used for shelter or protection and since it may be in use only occasionally or at specific times of year, a roost retains such designation whether the bats are present or not.

9.2.3 Seven species of bat (barbastelle, Bechstein's bat, noctule, soprano pipistrelle, brown long-eared bat, greater horseshoe bat and lesser horseshoe bat) have been adopted as Species of Principal Importance in England under Section 41 of NERC.

## 9.3 METHODS

**Preliminary Ecological Appraisal.**

9.3.1 A Site walkover was undertaken on 23 April 2021 by David Hughes, Natural England bat survey Class Licence Number 2015-14463-CLS-CLS (CL20). All trees on the Site were examined from the ground using close-focusing binoculars for Potential Roost Features (PRF) such as woodpecker holes, rot holes, cavities, snag ends and lifted bark. The Site and its connectivity to the wider landscape was then assessed for use by foraging and commuting bats in order to inform the design and extent of further work as per Bat Conservation Trust (BCT) guidelines (Collins, 2016).

**Activity surveys – static detectors.**

9.3.2 In order to determine species assemblage and assess habitat use within the Site, automated static bat detectors (Anabat Express and Anabat Swift) were deployed to run over nine

consecutive nights during July, August and September 2021. On each occasion, one detector was placed in an open habitat close to the IDB drain and the second was placed on a tree in the woodland belt along the railway. The detectors were programmed to switch on 20 minutes before sunset and switch off 20 minutes after sunrise. The location of each detector is shown on Figure 13.6.

**Activity surveys – walked transects.**

9.3.3 Walked transects were not undertaken due to the trip hazards associated with uneven ground and dense bramble. Given the habitats present, the use of static detectors was considered sufficient to provide a robust methodology for assessment purposes.

**Data analysis.**

9.3.4 Call analysis was undertaken by experienced bat ecologist Emily Cook, Natural England bat survey Class Licence Number 2015-14463-CLS-CLS (CL18), using Anabat insight software. Bat activity was assessed based on the number of passes (sound files) per bat at each sample point per night. The number of the passes was used as a proxy for how important each habitat is likely to be for bats. The times of the first and last bat passes relative to sunset and sunrise were compared with published emergence times in order estimate the likelihood of there being a roost site in the vicinity. Clusters of calls, especially those by *Pipistrellus* species along linear features, were attributed to repeat foraging passes by the same or low numbers of individuals.

## 9.4 RESULTS

**Preliminary Ecological Appraisal.**

9.4.1 All the structures on the Site are industrial buildings associated with the VPI plant and as such, have negligible suitability for significant use by bats. None of the trees on Site has any current potential for significant use by roosting bats; all are either too young, too healthy and/or have insufficient girth in the trunk.

**Activity surveys – static detectors.**

9.4.2 A total of four bats was identified to species level, namely:

- Common pipistrelle.
- Soprano pipistrelle.
- Nathusius' pipistrelle.
- Noctule bat.

9.4.3 Bats of the *Myotis* genus were lumped together due to call convergence but the majority of those recorded close to water are likely Daubenton's bat.

9.4.4 Bat activity was low, with marginally greater activity in the edge habitat. The activity levels are described below for each species, with the acoustic data from each sample point summarised in Tables 26 to 28 inclusive.

**Common pipistrelle.**

9.4.5 Common pipistrelles are the commonest and most widespread bat species in the UK and are likely the most frequently encountered species in most habitat types; their presence in all of the sample points is expected. It is highly likely there are multiple maternity roosts with 2km of the Site and the more productive habitats on Site will lie within each colonies Core Sustenance Zone so mitigation will be required.

**Soprano pipistrelle.**

9.4.6 Soprano pipistrelles are also a common and widespread species, with a greater preference for woodland and water than common pipistrelles. Soprano pipistrelles will benefit from mitigation measure designed for other species.

**Nathusius' pipistrelle.**

9.4.7 Nathusius' pipistrelle is a scarce but widespread species in the UK with an easterly bias and is a known, long-distance, intercontinental migrant. The UK's first maternity roost was discovered in southeast Lincolnshire in the mid-1990s. UK records tend to increase in autumn, this is perhaps why this bat was detected in September and not earlier in the summer. At these activity levels, this species likely resilient to any effects of the scheme but will benefit from mitigation measure designed for other species.

**Noctule bat.**

9.4.8 This is typically a high-flying open-habitat species. Its high amplitude calls make it easy to record, leading to double recording (the same calls being recorded on multiple detectors). Some of the calls are likely to be from bats commuting over the Site but the open grassland and scrub areas also provide foraging opportunities. The times of the calls were often close to sunset and sunrise, suggesting the bats are roosting locally and if so, are perhaps from the known maternity colony in Burkinshaw's covert. This species is likely resilient to any effects of the scheme.

**TABLE 26. Number of bat passes per species recorded in each habitat type in in July 2021.**

| Survey date | Open habitat | | Edge habitat | | | |
|---|---|---|---|---|---|---|
| | Common pipistrelle | Noctule | Common pipistrelle | Noctule | Soprano pipistrelle | Myotis species |
| 29/06/2021 | 0 | 2 | 2 | 6 | 0 | 0 |
| 30/06/2021 | 4 | 0 | 11 | 8 | 0 | 0 |
| 01/07/2021 | 3 | 15 | 25 | 47 | 0 | 5 |
| 02/07/2021 | 6 | 9 | 22 | 5 | 1 | 3 |
| 03/07/2021 | 4 | 1 | 6 | 0 | 0 | 0 |
| 04/07/2021 | 2 | 7 | 13 | 3 | 0 | 0 |
| 05/07/2021 | 2 | 1 | 13 | 10 | 0 | 2 |
| 06/07/2021 | 1 | 2 | 32 | 11 | 0 | 0 |
| 07/07/2021 | 3 | 0 | 22 | 1 | 0 | 1 |

**TABLE 27. Number of bat passes per species recorded in each habitat type in August 2021.**

| Survey date | Open habitat | | Edge habitat | | | |
|---|---|---|---|---|---|---|
| | Common pipistrelle | Noctule | Common pipistrelle | Noctule | Soprano pipistrelle | Myotis species |
| 24/08/2021 | 0 | 0 | 40 | 1 | 0 | 0 |
| 25/08/2021 | 0 | 0 | 1 | 0 | 0 | 0 |
| 26/08/2021 | 0 | 0 | 1 | 0 | 0 | 0 |
| 27/08/2021 | 0 | 0 | 9 | 0 | 0 | 0 |
| 28/08/2021 | 0 | 2 | 51 | 4 | 1 | 0 |
| 29/08/2021 | 1 | 0 | 120 | 1 | 0 | 0 |
| 30/08/2021 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31/09/2021 | 0 | 0 | 5 | 1 | 0 | 0 |
| 01/09/2021 | 1 | 0 | 2 | 0 | 0 | 0 |

**TABLE 28. Number of bat passes per species recorded in each habitat type in September 2021.**

| Survey date | Open habitat | | Edge habitat | | | |
|---|---|---|---|---|---|---|
| | Common pipistrelle | Noctule | Common pipistrelle | Noctule | Nathusius' pipistrelle | Myotis species |
| 17/09/2021 | 9 | 1 | 3 | 1 | 1 | 0 |
| 18/09/2021 | 1 | 4 | 5 | 1 | 4 | 0 |
| 19/09/2021 | 1 | 4 | 9 | 2 | 0 | 0 |

| Survey date | Open habitat | | Edge habitat | | | |
|---|---|---|---|---|---|---|
| | Common pipistrelle | Noctule | Common pipistrelle | Noctule | Nathusius' pipistrelle | Myotis species |
| 20/09/2021 | 2 | 1 | 4 | 2 | 0 | 1 |
| 21/09/2021 | 3 | 0 | 10 | 0 | 0 | 0 |
| 22/09/2021 | 0 | 0 | 24 | 0 | 0 | 0 |
| 23/09/2021 | 0 | 0 | 8 | 1 | 0 | 0 |
| 24/09/2021 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25/09/2021 | 0 | 0 | 0 | 0 | 0 | 0 |

9.4.9 Bats are highly transient animals with complex life cycles. Activity levels are influenced by a range of factors including local population size, prey availability and weather conditions. In addition, acoustic detection is influenced by species abundance, call amplitude and foraging strategy. These factors generate high inter-night variability in datasets that can influence its interpretation however, on balance, the species assemblage and activity levels recorded during the surveys are considered a fair representation of how the Site is utilised by local bat populations.

9.4.10 The acoustic surveys revealed low levels of foraging activity by common pipistrelle and noctule bats.

### 9.5 ASSESSMENT OF IMPORTANCE

9.5.1 The Site provides no roosting opportunities for bats and limited foraging opportunities, which is reflected in the very low activity levels. Determining the importance of habitats based on the number of bat passes is not easy but as a guide based on experience, productive linear habitats such as hedgerows or tree belts can generate 300-500 bat passes per night. In contrast, the results across the Site were consistently low.

9.5.2 Bats are highly mobile species and the Site is relatively small with no habitats that are markedly better than those in the wider landscape. Whilst all bat species found in the UK enjoy a high level of statutory protection and noctule/soprano pipistrelle are S41 species, given the woodland belt along the railway is to be retained, bats are likely to be largely resilient to any effects of the scheme.

## 10 BADGERS

### 10.1 DESK STUDY

10.1.1 GLNP provided a number of badger records, the nearest being 1.1km away from 2017. In 2022, ESL recorded a badger on a camera trap 1.4km southwest of the Site. In both cases,

the locations have not been disclosed in this report for reasons of sensitivity. Neither record is germane to this assessment.

10.1.2 No evidence of badgers was found on the adjacent VPI site by AECOM in 2018.

## 10.2 CONSERVATION STATUS

10.2.1 Badgers are fully protected by the Protection of Badgers Act 1992, which subsumed all previous legislation covering this species. This Act makes it an offence, *inter alia*, to:

- Wilfully kill, injure or take, or attempt to kill, injure or take, a badger.
- Interfere with a badger sett by doing any of the following things, intending to do any of these things or being reckless as to whether one's actions would have any of these consequences:
    - Damaging a badger sett or any part of it.
    - Destroying a badger sett.
    - Obstructing access to, or any entrance of, a badger sett.
    - Disturbing a badger when it is occupying a badger sett.

10.2.2 A badger sett is defined in the Act as any structure or place that displays 'recent' signs indicating use by a badger. The term 'recent' is now considered to mean about three months. Although a sett may be empty at a certain time, it may be used as part of a regular cycle throughout the year and may therefore become active again at any time. Under certain conditions, activities that could otherwise give rise to an offence may be licenced by Natural England.

10.2.3 If a disturbance-only licence is issued, it is now common for the badgers to be left in-situ and not excluded from the sett (by gating). A sett that can be shown by an experienced ecologist to be disused would fall outside the Act and no licence or special precautions are then required.

10.2.4 Badgers have been adopted as Species of Principal Importance in England under Section 41 of NERC.

## 10.3 METHODS

10.3.1 Signs of use by badgers were searched for on every site visit These included setts, dung pits/latrines, pathways, paw prints, feeding signs, bedding bundles, scratched trees/logs and distinctive badger hairs caught in fences, as described in Harris *et al*., 1994.

## 10.4 RESULTS

10.4.1 No evidence of badgers has been found on or adjacent to the Site to date.

### 10.5 ASSESSMENT OF IMPORTANCE

10.5.1 Whilst the Site provides suitable foraging habitat for badgers, this species is apparently absent from the both Sites.

## 11 WATER VOLES

### 11.1 DESK STUDY

11.1.1 GLNP provided a number of water vole records, the most germane being 11 records from 2004 to 2009 for Rosper Road Pools, 130m east of the Site.

### 11.2 CONSERVATION STATUS

11.2.1 Water voles are protected under the Wildlife and Countryside Act 1981 (as amended). It is an offence to intentionally:

- Kill, injure or take a water vole.
- Possess or control a water vole (alive or dead).

11.2.2 It is also an offence to intentionally or recklessly:

- Damage or destroy a structure or place used for shelter or protection.
- Disturb them in a place used for shelter or protection.
- Obstruct access to a place used for shelter or protection.

11.2.3 Water voles are also listed as a rare and most threatened species under Section 41 NERC.

### 11.3 METHODS

11.3.1 Watercourses and adjacent habitats within the Site and with connectivity to the Site were visually assessed for their suitability to support water voles. Each drain was then waded by one surveyor with a second on the bank-top providing health-and-safety cover and recording results. A ranging pole was used to gauge water depth and move overhanging vegetation to allow a clear view of the toe of the bank. Field signs indicating the presence of water voles included sightings, burrows, latrines, feeding remains and pathways, as per Dean *et al.,* 2016.

11.3.2 The survey included the open sections of the IDB drain from the point that it enters the western part off the Site to the point at which it discharges into Rosper Road Pools, together with the drains running north-south parallel to either side of Rosper Road. The full extent of the survey is shown on Figure 13.7. The surveys were undertaken on 6 June and 23 August 2021 by David Hughes, Natural England water vole Class Licence Number CL3100084, assisted by Grant Berky. Weather conditions on both dates were optimal, with no rain in the preceding three days.

## 11.4 RESULTS

11.4.1 A concise description of each watercourse is given in Table 29 below. No evidence of current use by water voles was recorded in any watercourse.

**TABLE 29. Description of watercourses included in the water vole survey.**

| Ditch No | Description | Water Vole Suitability |
|---|---|---|
| 1 | **IDB drain.** Approximately 4m wide and 0.75m deep over a silt substrate. Steady flow west to east. Bank face vertical in places, dense ruderals to the northern bank, south bank mown. Strong smell of hydrocarbons. Photograph 11 and 12. | Moderate. |
| 2 | **Rosper Road drain (western carriageway**). 1.5m wide and 0.3m deep over a firm gravel substrate. Shallow batter to stony banks, sub-optimal for burrowing. Ruderals to both banks. Photograph 13. | Low. |
| 3 | **IDB drain (eastern carriageway**). 2.5m wide and 1.25 deep over deep silt. Steep banks and dense emergent vegetation in the channel. Photograph 14. | Low. |
| 4 | **IDB drain into Rosper Road Pools**. 2.5m wide 0.4m deep. 45-degree batter to earth banks. Toe visible throughout. Little channel vegetation. Photograph 15 and 16. | Low. |

**Photograph 11.** IDB drain looking west into the Site from Rosper Road outfall.

**Photograph 12.** The drain along Rosper Road connects to the IDB drain via a flap valve. The IDB drain then runs eastwards under Rosper Road via an open culvert.

**Photograph 13.** The drain parallel with western carriageway of Rosper Road from the IDB outfall looking north.

**Photograph 14.** IDB/road Drain west of Rosper Road. Deep silt and dense emergent vegetation.

**Photograph 15.** IDB drain east of Rosper Road on its way eastwards to the pools.

**Photograph 16.** IDB drain as it trips over the spillway into Rosper Road pools.

## 11.5 ASSESSMENT OF IMPORTANCE

11.5.1 Water voles are protected under the Wildlife and Countryside Act 1981 (as amended) and are a S41 species. Water voles can be a cryptic species and their populations can increase or decrease rapidly. Whilst no water voles were found during the surveys in 2022, the habitats on and adjacent to the Site remain suitable and the desk study records are relatively recent. Rosper Road Pools covers a large area and the wide, dense reedbeds that border the pools could sustain a core population that in boom years could expand into the connecting IDB drain network. As such, the presence of water voles cannot be permanently ruled out and future vigilance will be required however, on the basis of evidence collected to date, water voles are not considered an important ecological feature of the Site.

# 12 OTTERS

## 12.1 DESK STUDY

12.1.1 GLNP provided 10 otter records from 1975 to 2020, most from either Halton Marsh Clay Pits or Killingholme Haven Pits, 4.4km and 2.7km northeast of the Site respectively.

## 12.2 CONSERVATION STATUS

12.2.1 It is an offence under the Wildlife and Countryside Act 1981 (as amended) to intentionally or recklessly:

- Disturb otters while they occupy a structure or place used for shelter or protection.
- Obstruct access to a place of shelter or protection.

12.2.2 Otters are also designated and protected as European protected species under the Conservation of Habitats and Species Regulations 2017. It is an offence to:

- Deliberately kill, injure, disturb or capture an otter.
- Damage or destroy a breeding sites and resting place - even if otters are not present.
- Possess, control or transport an otter (alive or dead).

12.2.3 Otters are also listed as rare and most threatened species under Section 41 of NERC.

## 12.3 METHODS

12.3.1 Field signs indicating the presence of otters, such as spraints, holts, paw-prints and feeding signs (Chanin, 2003), were searched for during the two water vole surveys in 2021.

## 12.4 RESULTS

12.4.1 No evidence of current use by otters was recorded in any watercourse.

## 12.5 ASSESSMENT OF IMPORTANCE

12.5.1 Otters are afforded strict legal protection under the Habitats Regs and the Wildlife and Countryside Act 1981 (as amended). Away from the coast, otters are a cryptic, nocturnal species with large home ranges. The records of otter in large waterbodies next the Humber Estuary probably reflects the availability of fish and eels however, there are no opportunities for holts on the Site and other than Rosper Road Pools, the drain network on and adjacent to the Site is sub-optimal. On balance, otters are not considered an important ecological feature of the Site.

## 13 OTHER PRIORITY SPECIES

13.1 Other priority species are considered below:

- White-clawed crayfish. GLNP provided no records for this species and it is not known to be present in North Lincolnshire. The drains on and adjacent to the Site are not suitable for this species and it is considered not to be an important ecological feature of the Site.
- No brown hares were seen on any site visit. Suitable habitat is restricted to the western part or Site, which is generally sub-optimal and this species is therefore considered not to be an important ecological feature of the Site.
- No hedgehogs were seen on any site visit. Again, suitable habitat is restricted to the western part or Site. There are no published survey guidelines for this species; presence is established through direct sightings and to a lesser degree, identification from droppings. This species is considered not to be an important ecological feature of the Site in terms of the assessment but conservation measures will be put in place in accordance with best practice.

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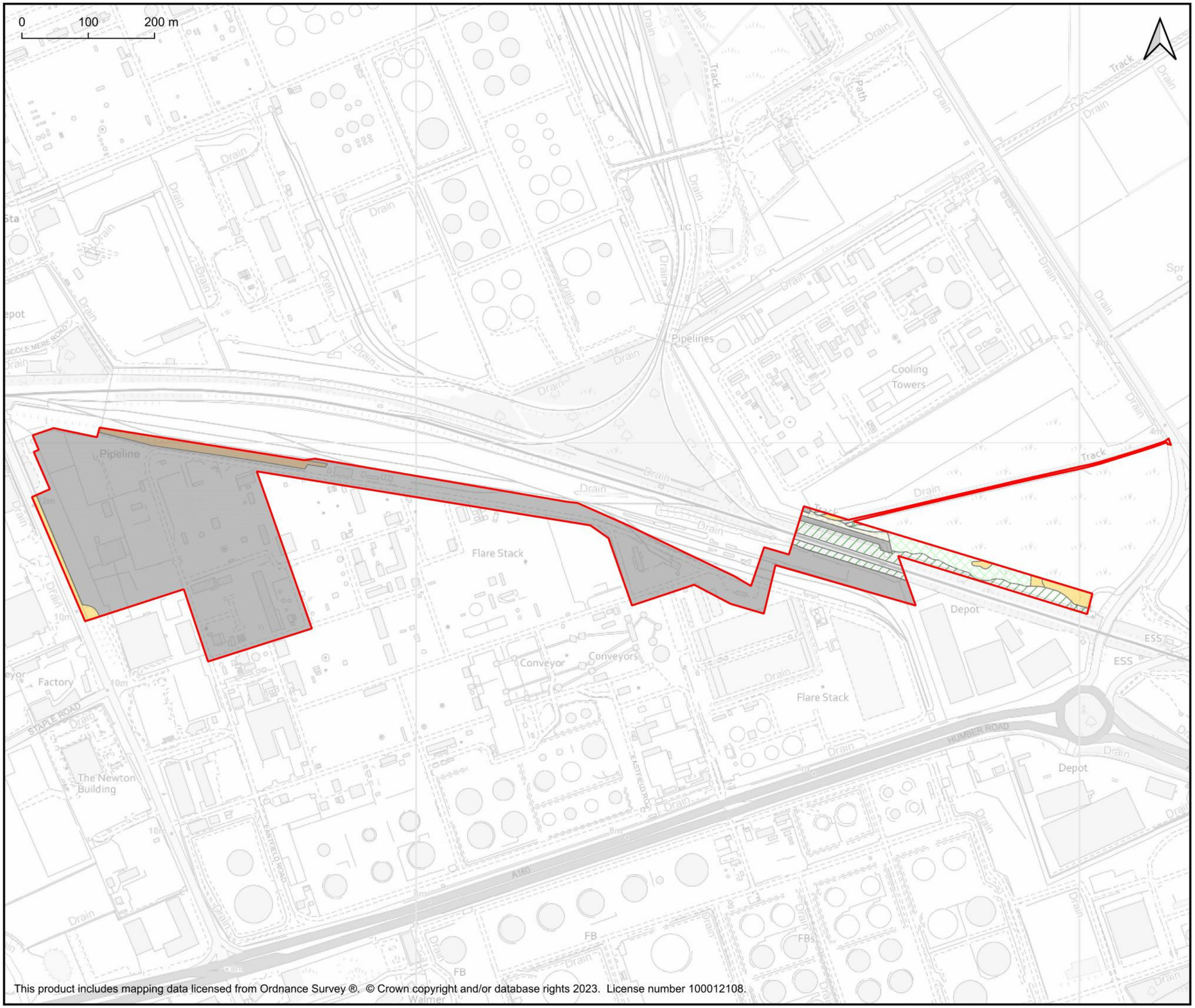
**KEY**

- Phillips 66 site boundary
- g4 - Modified grassland
- h3d - Bramble scrub
- h3h - Mixed scrub
- u1c - Artificial unvegetated, unsealed surface: 17 - Ruderal/Ephemeral
- u1c - Artificial unvegetated, unsealed surface
- u1b - Developed land; sealed surface
- u1a - Open Mosaic on Previously Developed Land
- w1g - Other woodland; broadleaved






SITE NAME:
**Humber Zero - Phillips 66.**

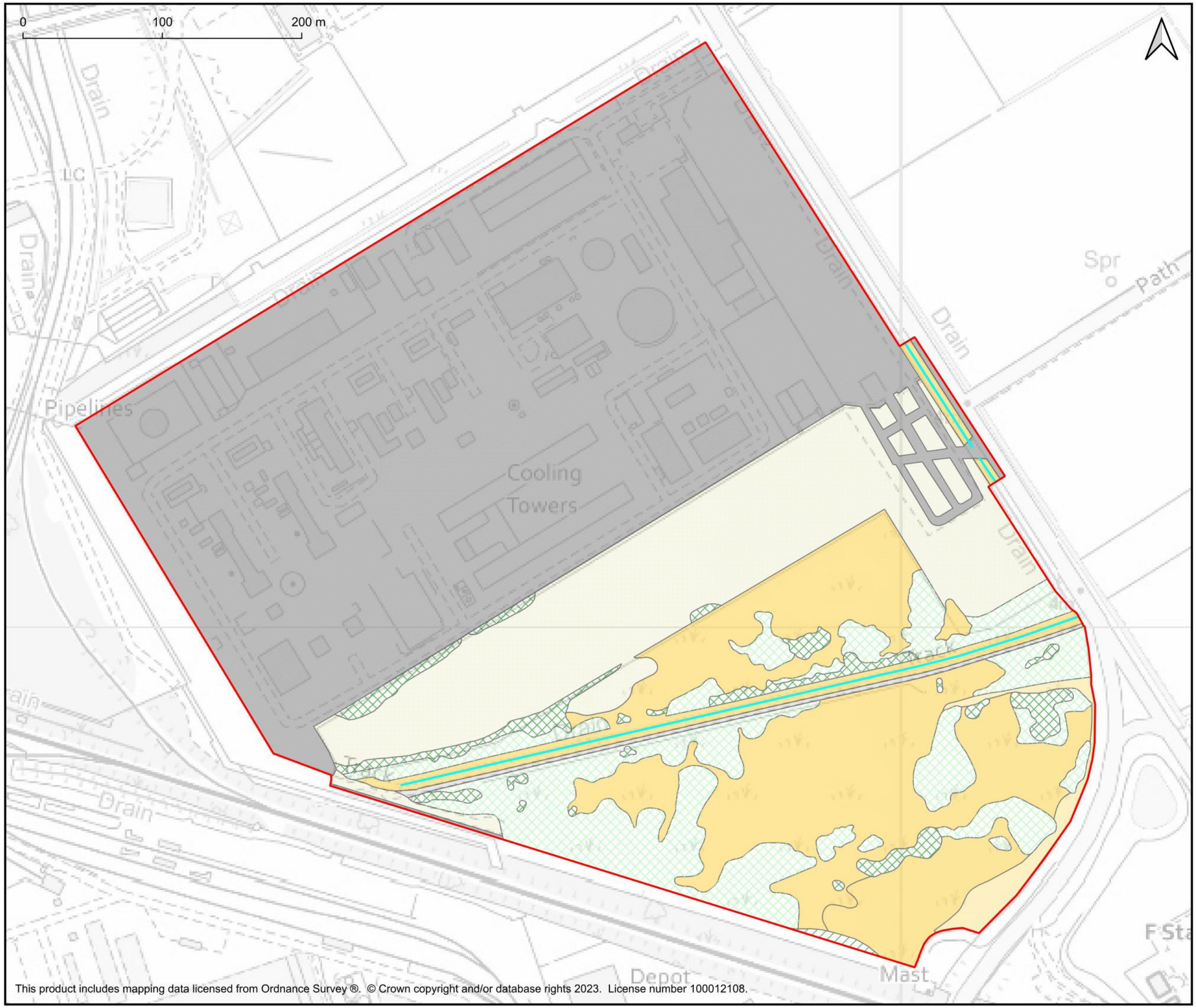
DRAWING TITLE:
**Habitat map.**

**Figure 13.1**
Dwg no.: ES78-L082-006 Date: Feb 2023

(Ecological Services) Limited

**KEY**

- VPI site boundary
- r1a - Eutrophic standing waters: 39 - Freshwater - man-made, 191 - Ditch
- River - Culvert
- g4 - Modified grassland
- g3c - Other neutral grassland
- h3d - Bramble scrub
- h3h - Mixed scrub
- u1c - Artificial unvegetated, unsealed surface
- u1b - Developed land; sealed surface
- u1a - Open Mosaic on Previously Developed Land
- w1g - Other woodland; broadleaved




SITE NAME:
**Humber Zero - VPI Immingham.**

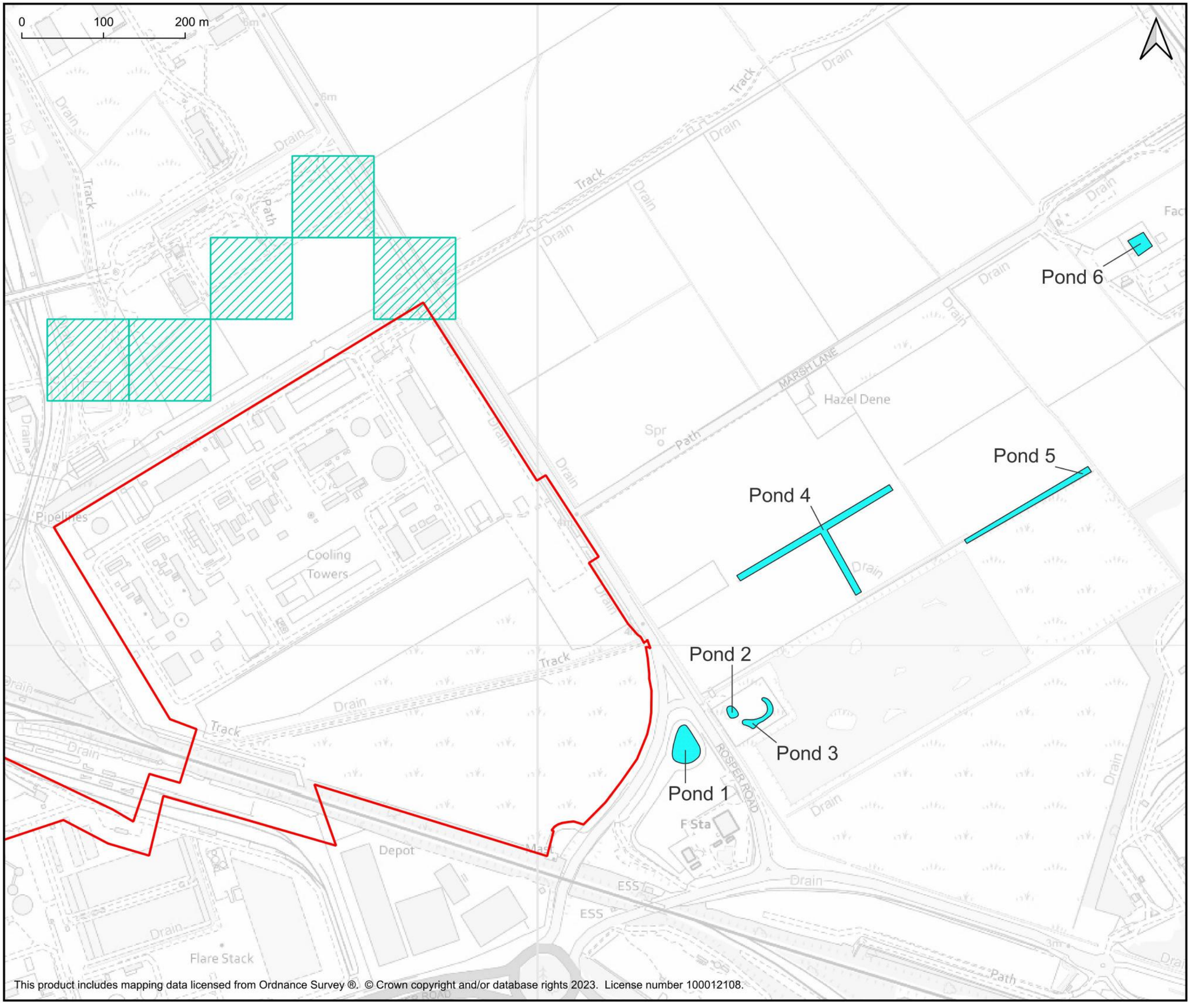
DRAWING TITLE:
**Habitat map.**

**Figure 13.2**
Dwg no.: ES78-L082-007 Date: Feb 2023

ESL (Ecological Services) Limited

**KEY**

- Site boundary
- 100m grid squares with waterbodies surveyed by AECOM in 2018.
- Waterbodies surveyed by ESL in 2021.






SITE NAME:
**Humber Zero.**

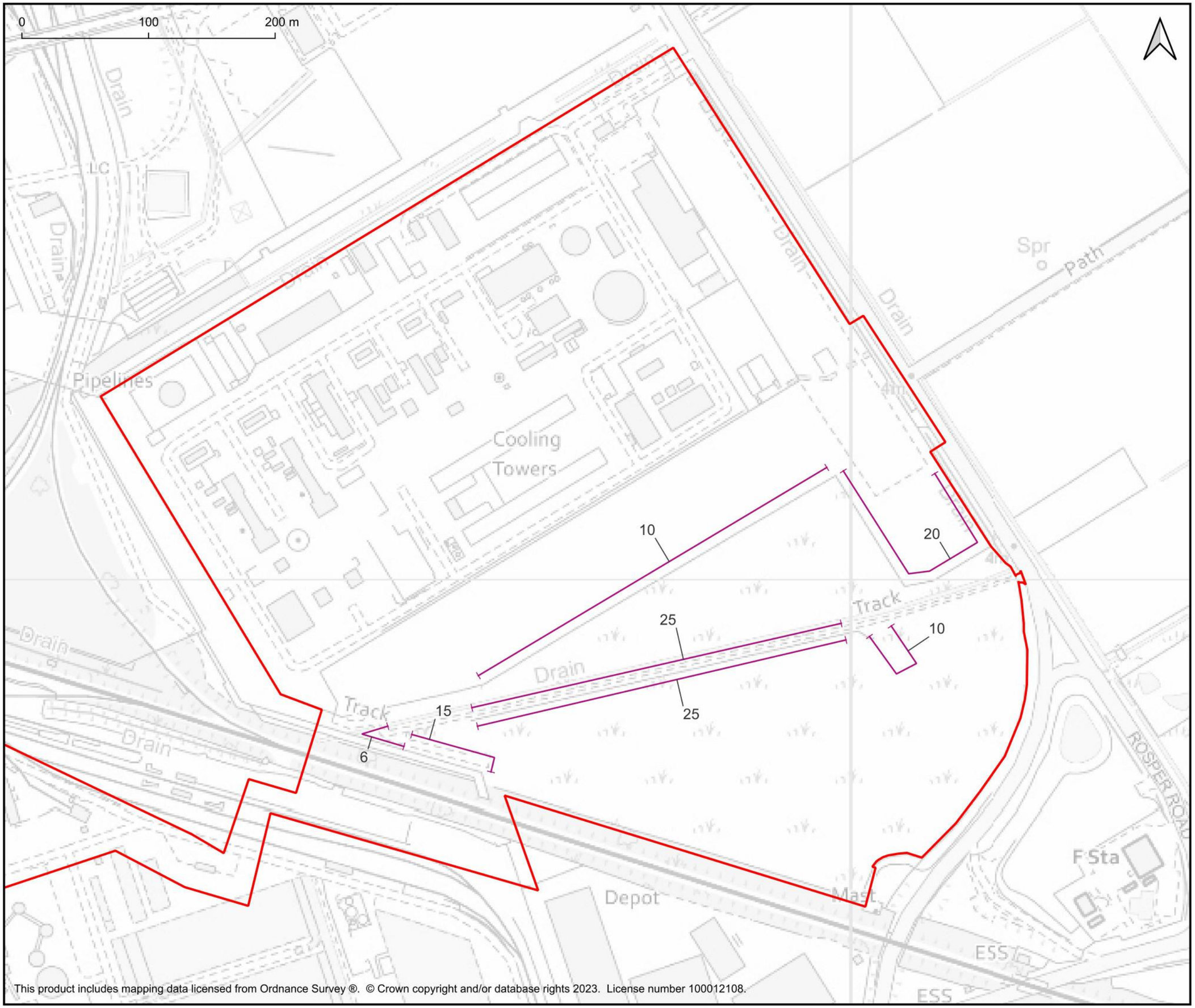
DRAWING TITLE:
**Pond locations - eDNA surveys.**

**Figure 13.3**
Dwg no.: ES78-L082-008 Date: Feb 2023

(Ecological Services) Limited

**KEY**

- Site boundary
- Artificial reptile refugia






SITE NAME:
**Humber Zero.**

DRAWING TITLE:
**Reptile tin locations.**

**Figure 13.4**
Dwg no.: ES78-L082-009 Date: Feb 2023

ESL (Ecological Services) Limited

**KEY**

- Area A
- Marsh Lane
- Foreshore
- Gigastack
- Rosper Road Pools Nature Reserve




SITE NAME:
**Humber Zero.**

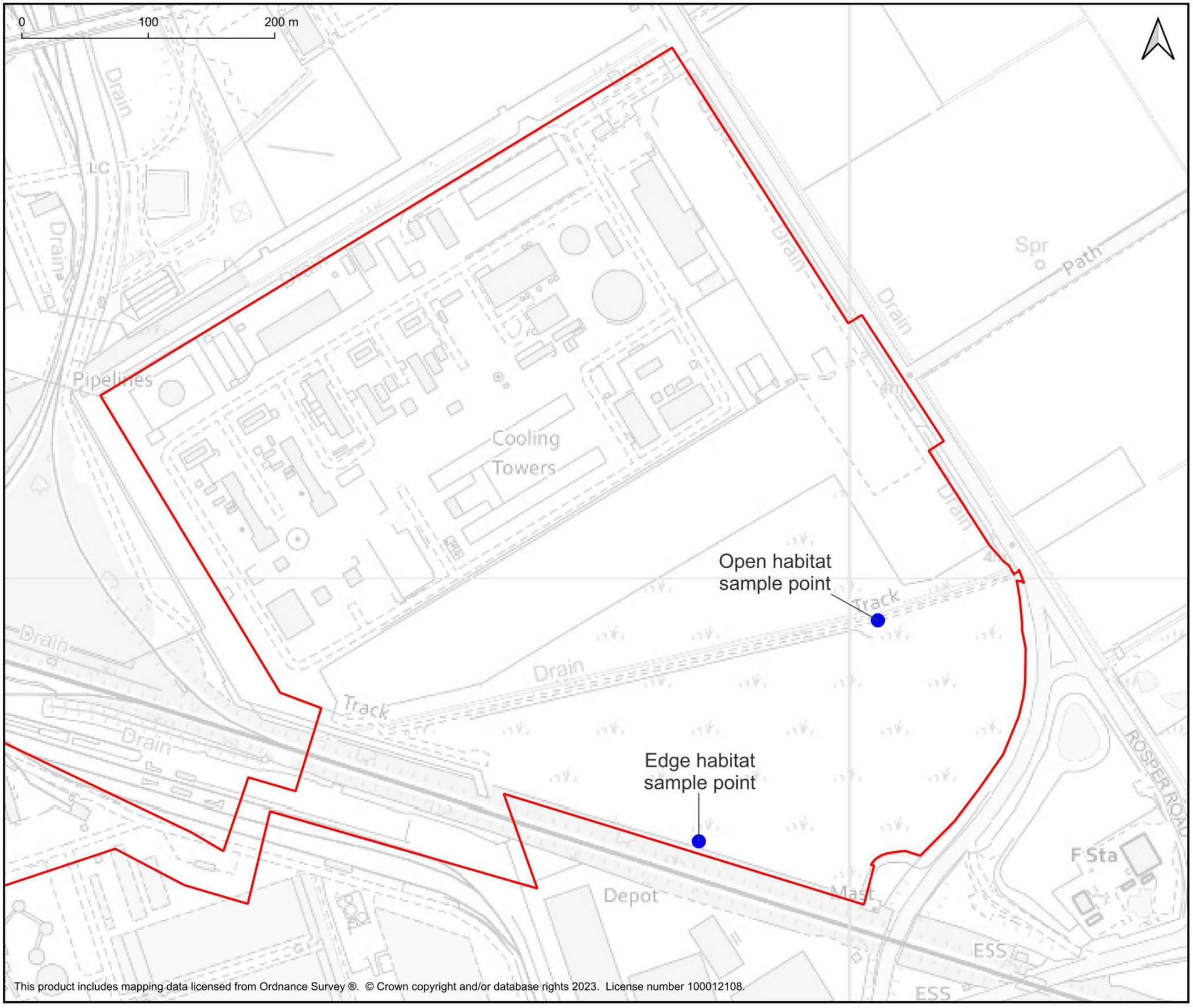
DRAWING TITLE:
**Approximate winter bird survey areas.**

**Figure 13.5**
Dwg no.: ES78-L082-010 Date: Jan 2023

(Ecological Services) Limited

**KEY**

- Site boundary
- Bat detector location






SITE NAME:
**Humber Zero.**

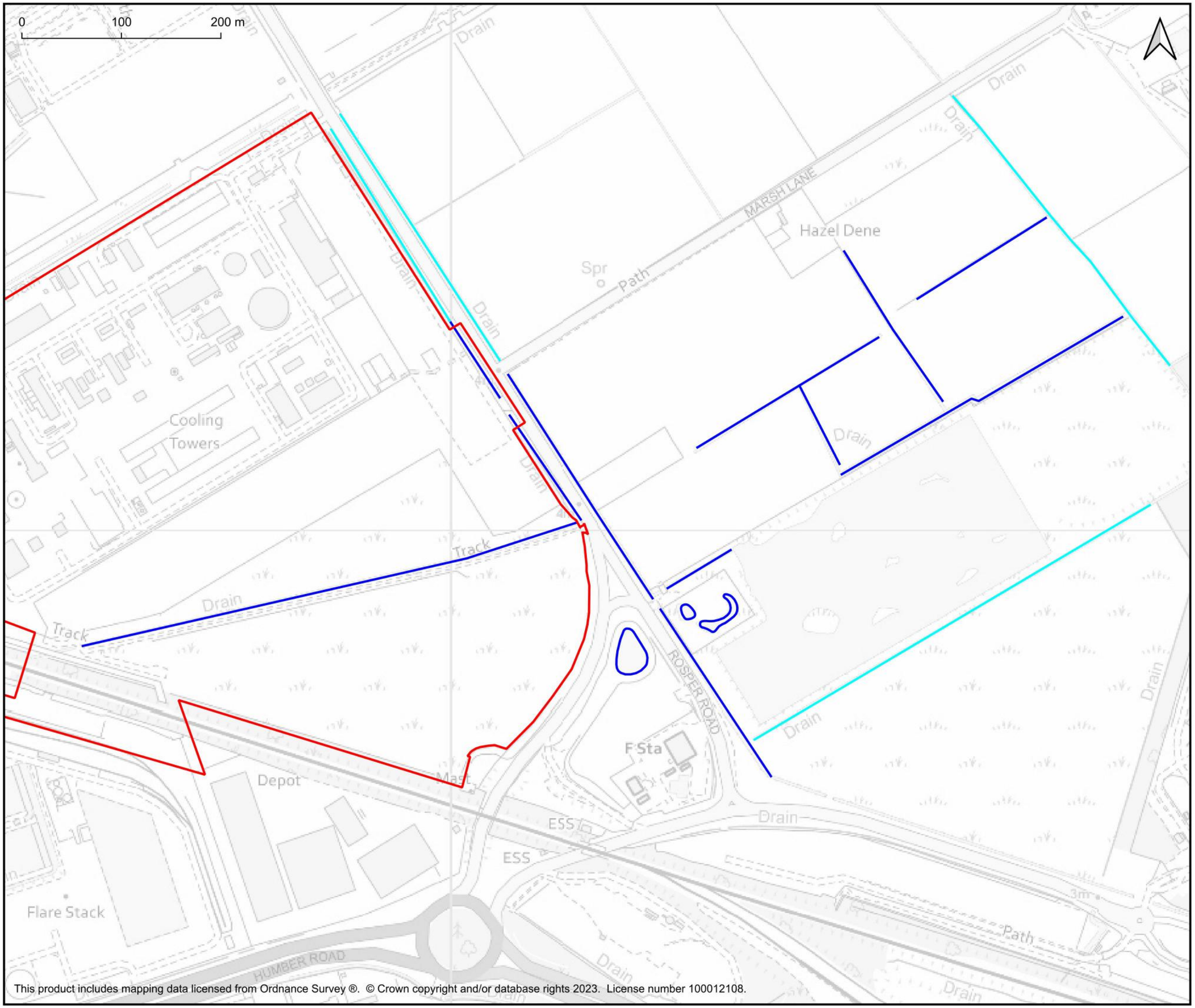
DRAWING TITLE:
**Bat detector locations.**

**Figure 13.6**
Dwg no.: ES78-L082-011 Date: Feb 2023

(Ecological Services) Limited

**KEY**

- Site boundary
- Waterbody surveyed for water voles
- Wet drain






SITE NAME:
**Humber Zero.**

DRAWING TITLE:
**Water vole surveys.**

**Figure 13.7**
Dwg no.: ES78-L082-012 Date: Feb 2023

(Ecological Services) Limited

# APPENDIX 13A.1

## SPECIES LISTS

| English name | Scientific name | DAFOR |
|---|---|---|
| **Plants** | | |
| ash | *Fraxinus excelsior* | O |
| barron brome | *Anisantha sterilis* | O |
| bittersweet | *Solanum dulcamara* | O |
| black medick | *Medicago lupulina* | F |
| bramble | *Rubus fruticosus* | A |
| bristly oxtongue | *Helminthotheca echioides* | O |
| broad-leaved dock | *Rumex obtusifolius* | O |
| broad-leaved willowherb | *Epilobium montanum* | O |
| bulrush | *Typha latifolia* | O |
| butterfly-bush | *Buddleja davidii* | O |
| cat's-ear | *Hypochaeris radicata* | O |
| cleavers | *Galium aparine* | O |
| cock's-foot | *Dactylis glomerata* | F |
| coltsfoot | *Tussilago farfara* | F |
| common bent | *Agrostis capillaris* | O |
| common bird's-foot trefoil | *Lotus corniculatus* | O |
| common centaury | *Centaurium erythraea* | F |
| common chickweed | *Stellaria media* | O |
| common couch | *Elymus repens* | O |
| common cudweed NT | *Filago vulgaris* | O |
| common figwort | *Scrophularia nodosa* | O |
| common fleabane | *Pulicaria dysenterica* | O |
| common horsetail | *Equisetum arvense* | O |
| common knapweed | *Centaurea nigra* | O |
| common mouse-ear | *Cerastium fontanum* | O |
| common nettle | *Urtica dioica* | F |
| common ragwort | *Senecio jacobaea* | O |
| common reed | *Phragmites australis* | F |
| common sedge | *Carex nigra* | O |
| common spike-rush | *Eleocharis palustris* | F |
| common spotted-orchid | *Dactylorhiza fuchsii* | O |
| common stork's-bill | *Erodium cicutarium* | F |
| common vetch | *Vicia sativa* | O |
| cow parsley | *Anthriscus sylvestris* | F |

| English name | Scientific name | DAFOR |
|---|---|---|
| **Plants** | | |
| creeping bent | *Agrostis stolonifera* | F |
| creeping buttercup | *Ranunculus repens* | F |
| creeping cinquefoil | *Potentilla reptans* | F |
| creeping thistle | *Cirsium arvense* | F |
| crested dog's-tail | *Cynosurus cristatus* | O |
| curled dock | *Rumex crispus* | F |
| cut-leaved crane's-bill | *Geranium dissectum* | O |
| daisy | *Bellis perennis* | O |
| dog-rose | *Rosa canina* | F |
| dogwood | *Cornus sanguinea* | O |
| elder | *Sambucus nigra* | O |
| false fox sedge | *Carex otrubae* | F |
| false oat-grass | *Arrhenatherum elatius* | A |
| fern grass | *Catapodium rigidum* | O |
| field bindweed | *Convolvulus arvensis* | O |
| field forget-me-not | *Myosotis arvensis* | O |
| field rose | *Rosa arvensis* | O |
| fool's water-cress | *Helosciadium nodiflorum* | O |
| goat's-beard | *Tragopogon pratensis* | O |
| goat willow | *Salix caprea* | O |
| great lettuce | *Lactuca virosa* | O |
| great willowherb | *Epilobium hirsutum* | F |
| greater bird’s-foot-trefoil | *Lotus pedunculatus* | R |
| greater plantain | *Plantago major* | O |
| grey poplar | *Populus x canescens* | O |
| grey willow | *Salix cinerea* | O |
| groundsel | *Senecio vulgaris* | O |
| hairy tare | *Vicia hirsuta* | O |
| hard rush | *Juncus inflexus* | F |
| hare's-foot clover | *Trifolium arvense* | O |
| hawthorn | *Crataegus monogyna* | F |
| hedge bedstraw | *Galium album* | O |
| hedge bindweed | *Cakystegia sepium* | O |
| hedge mustard | *Sisymbrium officinale* | R |

| English name | Scientific name | DAFOR |
|---|---|---|
| **Plants** | | |
| hedge woundwort | *Stachys sylvatica* | O |
| hemlock | *Conium maculatum* | O |
| hoary ragwort | *Senecio erucifolius* | O |
| hogweed | *Heracleum sphondylium* | F |
| jersey cudweed | *Gnaphalium luteoalbum* | R |
| lady's bedstraw | *Galium verum* | R |
| evening-primrose | *Oenothera* sp. | O |
| lesser trefoil | *Trifolium dubium* | O |
| marsh thistle | *Cirsium palustre* | F |
| meadow buttercup | *Ranunculus acris* | O |
| meadow foxtail | *Alopecurus pratensis* | O |
| meadow vetchling | *Lathyrus pratensis* | O |
| mouse-ear hawkweed | *Pilosella officinarum* | O |
| mugwort | *Artemisia vulgaris* | R |
| musk thistle | *Carduus nutans* | R |
| narrow-leaved ragwort | *Senecio inaequidens* | F |
| opium poppy | *Papaver somniferum* | O |
| oxeye daisy | *Leucanthemum vulgare* | O |
| pendulous sedge | *Carex pendula* | R |
| perennial rye-grass | *Lolium perenne* | O |
| perennial sow-thistle | *Sonchus arvensis* | R |
| perforate St John's-wort | *Hypericum perforatum* | O |
| prickly sow-thistle | *Sonchus asper* | O |
| purple toadflax | *Linaria purpurea* | O |
| red campion | *Silene dioica* | R |
| red clover | *Trifolium pratense* | O |
| ribwort plantain | *Plantago lanceolata* | F |
| rosebay willowherb | *Chamerion angustifolium* | O |
| rough chervil | *Chaerophyllum temulum* | O |
| salad burnet | *Sanguisorba minor* | R |
| scentless mayweed | *Tripleurospermum inodorum* | O |
| sea club-rush | *Bolboschoenus maritimus* | F |
| silver birch | *Betula pendula* | F |
| silverweed | *Potentilla anserina* | O |

| English name | Scientific name | DAFOR |
|---|---|---|
| **Plants** | | |
| smooth sow-thistle | *Sonchus oleraceus* | O |
| smooth tare | *Vicia tetrasperma* | O |
| soft brome | *Bromus hordeaceus* | O |
| soft-rush | *Juncus effusus* | O |
| southern marsh-orchid | *Dactylorhiza praetermissa* | O |
| spear thistle | *Cirsium vulgare* | O |
| square-stalked St John's-wort | *Hypericum tetrapterum* | R |
| tall melilot | *Melilotus altissimus* | R |
| teasel | *Dipsacus fullonum* | F |
| tufted hair-grass | *Deschampsia cespitosa* | A |
| tufted vetch | *Vicia cracca* | R |
| vervain | *Verbena officinalis* | R |
| viper's-bugloss | *Echium vulgare* | O |
| wall barley | *Hordeum murinum* | O |
| weld | *Reseda luteola* | O |
| welted thistle | *Carduus crispus* | R |
| willow-leaved cotoneaster | *Cotoneaster salicifolius* | R |
| white campion | *Silene latifolia* | R |
| white clover | *Trifolium repens* | F |
| white willow | *Salix alba* | O |
| yarrow | *Achillea millefolium* | O |
| yellow-wort | *Blackstonia perfoliata* | F |
| Yorkshire-fog | *Holcus lanatus* | A |

**KEY TO DAFOR (An estimate of plant relative abundance at a site)**

**D** **Dominant**

**A** **Abundant**

**F** **Frequent**

**O** **Occasional**

**R** **Rare**

| English name | Scientific name | Site | Adj. |
|---|---|---|---|
| **Birds** | | | |
| blackbird | *Turdus merula* | ✓ | ✓ |
| blackcap | *Sylvia atricapilla* | ✓ | |
| blue tit | *Cyanistes caeruleus* | ✓ | |

| English name | Scientific name | Site | Adj. |
|---|---|---|---|
| **Birds** | | | |
| bullfinch | *Pyrrhula pyrrhula* | ✓ | |
| carrion crow | *Corvus corone* | ✓ | |
| chaffinch | *Fringilla coelebs* | ✓ | |
| chiffchaff | *Phylloscopus collybita* | ✓ | |
| dunnock S41 | *Prunella modularis* | ✓ | |
| goldfinch | *Carduelis carduelis* | ✓ | |
| great tit | *Parus major* | ✓ | |
| grey wagtail | *Motacilla cinerea* | ✓ | |
| kestrel | *Falco tinnunculus* | ✓ | ✓ |
| lapwing Red List, S41 | *Vanellus vanellus* | ✓ | ✓ |
| lesser whitethroat | *Sylvia curruca* | ✓ | |
| linnet Red List, S41 | *Linaria cannabina* | ✓ | |
| little egret | *Egretta garzetta* | ✓ | |
| little ringed plover Schedule-1 | *Charadrius dubius* | ✓ | |
| long-tailed tit | *Aegithalos caudatus* | ✓ | |
| magpie | *Pica pica* | ✓ | ✓ |
| mallard | *Anas platyrhynchos* | ✓ | |
| meadow pipet | *Anthus pratensis* | ✓ | |
| pheasant | *Phasianus colchicus* | ✓ | |
| pied wagtail | *Motacilla alba* | ✓ | ✓ |
| reed bunting S41 | *Emberiza schoeniclus* | ✓ | ✓ |
| reed warbler | *Acrocephalus scripaceus* | ✓ | |
| robin | *Erithacus rubecula* | ✓ | |
| sedge warbler | *Acrocephalus schoenobaenus* | ✓ | |
| skylark Red List, S41 | *Alauda arvensis* | ✓ | |
| snipe | *Gallinago gallinago* | ✓ | |
| song thrush Red List, S41 | *Turdus philomelos* | ✓ | |
| sparrowhawk | *Accipiter nisus* | ✓ | ✓ |
| starling Red List, S41 | *Sturnus vulgaris* | ✓ | ✓ |
| stock dove | *Columba oenas* | ✓ | |
| wheatear | *Oenanthe oenanthe* | ✓ | |
| whitethroat | *Curruca communis* | ✓ | |
| wood pigeon | *Columba palumbus* | ✓ | ✓ |
| wren | *Troglodytes troglodytes* | ✓ | ✓ |

| English name | Scientific name | Site | Adj. |
|---|---|---|---|
| **Amphibians** | | | |
| common toad S41 | *Bufo bufo* | ✓ | |

| English name | Scientific name | Site | Adj. |
|---|---|---|---|
| **Mammals** | | | |
| common shrew | *Sorex araneus* | ✓ | |
| field vole | *Microtus agrestis* | ✓ | |
| fox | *Vulpes vulpes* | ✓ | ✓ |
| rabbit | *Oryctolagus cuniculus* | ✓ | ✓ |
| roe deer | *Capreolus capreolus* | ✓ | |

| English name | Scientific name | Site | Adj. |
|---|---|---|---|
| **Invertebrates** | | | |
| blue-tailed damselfly | *Ischnura elegans* | ✓ | |
| cinnabar S41 | *Tyria jacobaeae* | ✓ | |
| common blue | *Polyommatus icarus* | ✓ | |
| common blue damselfly | *Enallagma cyathigerum* | ✓ | |
| common darter | *Sympetrum striolatum* | | ✓ |
| drinker moth | *Euthrix potatoria* | ✓ | |
| lackey moth | *Malacomsoma neustria* | ✓ | |
| meadow brown | *Maniola jurtina* | ✓ | |
| mother shipton | *Callistege mi* | ✓ | |
| painted lady | *Vanessa cardui* | ✓ | |
| peacock | *Aglais io* | ✓ | |
| red admiral | *Vanessa atalanta* | ✓ | |
| ringlet | *Aphantopus hyperantus* | ✓ | |
| small heath S41 | *Coenonympha pamphilus* | ✓ | |
| small skipper | *Thymelicus sylvestris* | ✓ | |
| small tortoiseshell | *Aglais urticae* | ✓ | |
| small white | *Pieris rapae* | ✓ | |
| southern hawker | *Aeshna cyanea* | ✓ | |

# APPENDIX 13A.2

## DATA SEARCH

# LERC Search Summary Report

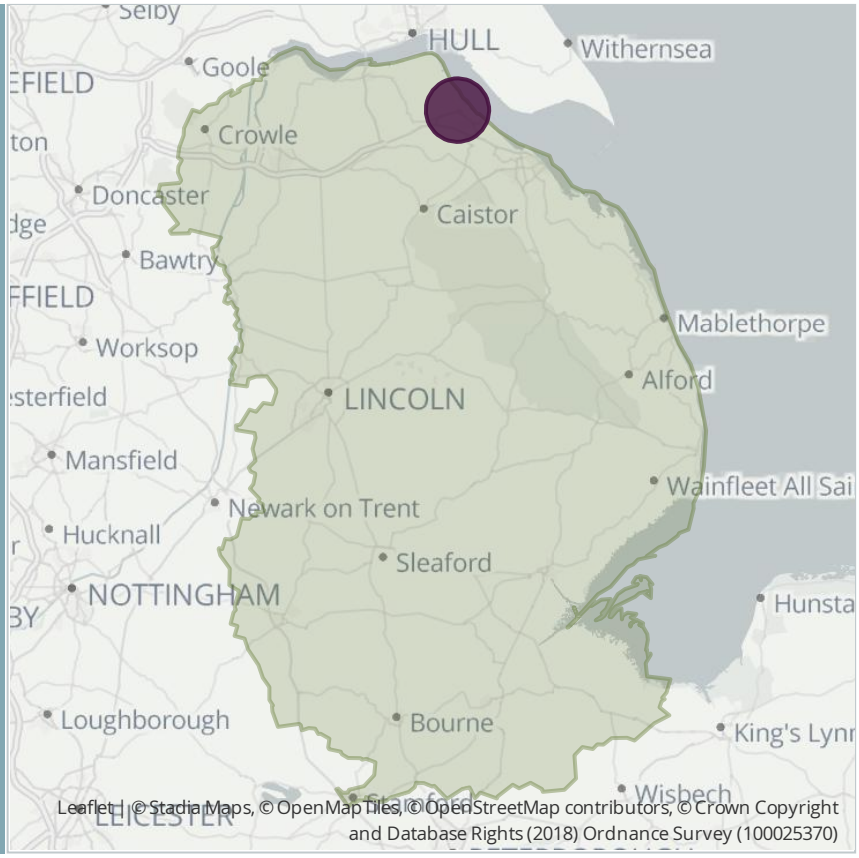
## Grid Reference: TA 16930 16919
## Buffer: 5km

**Date of publication: 20/07/2021**
**Expires: 20/07/2022**

*Achieving more for nature*

GLNP
GREATER LINCOLNSHIRE NATURE PARTNERSHIP

# Report Details

| | |
|---|---|
| **Produced for** | Luke Hartley, ESL (Ecological Services) Ltd |
| **Search area** |  |



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This report summarises a search of statutory sites, non-statutory sites, other sites, habitats and species within the specified area; where no information is returned for a section, it is excluded from this summary report.

## About the Lincolnshire Environmental Records Centre

The Lincolnshire Environmental Records Centre (LERC) collates wildlife and geological information for Greater Lincolnshire from various sources and makes it available for various uses. This data is crucial to aid conservation management of sites, to help organisations prioritise action, and to understand the distribution of species and trends over time. For more information on LERC or to request a data search, visit the website at https://glnp.org.uk/partnership/lerc/

an ALERC accredited LERC
Association of Local Environmental Records Centres

*Lincolnshire Environmental Records Centre is an ALERC accredited LRC, meeting the standard level criteria.*
*For more information on acceditation, see the ALERC website at http://www.alerc.org.uk/alerc-accreditation.html*

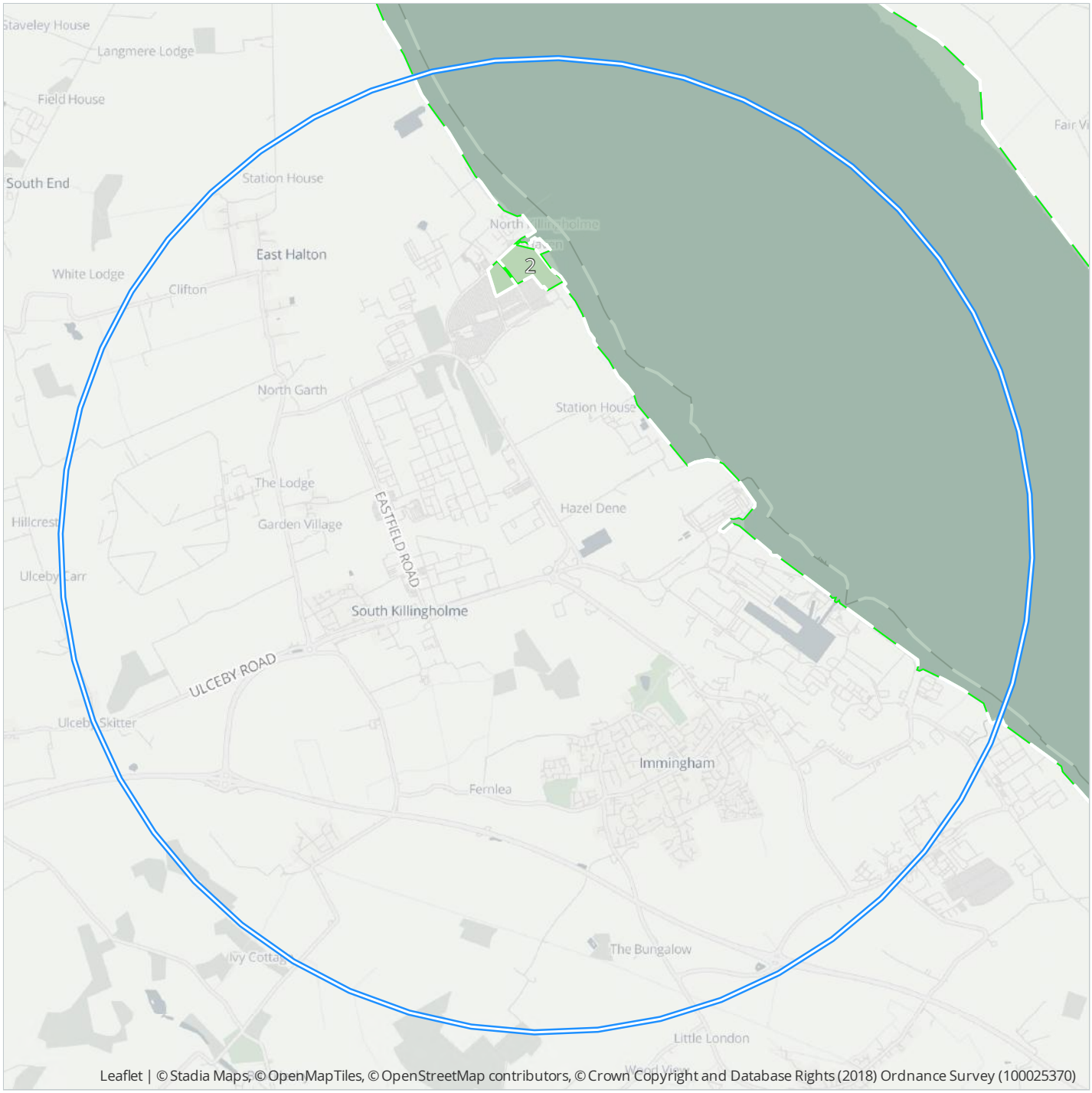
## Statutory Sites

Statutory sites are those afforded legal protection aimed at preventing activities that may damage features of interest. Further information on these sites is available from Natural England (SSSIs, NNRs, LNRs, SPAs, SACs, Ramsars) and The National Association for Areas of Outstanding Natural Beauty (AONBs).



| Code | Designation | Status | Name |
|---|---|---|---|
| 1 | SSSI | Notified | Humber Estuary |
| 2 | SSSI | Notified | North Killingholme Haven Pits |
| 3 | SAC | Designated | Humber Estuary |
| 4 | SAC | Classified | Humber Estuary |
| 5 | Ramsar | Listed | Humber Estuary |

## Statutory Sites within the search area




*Space restrictions on the map may result in some sites not being labelled.*

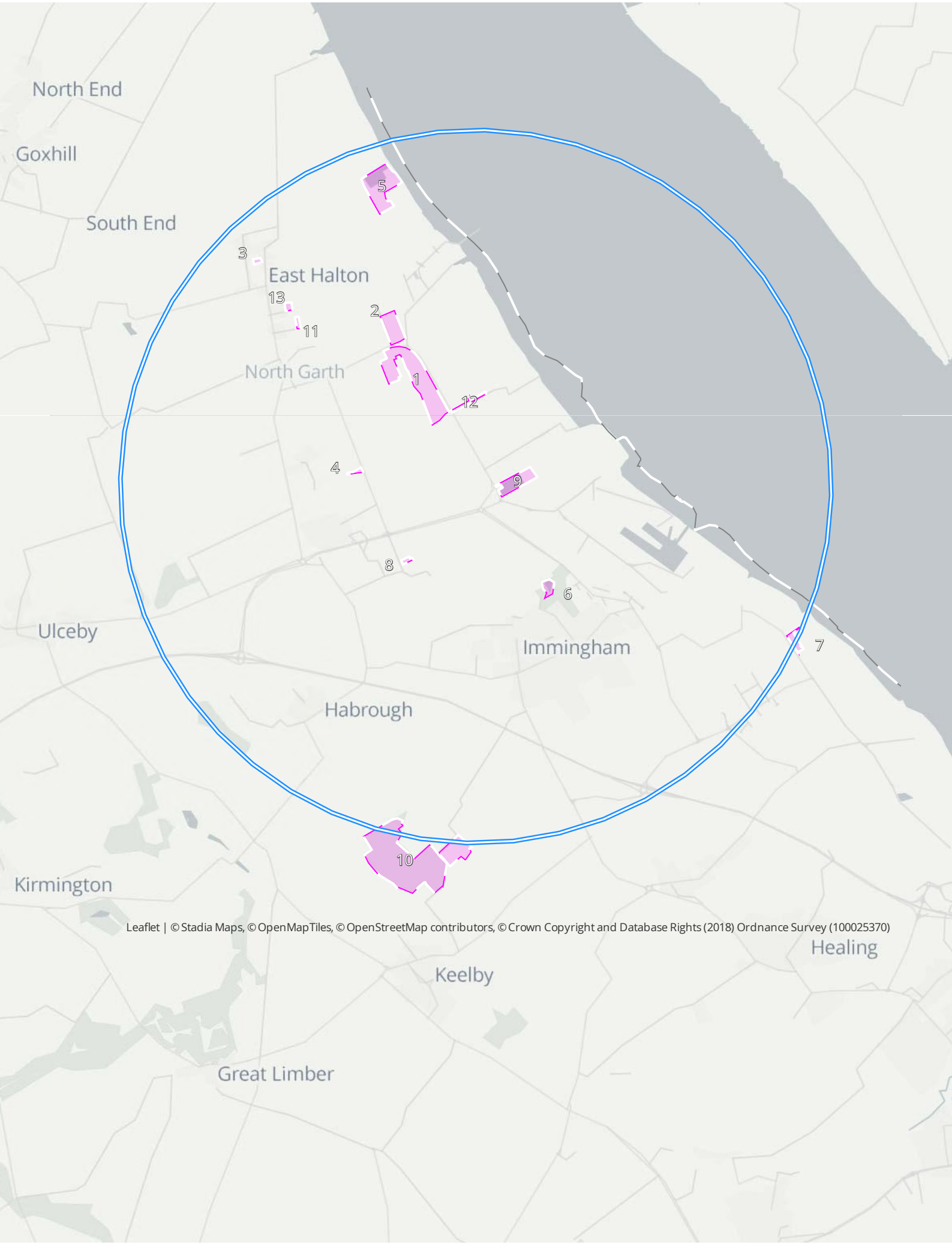
- Site of Special Scientific Interest
- Special Area of Conservation
- Ramsar Site
- Search area
- LERC boundary

## Non-statutory sites

The GLNP works directly with local authorities to coordinate the Local Sites system in Greater Lincolnshire. Sites are selected by the Nature Partnership, based on recommendations made by its expert working groups known as the LWS Panel and LGS Panel. The Register of Local Sites is then submitted for inclusion within local authority planning policy.

These sites are recognition of wildlife or geological value and are a testament to the land management that is already being undertaken on them. Identifying these sites helps local authorities meet their obligations under legislation and government guidance, including reporting on the number of sites in positive management for Single Data List Indicator 160-00.

| Code | Designation | Status | Name |
|---|---|---|---|
| 1 | LWS | Selected | Burkinshaw's Covert |
| 2 | LWS | Selected | Chase Hill Wood |
| 3 | LWS | Selected | East View Meadow |
| 4 | LWS | Selected | Eastfield Road Railway Embankment |
| 5 | LWS | Selected | Halton Marsh Clay Pits |
| 6 | LWS | Selected | Homestead Park Pond |
| 7 | LWS | Selected | Laporte Road Brownfield Site |
| 8 | LWS | Selected | Mayflower Wood Meadow |
| 9 | LWS | Selected | Rosper Road Pools |
| 10 | LWS | Selected | Roxton Wood |
| 11 | LWS | Selected | Scrub Lane East Field |
| 12 | LWS | Selected | Station Road Field |
| 13 | LWS | Selected | Swinster Lane Field |

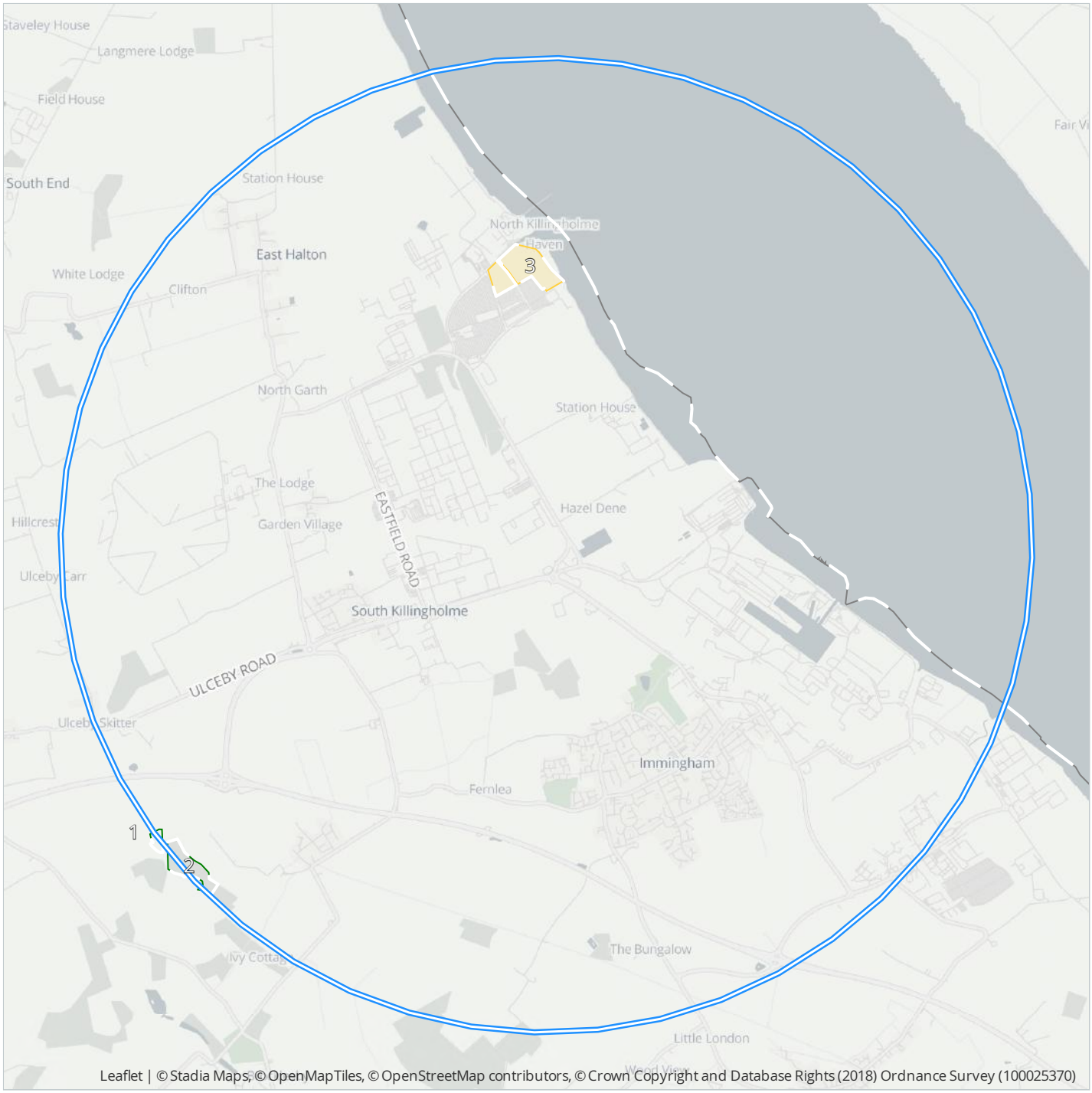

North End
Goxhill
South End
East Halton
North Garth
Ulceby
Immingham
Habrough
Kirmington
Keelby
Great Limber
Healing
1
2
3
4
5
6
7
8
9
10
11
12
13
Leaflet | © Stadia Maps, © OpenMapTiles, © OpenStreetMap contributors, © Crown Copyright and Database Rights (2018) Ordnance Survey (100025370)

## Other Sites

There are a number of other sites which can be important for the biodiversity they support and as part of the natural environments wider ecological network. For more information on these, please contact the relevant organisation.

| Code | Designation | Status | Name |
|---|---|---|---|
| 1 | Ancient Woodland | Ancient & Semi-Natural Woodland | - |
| 2 | Ancient Woodland | Ancient & Semi-Natural Woodland | ALDER WOOD |
| 3 | LWT | - | Killingholme Haven Pits |

## Other Sites within the search area




*Space restrictions on the map may result in some sites not being labelled.*

Ancient & Semi-Natural Woodland

Lincolnshire Wildlife Trust Reserve

Search area

LERC boundary

# Habitats

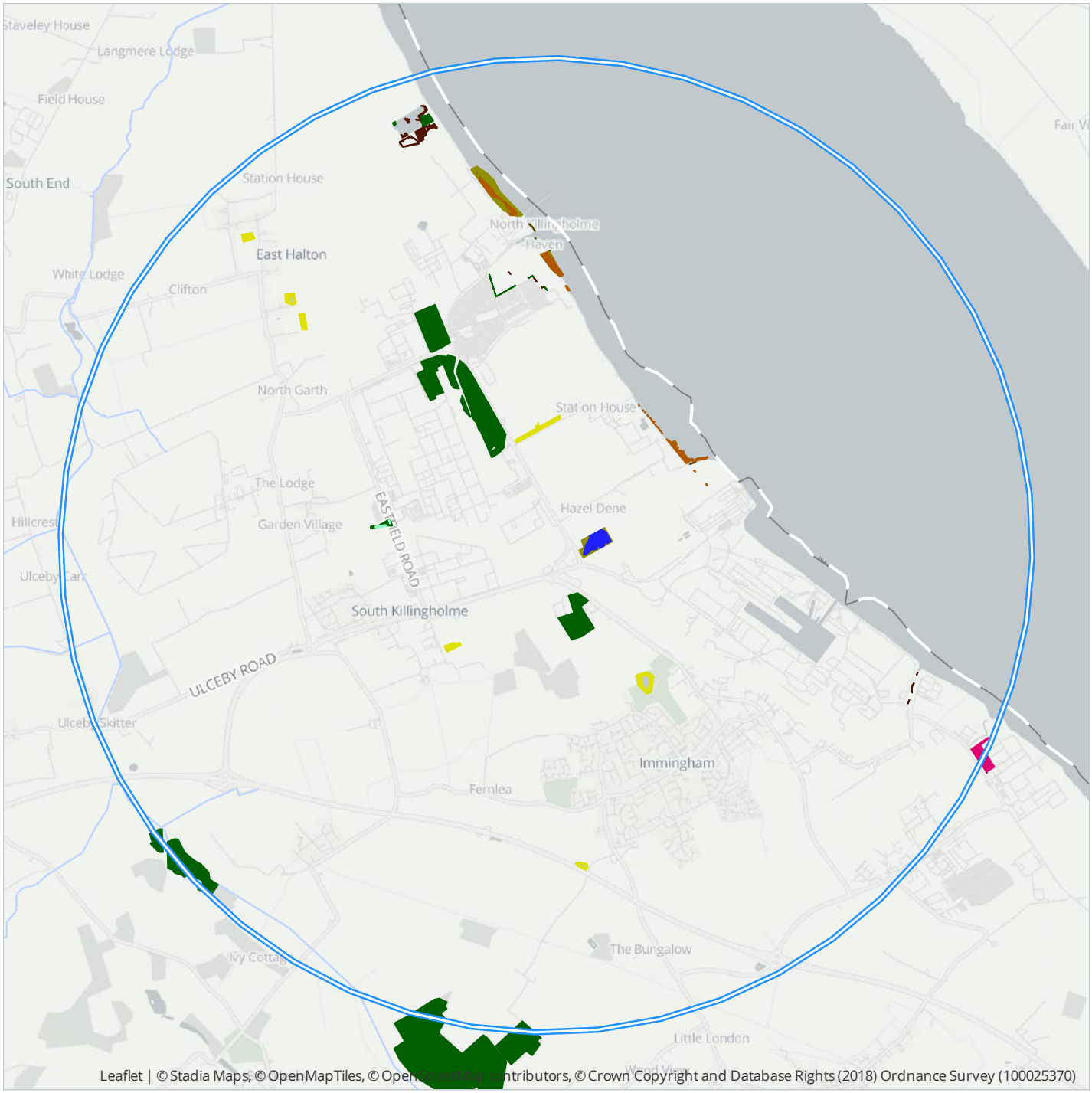
Priority habitats are those identified as being the most threatened and requiring conservation action in the UK. The most-recent list of UK priority species and habitats was published in August 2007 following a 2-year review of the process and priorities, representing the most comprehensive analysis of such information ever undertaken in the UK.

The data presented is the most up-to-date of the data collated by the GLNP and mostly comes from surveys of Local Sites; further historic data and non-Priority habitat data may also be available. Absence of information doesn't mean that the Priority habitat isn't present merely that no information is held.

A number of different datasets have been consulted to produce this report - a summary of attribution statements is available at https://glnp.org.uk/images/uploads/services/lincolnshire-environmental-records-centre/habitat%20attribution.pdf.

| Type | Habitat | Survey Date | Area (ha) |
|---|---|---|---|
| Priority Habitat | Coastal saltmarsh | 2001 - 2011 | 4.94 |
| Priority Habitat | Eutrophic standing waters | 2007 | 3.46 |
| Priority Habitat | Intertidal mudflats | 2000 | 0.04 |
| Priority Habitat | Lowland calcareous grassland | 2007 | 0.23 |
| Priority Habitat | Lowland fens | 2007 - 2011 | 7.13 |
| Priority Habitat | Lowland meadows | 2007 - 2011 | 7.1 |
| Priority Habitat | Lowland mixed deciduous woodland | 2002 - 2020 | 138.04 |
| Priority Habitat | Open mosaic habitats on previously developed land | 2015 | 2.93 |
| Priority Habitat | Reedbeds | 2002 - 2015 | 2.45 |
| Priority Habitat | Rivers | 2019 | 11.1 |

## Habitats within the search area




*Space restrictions on the map may result in some sites not being labelled.*

- Coastal saltmarsh
- Eutrophic standing waters
- Intertidal mudflats
- Lowland calcareous grassland
- Lowland fens
- Lowland meadows
- Lowland mixed deciduous woodland
- Open mosaic habitats on previously developed land
- Reedbeds
- Rivers
- Search area
- LERC boundary

# Species

Lincolnshire Environmental Records Centre holds records on the following species within or overlapping the search area. Data shown is as held by LERC; past records of presence of a species does not guarantee continued occurrence and absence of records does not imply absence of a species, merely that no records are held. Confidential data, zero abundance records, data at poorly defined geographic resolutions and data pending validation and/or verification are also excluded from this report. A number of different datasets have been consulted to produce this report - a summary of attribution statements is available at https://glnp.org.uk/images/uploads/services/lincolnshire-environmental-records-centre/species%20attribution.pdf

## Amphibian (4 taxa)

| | | | |
|---|---|---|---|
| Common Frog, *Rana temporaria* | 20 | 1977 - 2018 | Protected |
| Common Toad, *Bufo bufo* | 26 | 1977 - 2016 | Protected, Priority |
| Great Crested Newt, *Triturus cristatus* | 79 | 1977 - 2020 | Protected, Priority, Local Priority |
| Smooth Newt, *Lissotriton vulgaris* | 34 | 2004 - 2020 | Protected |

## Annelid (1 taxa)

| | | | |
|---|---|---|---|
| Tentacled Lagoon-Worm, *Alkmaria romijni* | 2 | 1986 - 1986 | Protected |

## Bird (95 taxa)

| | | | |
|---|---|---|---|
| Avocet, *Recurvirostra avosetta* | 55 | 1980 - 2019 | Protected |
| Barn Owl, *Tyto alba* | 47 | 1990 - 2017 | Protected, Local Priority |
| Barnacle Goose, *Branta leucopsis* | 2 | 2011 - 2017 | Non-native |
| Bearded Reedling, *Panurus biarmicus* | 15 | 1993 - 2017 | Protected |
| Bittern, *Botaurus stellaris* | 11 | 1993 - 2012 | Protected, Priority |
| Black Kite, *Milvus migrans* | 1 | 2014 - 2014 | Non-native |
| Black Redstart, *Phoenicurus ochruros* | 2 | 2001 - 2011 | Protected |
| Black Tern, *Chlidonias niger* | 3 | 1980 - 2007 | Protected |
| Black-tailed Godwit, *Limosa limosa* | 400 | 1980 - 2017 | Protected |
| Blue-headed Wagtail, *Motacilla flava subsp. flava* | 1 | 2005 - 2005 | Local Priority |
| Brambling, *Fringilla montifringilla* | 6 | 1999 - 2017 | Protected |
| Bullfinch, *Pyrrhula pyrrhula* | 82 | 1974 - 2017 | Local Priority |
| Canada Goose, *Branta canadensis* | 43 | 1978 - 2013 | Non-native |
| Cetti's Warbler, *Cettia cetti* | 8 | 2013 - 2019 | Protected |
| Collared Dove, *Streptopelia decaocto* | 175 | 1975 - 2018 | Non-native |
| Columba livia 'feral', *Columba livia 'feral'* | 24 | 1999 - 2017 | Non-native |
| Common Firecrest, *Regulus ignicapilla* | 1 | 2016 - 2016 | Protected |
| Common Scoter, *Melanitta nigra* | 7 | 2006 - 2017 | Protected, Priority |
| Corn Bunting, *Emberiza calandra* | 2 | 1976 - 1977 | Local Priority |
| Cuckoo, *Cuculus canorus* | 28 | 1975 - 2018 | Priority |
| Curlew, *Numenius arquata* | 781 | 1977 - 2017 | Priority |
| Dark-bellied Brent Goose, *Branta bernicla subsp. bernicla* | 3 | 2011 - 2017 | Priority, Non-native |
| Eurasian Whimbrel, *Numenius phaeopus* | 36 | 1977 - 2017 | Protected |

| Bird (95 taxa) | | | |
|---|---|---|---|
| European Greater White-fronted Goose, *Anser albifrons subsp. albifrons* | 3 | 2012 - 2016 | Priority, Non-native |
| Fieldfare, *Turdus pilaris* | 73 | 1978 - 2017 | Protected |
| Gadwall, *Anas strepera* | 24 | 1997 - 2008 | Non-native |
| Garganey, *Anas querquedula* | 4 | 1986 - 1990 | Protected |
| Goldeneye, *Bucephala clangula* | 10 | 1996 - 2017 | Protected |
| Grasshopper Warbler, *Locustella naevia* | 32 | 1977 - 2012 | Priority |
| Green Sandpiper, *Tringa ochropus* | 25 | 1977 - 2017 | Protected |
| Greenshank, *Tringa nebularia* | 69 | 1977 - 2017 | Protected |
| Grey Partridge, *Perdix perdix* | 30 | 1977 - 2017 | Priority, Non-native |
| Greylag Goose, *Anser anser* | 53 | 1989 - 2017 | Protected |
| Hen Harrier, *Circus cyaneus* | 4 | 2009 - 2014 | Protected |
| Hobby, *Falco subbuteo* | 12 | 2001 - 2015 | Protected |
| House Sparrow, *Passer domesticus* | 257 | 1977 - 2017 | Priority |
| Kingfisher, *Alcedo atthis* | 56 | 1998 - 2017 | Protected |
| Lapwing, *Vanellus vanellus* | 386 | 1977 - 2017 | Priority, Local Priority |
| Leach's Storm Petrel, *Oceanodroma leucorhoa* | 1 | 2016 - 2016 | Protected |
| Lesser Redpoll, *Acanthis cabaret* | 1 | 2017 - 2017 | Priority |
| Linnet, *Linaria cannabina* | 91 | 1977 - 2017 | Local Priority |
| Little Bittern, *Ixobrychus minutus* | 1 | 1978 - 1978 | Protected |
| Little Gull, *Hydrocoloeus minutus* | 8 | 1980 - 2011 | Protected |
| Little Owl, *Athene noctua* | 2 | 1999 - 1999 | Non-native |
| Little Ringed Plover, *Charadrius dubius* | 6 | 1977 - 2011 | Protected |
| Little Tern, *Sternula albifrons* | 1 | 2001 - 2001 | Protected |
| Long-tailed Duck, *Clangula hyemalis* | 1 | 1999 - 1999 | Protected |
| Mandarin Duck, *Aix galericulata* | 1 | 2010 - 2010 | Non-native |
| Marsh Harrier, *Circus aeruginosus* | 63 | 1998 - 2019 | Protected |
| Merlin, *Falco columbarius* | 20 | 1980 - 2017 | Protected |
| Mute Swan, *Cygnus olor* | 176 | 1977 - 2017 | Non-native |
| Peregrine, *Falco peregrinus* | 46 | 1998 - 2017 | Protected |
| Pheasant, *Phasianus colchicus* | 98 | 1975 - 2019 | Non-native |
| Pink-footed Goose, *Anser brachyrhynchus* | 28 | 1998 - 2017 | Non-native |
| Pintail, *Anas acuta* | 8 | 1990 - 2017 | Protected, Non-native |
| Pochard, *Aythya ferina* | 72 | 1993 - 2017 | Non-native |
| Purple Heron, *Ardea purpurea* | 1 | 2005 - 2005 | Protected |
| Purple Sandpiper, *Calidris maritima* | 4 | 1978 - 2016 | Protected |
| Red Crossbill, *Loxia curvirostra* | 1 | 2009 - 2009 | Protected |
| Red Kite, *Milvus milvus* | 4 | 2009 - 2017 | Protected |
| Red-legged Partridge, *Alectoris rufa* | 19 | 1977 - 2017 | Non-native |
| Red-necked Phalarope, *Phalaropus lobatus* | 1 | 1990 - 1990 | Protected, Priority |
| Red-throated Loon, *Gavia stellata* | 1 | 2014 - 2014 | Protected |
| Redshank, *Tringa totanus* | 869 | 1977 - 2017 | Local Priority |

| Bird (95 taxa) | | | |
|---|---|---|---|
| Redwing, *Turdus iliacus* | 67 | 1974 - 2017 | Protected |
| Reed Bunting, *Emberiza schoeniclus* | 113 | 1974 - 2017 | Priority, Local Priority |
| Ring Ouzel, *Turdus torquatus* | 4 | 2007 - 2017 | Priority |
| Rock Dove, *Columba livia* | 10 | 1997 - 2009 | Non-native |
| Rose-coloured Starling, *Pastor roseus* | 1 | 2015 - 2015 | Non-native |
| Ruddy Duck, *Oxyura jamaicensis* | 62 | 1987 - 2011 | Non-native |
| Ruddy Shelduck, *Tadorna ferruginea* | 1 | 2004 - 2004 | Non-native |
| Ruff, *Calidris pugnax* | 92 | 1976 - 2017 | Protected |
| Scaup, *Aythya marila* | 5 | 1989 - 2017 | Protected, Priority |
| Skylark, *Alauda arvensis* | 111 | 1977 - 2017 | Local Priority |
| Snipe, *Gallinago gallinago* | 169 | 1977 - 2017 | Local Priority |
| Snow Bunting, *Plectrophenax nivalis* | 14 | 1989 - 2015 | Protected |
| Song Thrush, *Turdus philomelos* | 95 | 1977 - 2019 | Local Priority |
| Spoonbill, *Platalea leucorodia* | 15 | 2001 - 2011 | Protected |
| Spotted Flycatcher, *Muscicapa striata* | 6 | 1997 - 2011 | Priority |
| Starling, *Sturnus vulgaris* | 274 | 1977 - 2018 | Local Priority |
| Swift, *Apus apus* | 69 | 1975 - 2019 | Local Priority |
| Tree Pipit, *Anthus trivialis* | 2 | 2017 - 2017 | Priority |
| Tree Sparrow, *Passer montanus* | 126 | 1975 - 2017 | Priority |
| Turtle Dove, *Streptopelia turtur* | 53 | 1975 - 2015 | Priority |
| Velvet Scoter, *Melanitta fusca* | 2 | 1998 - 2013 | Protected |
| Western Cattle Egret, *Bubulcus ibis* | 1 | 2016 - 2016 | Non-native |
| Western Osprey, *Pandion haliaetus* | 2 | 2010 - 2013 | Protected |
| White-fronted Goose, *Anser albifrons* | 3 | 2017 - 2017 | Non-native |
| Whooper Swan, *Cygnus cygnus* | 12 | 1998 - 2017 | Protected, Non-native |
| Wigeon, *Anas penelope* | 8 | 1977 - 2010 | Non-native |
| Wood Sandpiper, *Tringa glareola* | 15 | 1977 - 2015 | Protected |
| Wood Warbler, *Phylloscopus sibilatrix* | 1 | 2006 - 2006 | Priority |
| Yellow Wagtail, *Motacilla flava* | 51 | 1974 - 2017 | Local Priority |
| Yellow Wagtail, *Motacilla flava subsp. flavissima* | 1 | 1990 - 1990 | Priority, Local Priority |
| Yellowhammer, *Emberiza citrinella* | 112 | 1975 - 2018 | Priority, Local Priority |

| Bony Fish (Actinopterygii) (3 taxa) | | | |
|---|---|---|---|
| Common Carp, *Cyprinus carpio* | 23 | 1977 - 1995 | Non-native |
| Crucian Carp, *Carassius carassius* | 14 | 1987 - 1995 | Non-native |
| European Eel, *Anguilla anguilla* | 1 | 1977 - 1977 | Priority |

| Conifer (12 taxa) | | | |
|---|---|---|---|
| Cedar-of-Lebanon, *Cedrus libani* | 1 | 2011 - 2011 | Non-native |
| Colorado Spruce, *Picea pungens* | 1 | 2019 - 2019 | Non-native |
| Corsican Pine, *Pinus nigra* | 12 | 1997 - 2019 | Non-native |
| European Larch, *Larix decidua* | 3 | 1993 - 1997 | Non-native |
| Lawson's Cypress, *Chamaecyparis lawsoniana* | 4 | 2011 - 2016 | Non-native |
| Leyland Cypress, *Cupressus macrocarpa x Xanthocyparis nootkatensis = X Cuprocyparis leylandi* | 9 | 2009 - 2019 | Non-native |
| Lodgepole Pine, *Pinus contorta* | 2 | 2012 - 2016 | Non-native |
| Monkey-puzzle, *Araucaria araucana* | 5 | 2008 - 2013 | Non-native |
| Monterey Cypress, *Cupressus macrocarpa* | 2 | 2008 - 2016 | Non-native |
| Norway Spruce, *Picea abies* | 3 | 2008 - 2019 | Non-native |
| Wellingtonia, *Sequoiadendron giganteum* | 1 | 2012 - 2012 | Non-native |
| Western Red-cedar, *Thuja plicata* | 2 | 2016 - 2019 | Non-native |

| Crustacean (2 taxa) | | | |
|---|---|---|---|
| Crangonyx pseudogracilis, *Crangonyx pseudogracilis* | 21 | 1995 - 2016 | Non-native |
| Gammarus tigrinus, *Gammarus tigrinus* | 3 | 2000 - 2000 | Non-native |

| Flowering Plant (250 taxa) | | | |
|---|---|---|---|
| , *Oenothera agg.* | 1 | 2011 - 2011 | Non-native |
| Almond Willow, *Salix triandra* | 1 | 1999 - 1999 | Non-native |
| Alsike Clover, *Trifolium hybridum* | 11 | 1972 - 2019 | Non-native |
| Alsike Clover, *Trifolium hybridum subsp. hybridum* | 1 | 1977 - 1977 | Non-native |
| American Slough-grass, *Beckmannia syzigachne* | 1 | 1993 - 1993 | Non-native |
| American Willowherb, *Epilobium ciliatum* | 21 | 1993 - 2019 | Non-native |
| Annual Vernal-grass, *Anthoxanthum aristatum* | 2 | 1985 - 1985 | Non-native |
| Annual Wall-rocket, *Diplotaxis muralis* | 1 | 1977 - 1977 | Non-native |
| Apple, *Malus pumila* | 23 | 1986 - 2019 | Non-native |
| Balm, *Melissa officinalis* | 5 | 2008 - 2015 | Non-native |
| Balm-of-Gilead, *Populus balsamifera x deltoides = P. x jackii* | 1 | 2019 - 2019 | Non-native |
| Barren Brome, *Bromus sterilis* | 120 | 1977 - 2019 | Non-native |
| Beaked Hawk's-beard, *Crepis vesicaria* | 27 | 1977 - 2019 | Non-native |
| Black Bent, *Agrostis gigantea* | 3 | 1993 - 1993 | Non-native |
| Black Currant, *Ribes nigrum* | 2 | 2008 - 2008 | Non-native |
| Black Horehound, *Ballota nigra* | 5 | 1997 - 2019 | Non-native |
| Black-bindweed, *Fallopia convolvulus* | 43 | 1977 - 2019 | Non-native |
| Black-grass, *Alopecurus myosuroides* | 33 | 1990 - 2019 | Non-native |
| Bladder-senna, *Colutea arborescens* | 1 | 2005 - 2005 | Non-native |
| Bluebell, *Hyacinthoides non-scripta* | 12 | 1987 - 2017 | Protected |
| Bluebell, *Hyacinthoides non-scripta x hispanica = H. x massartiana* | 1 | 2019 - 2019 | Non-native |
| Borage, *Borago officinalis* | 6 | 2009 - 2019 | Non-native |

| Flowering Plant (250 taxa) | | | |
|---|---|---|---|
| Bread Wheat, *Triticum aestivum* | 10 | 2005 - 2019 | Non-native |
| Bristly Oxtongue, *Picris echioides* | 127 | 1973 - 2019 | Non-native |
| Broad Bean, *Vicia faba* | 1 | 2014 - 2014 | Non-native |
| Broad-leaved Cockspurthorn, *Crataegus persimilis* | 2 | 2019 - 2019 | Non-native |
| Broad-leaved Everlasting-pea, *Lathyrus latifolius* | 4 | 2012 - 2019 | Non-native |
| Buckwheat, *Fagopyrum esculentum* | 3 | 1990 - 1990 | Non-native |
| Bugloss, *Anchusa arvensis* | 3 | 2011 - 2019 | Non-native |
| Bullwort, *Ammi majus* | 1 | 2011 - 2011 | Non-native |
| Butterfly-bush, *Buddleja davidii* | 25 | 1997 - 2019 | Non-native |
| Calystegia silvatica subsp. disjuncta, *Calystegia silvatica subsp. disjuncta* | 2 | 2019 - 2019 | Non-native |
| Canadian Fleabane, *Conyza canadensis* | 25 | 1997 - 2019 | Non-native |
| Canadian Goldenrod, *Solidago canadensis* | 1 | 2005 - 2005 | Non-native |
| Canadian Waterweed, *Elodea canadensis* | 1 | 1993 - 1993 | Non-native |
| Canary-grass, *Phalaris canariensis* | 6 | 1993 - 2009 | Non-native |
| Chamomile, *Chamaemelum nobile* | 1 | 1977 - 1977 | Priority |
| Charlock, *Sinapis arvensis* | 47 | 1985 - 2019 | Non-native |
| Cherry Laurel, *Prunus laurocerasus* | 4 | 2005 - 2015 | Non-native |
| Cherry Plum, *Prunus cerasifera* | 10 | 1997 - 2019 | Non-native |
| Cherry Plum, *Prunus cerasifera var. pissardii* | 1 | 2012 - 2012 | Non-native |
| Chicory, *Cichorium intybus* | 1 | 2019 - 2019 | Non-native |
| Cockspur, *Echinochloa crus-galli* | 2 | 1993 - 1993 | Non-native |
| Common Amaranth, *Amaranthus retroflexus* | 4 | 1993 - 1996 | Non-native |
| Common Evening-primrose, *Oenothera biennis* | 1 | 1973 - 1973 | Non-native |
| Common Fiddleneck, *Amsinckia micrantha* | 1 | 2011 - 2011 | Non-native |
| Common Field-speedwell, *Veronica persica* | 57 | 1977 - 2019 | Non-native |
| Common Fumitory, *Fumaria officinalis subsp. officinalis* | 2 | 2007 - 2007 | Non-native |
| Common Fumitory, *Fumaria officinalis* | 5 | 1993 - 2019 | Non-native |
| Common Mallow, *Malva sylvestris* | 36 | 1985 - 2019 | Non-native |
| Common Millet, *Panicum miliaceum* | 1 | 1993 - 1993 | Non-native |
| Common Poppy, *Papaver rhoeas* | 71 | 1977 - 2019 | Non-native |
| Common Vetch, *Vicia sativa subsp. segetalis* | 20 | 1973 - 2019 | Non-native |
| Confused Michaelmas-daisy, *Aster novi-belgii* | 1 | 1977 - 1977 | Non-native |
| Corn Marigold, *Glebionis segetum* | 2 | 1991 - 1993 | Non-native |
| Corncockle, *Agrostemma githago* | 2 | 1991 - 1991 | Non-native |
| Cornflower, *Centaurea cyanus* | 3 | 1991 - 2014 | Priority, Non-native |
| Cornus sanguinea subsp. australis, *Cornus sanguinea subsp. australis* | 3 | 2012 - 2015 | Non-native |
| Cotton Thistle, *Onopordum acanthium* | 2 | 1996 - 1996 | Non-native |
| Cowherb, *Vaccaria hispanica* | 1 | 1976 - 1976 | Non-native |
| Crepis vesicaria subsp. taraxacifolia, *Crepis vesicaria subsp. taraxacifolia* | 1 | 2014 - 2014 | Non-native |

| Flowering Plant (250 taxa) | | | |
|---|---|---|---|
| Crown Vetch, *Securigera varia* | 7 | 1988 - 2015 | Non-native |
| Curly Waterweed, *Lagarosiphon major* | 1 | 2012 - 2012 | Non-native |
| Cut-leaved Crane's-bill, *Geranium dissectum* | 145 | 1977 - 2019 | Non-native |
| Cut-leaved Dead-nettle, *Lamium hybridum* | 7 | 1970 - 2014 | Non-native |
| Daisy-bush, *Olearia avicenniifolia x moschata = O. x haastii* | 1 | 2012 - 2012 | Non-native |
| Divided Sedge, *Carex divisa* | 1 | 2011 - 2011 | Priority |
| Dotted Loosestrife, *Lysimachia punctata* | 4 | 2007 - 2015 | Non-native |
| Dwarf Mallow, *Malva neglecta* | 2 | 1998 - 2009 | Non-native |
| Dwarf Spurge, *Euphorbia exigua* | 2 | 1993 - 2019 | Non-native |
| Early Goldenrod, *Solidago gigantea* | 2 | 2009 - 2019 | Non-native |
| Eastern Rocket, *Sisymbrium orientale* | 3 | 2007 - 2011 | Non-native |
| Equal-leaved Knotgrass, *Polygonum arenastrum* | 9 | 1972 - 2016 | Non-native |
| False-acacia, *Robinia pseudoacacia* | 3 | 1997 - 2019 | Non-native |
| Fennel, *Foeniculum vulgare* | 1 | 2019 - 2019 | Non-native |
| Feverfew, *Tanacetum parthenium* | 6 | 1998 - 2019 | Non-native |
| Field Forget-me-not, *Myosotis arvensis* | 93 | 1973 - 2019 | Non-native |
| Field Pansy, *Viola arvensis* | 18 | 1977 - 2014 | Non-native |
| Field Penny-cress, *Thlaspi arvense* | 8 | 1997 - 2016 | Non-native |
| Fig-leaved Goosefoot, *Chenopodium ficifolium* | 2 | 2014 - 2019 | Non-native |
| Flixweed, *Descurainia sophia* | 1 | 2011 - 2011 | Non-native |
| Flowering Currant, *Ribes sanguineum* | 3 | 2012 - 2019 | Non-native |
| Fox-and-cubs, *Pilosella aurantiaca* | 2 | 1998 - 2019 | Non-native |
| Foxtail Barley, *Hordeum jubatum* | 3 | 2013 - 2019 | Non-native |
| Franchet's Cotoneaster, *Cotoneaster franchetii* | 1 | 2015 - 2015 | Non-native |
| Fringecups, *Tellima grandiflora* | 1 | 2011 - 2011 | Non-native |
| Garden Asparagus, *Asparagus officinalis* | 1 | 2009 - 2009 | Non-native |
| Garden Candytuft, *Iberis umbellata* | 1 | 2014 - 2014 | Non-native |
| Garden Grape-hyacinth, *Muscari armeniacum* | 3 | 2005 - 2011 | Non-native |
| Garden Lady's-mantle, *Alchemilla mollis* | 2 | 2012 - 2015 | Non-native |
| Garden Lobelia, *Lobelia erinus* | 1 | 2015 - 2015 | Non-native |
| Garden Pansy, *Viola lutea x tricolor x altaica = V. x wittrockiana* | 1 | 2011 - 2011 | Non-native |
| Garden Privet, *Ligustrum ovalifolium* | 8 | 1998 - 2019 | Non-native |
| Gooseberry, *Ribes uva-crispa* | 27 | 1978 - 2011 | Non-native |
| Great Brome, *Bromus diandrus* | 3 | 2013 - 2019 | Non-native |
| Greater Burdock, *Arctium lappa* | 3 | 2014 - 2019 | Non-native |
| Greater Celandine, *Chelidonium majus* | 1 | 2011 - 2011 | Non-native |
| Greater Periwinkle, *Vinca major* | 4 | 2008 - 2019 | Non-native |
| Greater Snowdrop, *Galanthus elwesii* | 1 | 2015 - 2015 | Non-native |
| Green Alkanet, *Pentaglottis sempervirens* | 3 | 2011 - 2019 | Non-native |
| Green Bristle-grass, *Setaria viridis* | 2 | 1993 - 1993 | Non-native |
| Green Field-speedwell, *Veronica agrestis* | 4 | 1997 - 1997 | Non-native |

| Flowering Plant (250 taxa) | | | |
|---|---|---|---|
| Grey Alder, *Alnus incana* | 7 | 1997 - 2019 | Non-native |
| Ground-elder, *Aegopodium podagraria* | 2 | 2012 - 2016 | Non-native |
| Guernsey Fleabane, *Conyza sumatrensis* | 1 | 2009 - 2009 | Non-native |
| Hare's-tail, *Lagurus ovatus* | 1 | 2013 - 2013 | Non-native |
| Hedge Mustard, *Sisymbrium officinale* | 75 | 1977 - 2019 | Non-native |
| Hedgerow Crane's-bill, *Geranium pyrenaicum* | 5 | 1998 - 2019 | Non-native |
| Hemlock, *Conium maculatum* | 120 | 1977 - 2019 | Non-native |
| Hemp, *Cannabis sativa* | 4 | 1990 - 1990 | Non-native |
| Henbit Dead-nettle, *Lamium amplexicaule* | 1 | 2011 - 2011 | Non-native |
| Hoary Cress, *Lepidium draba* | 13 | 1973 - 2019 | Non-native |
| Hoary Cress, *Lepidium draba subsp. draba* | 2 | 2015 - 2019 | Non-native |
| Honesty, *Lunaria annua* | 2 | 1998 - 2008 | Non-native |
| Horse-chestnut, *Aesculus hippocastanum* | 24 | 1970 - 2019 | Non-native |
| Horse-radish, *Armoracia rusticana* | 11 | 1973 - 2019 | Non-native |
| Hungarian Brome, *Bromopsis inermis* | 2 | 2013 - 2014 | Non-native |
| Hybrid Balsam-poplar, *Populus trichocarpa x balsamifera = P. 'Balsam Spire'* | 2 | 2013 - 2016 | Non-native |
| Hybrid Black-poplar, *Populus nigra x deltoides = P. x canadensis* | 40 | 1993 - 2019 | Non-native |
| Hybrid Coralberry, *Symphoricarpos microphyllus x orbiculatus = S. x chenaultii* | 1 | 2019 - 2019 | Non-native |
| Hybrid Crack-willow, *Salix euxina x alba = S. x fragilis* | 8 | 2007 - 2012 | Non-native |
| Italian Alder, *Alnus cordata* | 3 | 2008 - 2019 | Non-native |
| Italian Rye-grass, *Lolium multiflorum* | 24 | 1978 - 2019 | Non-native |
| Ivy-leaved Speedwell, *Veronica hederifolia* | 4 | 1998 - 2008 | Non-native |
| Ivy-Leaved Speedwell, *Veronica hederifolia subsp. lucorum* | 1 | 2011 - 2011 | Non-native |
| Ivy-Leaved Speedwell, *Veronica hederifolia subsp. hederifolia* | 3 | 2011 - 2014 | Non-native |
| Ivy-leaved Toadflax, *Cymbalaria muralis* | 1 | 1999 - 1999 | Non-native |
| Japanese Cherry, *Prunus serrulata* | 2 | 2011 - 2011 | Non-native |
| Japanese Honeysuckle, *Lonicera japonica* | 1 | 2019 - 2019 | Non-native |
| Japanese Knotweed, *Fallopia japonica* | 4 | 1987 - 2009 | Non-native |
| Japanese Rose, *Rosa rugosa* | 3 | 2013 - 2019 | Non-native |
| Kerria japonica, *Kerria japonica* | 1 | 2015 - 2015 | Non-native |
| Laburnham, *Laburnum anagyroides* | 5 | 1993 - 2011 | Non-native |
| Lamb's-ear, *Stachys byzantina* | 1 | 2016 - 2016 | Non-native |
| Large Bindweed, *Calystegia silvatica* | 30 | 1998 - 2019 | Non-native |
| Least Duckweed, *Lemna minuta* | 2 | 2012 - 2013 | Non-native |
| Lesser Swine-cress, *Lepidium didymum* | 6 | 1997 - 2018 | Non-native |
| Lilac, *Syringa vulgaris* | 16 | 1993 - 2019 | Non-native |
| London Plane, *Platanus occidentalis x orientalis = P. x hispanica* | 3 | 2015 - 2016 | Non-native |
| Long Smooth-headed Poppy, *Papaver dubium* | 8 | 1977 - 2019 | Non-native |
| Loose Silky-bent, *Apera spica-venti* | 1 | 1993 - 1993 | Non-native |

| Flowering Plant (250 taxa) | | | |
|---|---|---|---|
| Lucerne, *Medicago sativa subsp. sativa* | 8 | 1972 - 2015 | Non-native |
| Lungwort, *Pulmonaria officinalis* | 2 | 1979 - 2008 | Non-native |
| Maize, *Zea mays* | 1 | 1990 - 1990 | Non-native |
| Medium-flowered Winter-cress, *Barbarea intermedia* | 1 | 2016 - 2016 | Non-native |
| Mind-your-own-business, *Soleirolia soleirolii* | 2 | 1998 - 2009 | Non-native |
| Moth Mullein, *Verbascum blattaria* | 2 | 2019 - 2019 | Non-native |
| Mrs Wilson's Barberry, *Berberis wilsoniae* | 1 | 2015 - 2015 | Non-native |
| Mugwort, *Artemisia vulgaris* | 88 | 1973 - 2019 | Non-native |
| Musk Stork's-bill, *Erodium moschatum* | 3 | 2011 - 2011 | Non-native |
| Narrow-leaved Pepperwort, *Lepidium ruderale* | 4 | 1993 - 2019 | Non-native |
| Narrow-leaved Ragwort, *Senecio inaequidens* | 18 | 2010 - 2019 | Non-native |
| Nettle-leaved Goosefoot, *Chenopodium murale* | 2 | 1993 - 1993 | Non-native |
| New Zealand Pigmyweed, *Crassula helmsii* | 3 | 2011 - 2016 | Non-native |
| Norway Maple, *Acer platanoides* | 23 | 1987 - 2015 | Non-native |
| Nuttall's Waterweed, *Elodea nuttallii* | 7 | 1997 - 1997 | Non-native |
| Oat, *Avena sativa* | 1 | 2012 - 2012 | Non-native |
| Oil-seed Rape, *Brassica napus subsp. oleifera* | 16 | 1993 - 2019 | Non-native |
| Opium Poppy, *Papaver somniferum* | 11 | 1997 - 2019 | Non-native |
| Osier, *Salix viminalis* | 31 | 1970 - 2019 | Non-native |
| Oxford Ragwort, *Senecio squalidus* | 51 | 1977 - 2019 | Non-native |
| Pampas-grass, *Cortaderia selloana* | 2 | 2011 - 2011 | Non-native |
| Pear, *Pyrus communis* | 2 | 2013 - 2013 | Non-native |
| Pear, *Pyrus communis sens.lat.* | 4 | 1994 - 2005 | Non-native |
| Perennial Cornflower, *Centaurea montana* | 3 | 1993 - 2020 | Non-native |
| Petty Spurge, *Euphorbia peplus* | 19 | 1998 - 2019 | Non-native |
| Pheasant's-eye, *Adonis annua* | 2 | 2011 - 2011 | Priority, Non-native |
| Pineappleweed, *Matricaria discoidea* | 47 | 1977 - 2019 | Non-native |
| Portugal Laurel, *Prunus lusitanica* | 2 | 1999 - 2008 | Non-native |
| Pot Marigold, *Calendula officinalis* | 1 | 2011 - 2011 | Non-native |
| Potato, *Solanum tuberosum* | 1 | 2012 - 2012 | Non-native |
| Prickly Lettuce, *Lactuca serriola* | 41 | 1997 - 2019 | Non-native |
| Prickly Saltwort, *Salsola kali subsp. kali* | 2 | 1993 - 1993 | Priority |
| Procumbent Yellow-Sorrel, *Oxalis corniculata var. atropurpurea* | 1 | 2019 - 2019 | Non-native |
| Purple Toadflax, *Linaria purpurea* | 17 | 1994 - 2019 | Non-native |
| Ragweed, *Ambrosia artemisiifolia* | 2 | 1993 - 1993 | Non-native |
| Rape, *Brassica napus* | 2 | 1997 - 1997 | Non-native |
| Rat's-tail Fescue, *Vulpia myuros* | 28 | 1977 - 2019 | Non-native |
| Red Dead-nettle, *Lamium purpureum* | 30 | 1973 - 2019 | Non-native |
| Red Horse-chestnut, *Aesculus carnea* | 1 | 2019 - 2019 | Non-native |
| Red Valerian, *Centranthus ruber* | 7 | 2011 - 2019 | Non-native |
| Reflexed Stonecrop, *Sedum rupestre* | 5 | 1988 - 2011 | Non-native |

| Flowering Plant (250 taxa) | | | |
|---|---|---|---|
| Ribbed Melilot, *Melilotus officinalis* | 11 | 1972 - 2015 | Non-native |
| Rose-of-Sharon, *Hypericum calycinum* | 1 | 2005 - 2005 | Non-native |
| Russian Comfrey, *Symphytum officinale x asperum = S. x uplandicum* | 2 | 2012 - 2012 | Non-native |
| Russian-vine, *Fallopia baldschuanica* | 2 | 2014 - 2014 | Non-native |
| Rye Brome, *Bromus secalinus* | 4 | 2012 - 2016 | Non-native |
| Safflower, *Carthamus tinctorius* | 5 | 1990 - 1993 | Non-native |
| Salsify, *Tragopogon porrifolius* | 1 | 2011 - 2011 | Non-native |
| Scented Mayweed, *Matricaria chamomilla* | 40 | 1991 - 2019 | Non-native |
| Scentless Mayweed, *Tripleurospermum inodorum* | 91 | 1973 - 2019 | Non-native |
| Shaggy Soldier, *Galinsoga quadriradiata* | 1 | 2009 - 2009 | Non-native |
| Shasta Daisy, *Leucanthemum lacustre x maximum = L. x superbum* | 2 | 2007 - 2007 | Non-native |
| Shepherd's-purse, *Capsella bursa-pastoris* | 75 | 1985 - 2019 | Non-native |
| Silver Maple, *Acer saccharinum* | 1 | 2019 - 2019 | Non-native |
| Six-rowed Barley, *Hordeum vulgare* | 1 | 2014 - 2014 | Non-native |
| Slender Speedwell, *Veronica filiformis* | 8 | 1997 - 2012 | Non-native |
| Small Nettle, *Urtica urens* | 4 | 1997 - 1997 | Non-native |
| Small Toadflax, *Chaenorhinum minus* | 12 | 1972 - 2016 | Non-native |
| Snapdragon, *Antirrhinum majus* | 2 | 2016 - 2019 | Non-native |
| Snow-in-summer, *Cerastium tomentosum* | 1 | 1997 - 1997 | Non-native |
| Snowberry, *Symphoricarpos albus* | 13 | 1997 - 2015 | Non-native |
| Snowdrop, *Galanthus nivalis* | 16 | 1999 - 2020 | Non-native |
| Soapwort, *Saponaria officinalis* | 2 | 2005 - 2009 | Non-native |
| Spanish Bluebell, *Hyacinthoides hispanica* | 4 | 2005 - 2017 | Non-native |
| Spear Mint, *Mentha spicata* | 3 | 1987 - 2011 | Non-native |
| Spiraea agg., *Spiraea agg.* | 2 | 1999 - 1999 | Non-native |
| Spotted Dead-nettle, *Lamium maculatum* | 2 | 2012 - 2012 | Non-native |
| Spotted-laurel, *Aucuba japonica* | 1 | 1999 - 1999 | Non-native |
| Spreading Cotoneaster, *Cotoneaster divaricatus* | 1 | 2019 - 2019 | Non-native |
| Spurge, *Euphorbia amygdaloides subsp. robbiae* | 1 | 2013 - 2013 | Non-native |
| Stag's-horn Sumach, *Rhus typhina* | 1 | 2009 - 2009 | Non-native |
| Sticky Groundsel, *Senecio viscosus* | 23 | 1977 - 2016 | Non-native |
| Summer-cypress, *Bassia scoparia* | 5 | 1993 - 1997 | Non-native |
| Sun Spurge, *Euphorbia helioscopia* | 11 | 1997 - 2019 | Non-native |
| Sunflower, *Helianthus annuus* | 6 | 1990 - 1993 | Non-native |
| Swedish Whitebeam, *Sorbus intermedia* | 12 | 1993 - 2019 | Non-native |
| Sweet Chestnut, *Castanea sativa* | 5 | 1993 - 2008 | Non-native |
| Swine-cress, *Lepidium coronopus* | 9 | 1983 - 2018 | Non-native |
| Sycamore, *Acer pseudoplatanus* | 104 | 1985 - 2019 | Non-native |
| Tall Melilot, *Melilotus altissimus* | 14 | 1973 - 2019 | Non-native |
| Tall Rocket, *Sisymbrium altissimum* | 2 | 1977 - 1997 | Non-native |

| Flowering Plant (250 taxa) | | | |
|---|---|---|---|
| Thorn-apple, *Datura stramonium* | 1 | 2019 - 2019 | Non-native |
| Tomato, *Lycopersicon esculentum* | 1 | 1990 - 1990 | Non-native |
| Trailing Bellflower, *Campanula poscharskyana* | 1 | 2016 - 2016 | Non-native |
| Tree-of-heaven, *Ailanthus altissima* | 1 | 2019 - 2019 | Non-native |
| Turkey Oak, *Quercus cerris* | 1 | 2008 - 2008 | Non-native |
| Turnip, *Brassica rapa* | 1 | 1973 - 1973 | Non-native |
| Two-rowed Barley, *Hordeum distichon* | 1 | 2019 - 2019 | Non-native |
| Wall Barley, *Hordeum murinum* | 24 | 1993 - 2019 | Non-native |
| Wall Cotoneaster, *Cotoneaster horizontalis* | 3 | 1998 - 2019 | Non-native |
| Walnut, *Juglans regia* | 3 | 1997 - 2013 | Non-native |
| Water Bent, *Polypogon viridis* | 2 | 2016 - 2019 | Non-native |
| Weeping Willow, *Salix alba x babylonica = S. x sepulcralis* | 3 | 2015 - 2019 | Non-native |
| Weld, *Reseda luteola* | 46 | 1973 - 2019 | Non-native |
| White Campion, *Silene latifolia* | 56 | 1973 - 2019 | Non-native |
| White Dead-nettle, *Lamium album* | 91 | 1973 - 2019 | Non-native |
| White Dogwood, *Cornus alba* | 1 | 2009 - 2009 | Non-native |
| White Melilot, *Melilotus albus* | 1 | 2019 - 2019 | Non-native |
| White Poplar, *Populus alba* | 10 | 1998 - 2019 | Non-native |
| White Stonecrop, *Sedum album* | 18 | 1987 - 2019 | Non-native |
| White Willow, *Salix alba* | 8 | 2005 - 2018 | Non-native |
| Wild Plum, *Prunus domestica* | 29 | 1993 - 2019 | Non-native |
| Wild Radish, *Raphanus raphanistrum subsp. raphanistrum* | 1 | 2005 - 2005 | Non-native |
| Wild-oat, *Avena fatua* | 50 | 1977 - 2019 | Non-native |
| Wilson's Honeysuckle, *Lonicera nitida* | 5 | 2005 - 2019 | Non-native |
| Winter Heliotrope, *Petasites fragrans* | 7 | 1989 - 2019 | Non-native |
| Wormwood, *Artemisia absinthium* | 1 | 2009 - 2009 | Non-native |
| Yellow Archangel, *Lamiastrum galeobdolon subsp. argentatum* | 1 | 2019 - 2019 | Non-native |
| Yellow Bristle-grass, *Setaria pumila* | 3 | 1993 - 1996 | Non-native |

| Insect - Beetle (Coleoptera) (4 taxa) | | | |
|---|---|---|---|
| Bean Seed Beetle, *Bruchus rufimanus* | 1 | 2017 - 2017 | Non-native |
| Cream-streaked Ladybird, *Harmonia quadripunctata* | 2 | 2015 - 2015 | Non-native |
| Harlequin Ladybird, *Harmonia axyridis* | 2 | 2016 - 2017 | Non-native |
| Rockface Beetle, *Ochthebius (Hymenodes) poweri* | 1 | 1999 - 1999 | Priority |

| Insect - Butterfly (4 taxa) | | | |
|---|---|---|---|
| Small Heath, *Coenonympha pamphilus* | 35 | 1989 - 2016 | Priority |
| Wall, *Lasiommata megera* | 51 | 1990 - 2015 | Priority |
| White Admiral, *Limenitis camilla* | 2 | 2014 - 2014 | Priority |
| White-letter Hairstreak, *Satyrium w-album* | 35 | 2003 - 2020 | Protected, Priority |

| Insect - Moth (12 taxa) | | | |
|---|---|---|---|
| Blood-vein, *Timandra comae* | 4 | 1987 - 2016 | Priority |
| Cinnabar, *Tyria jacobaeae* | 4 | 2002 - 2016 | Priority |
| Dot Moth, *Melanchra persicariae* | 1 | 1987 - 1987 | Priority |
| Double Dart, *Graphiphora augur* | 2 | 1987 - 1988 | Priority |
| Dusky Brocade, *Apamea remissa* | 1 | 1987 - 1987 | Priority |
| Ear Moth, *Amphipoea oculea* | 1 | 1987 - 1987 | Priority |
| Ghost Moth, *Hepialus humuli humuli* | 1 | 1987 - 1987 | Priority |
| Grey Dagger, *Acronicta psi* | 1 | 1987 - 1987 | Priority |
| Latticed Heath, *Chiasmia clathrata* | 1 | 1987 - 1987 | Priority |
| Rustic, *Hoplodrina blanda* | 2 | 1987 - 1988 | Priority |
| Shaded Broad-bar, *Scotopteryx chenopodiata* | 2 | 2007 - 2016 | Priority |
| White Ermine, *Spilosoma lubricipeda* | 1 | 1988 - 1988 | Priority |

| Insect - True Bug (Hemiptera) (2 taxa) | | | |
|---|---|---|---|
| Eurhadina loewii, *Eurhadina loewii* | 2 | 2016 - 2016 | Non-native |
| Western Conifer Seed Bug, *Leptoglossus occidentalis* | 3 | 2010 - 2019 | Non-native |

| Marine Mammal (1 taxa) | | | |
|---|---|---|---|
| Common Porpoise, *Phocoena phocoena* | 1 | 2010 - 2010 | Protected, Priority |

| Mollusc (12 taxa) | | | |
|---|---|---|---|
| Bladder snails, *Physa* | 30 | 1999 - 2004 | Non-native |
| Bladder snails, *Physa fontinalis* | 1 | 2004 - 2004 | Non-native |
| Blind Snail, *Cecilioides (Cecilioides) acicula* | 1 | 2017 - 2017 | Non-native |
| Budapest Keeled Slug, *Tandonia budapestensis* | 2 | 2014 - 2014 | Non-native |
| Common Garden Snail, *Cornu aspersum* | 4 | 2017 - 2017 | Non-native |
| Green Cellar Slug, *Limacus maculatus* | 2 | 2014 - 2014 | Non-native |
| Jenkins' Spire Snail, *Potamopyrgus antipodarum* | 162 | 1984 - 2019 | Non-native |
| Mud Snail, *Omphiscola glabra* | 1 | 2009 - 2009 | Priority |
| Physa 'acuta', *Physa 'acuta'* | 4 | 1999 - 1999 | Non-native |
| Physella acuta, *Physella acuta* | 3 | 2000 - 2017 | Non-native |
| Tramp Slug, *Deroceras invadens* | 1 | 2014 - 2014 | Non-native |
| Yellow Cellar Slug, *Limacus flavus* | 1 | 2010 - 2010 | Non-native |

| Reptile (2 taxa) | | | |
|---|---|---|---|
| Grass Snake, *Natrix helvetica* | 3 | 1977 - 1977 | Protected, Priority |
| Slow-worm, *Anguis fragilis* | 1 | 1977 - 1977 | Protected, Priority |

| Terrestrial Mammal (13 taxa) | | | |
|---|---|---|---|
| Black Rat, *Rattus rattus* | 5 | 2020 - 2020 | Non-native |
| Brown Hare, *Lepus europaeus* | 32 | 1977 - 2017 | Priority |
| Brown Rat, *Rattus norvegicus* | 16 | 1977 - 2014 | Non-native |
| Chinese Muntjac, *Muntiacus reevesi* | 6 | 2016 - 2020 | Non-native |
| Eastern Grey Squirrel, *Sciurus carolinensis* | 14 | 1977 - 2019 | Non-native |
| Eurasian Badger, *Meles meles* | 77 | 1977 - 2020 | Protected |
| European Otter, *Lutra lutra* | 9 | 1975 - 2020 | Protected, Priority |
| European Rabbit, *Oryctolagus cuniculus* | 67 | 1977 - 2020 | Non-native |
| European Water Vole, *Arvicola amphibius* | 100 | 1977 - 2018 | Protected, Priority |
| Fallow Deer, *Dama dama* | 4 | 1977 - 2007 | Non-native |
| Harvest Mouse, *Micromys minutus* | 3 | 2014 - 2014 | Priority |
| House Mouse, *Mus musculus* | 3 | 1977 - 1977 | Non-native |
| West European Hedgehog, *Erinaceus europaeus* | 29 | 1977 - 2018 | Priority |

| Terrestrial Mammal (bat) (7 taxa) | | | |
|---|---|---|---|
| Bats, *Chiroptera* | 43 | 1976 - 2015 | Protected, Priority |
| Brown Long-eared Bat, *Plecotus auritus* | 7 | 2003 - 2012 | Protected, Priority |
| Common Pipistrelle, *Pipistrellus pipistrellus sensu stricto* | 39 | 2003 - 2015 | Protected |
| Noctule Bat, *Nyctalus noctula* | 18 | 2003 - 2013 | Protected, Priority |
| Pipistrelle Bat species, *Pipistrellus* | 16 | 1992 - 2018 | Protected, Priority |
| Soprano Pipistrelle, *Pipistrellus pygmaeus* | 2 | 2011 - 2015 | Protected, Priority |
| Unidentified Bat, *Myotis* | 1 | 2011 - 2011 | Protected, Priority, Local Priority |

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# LERC Search Summary Report - Citation Sheets

## Grid Reference: TA 16930 16919
## Buffer: 5km

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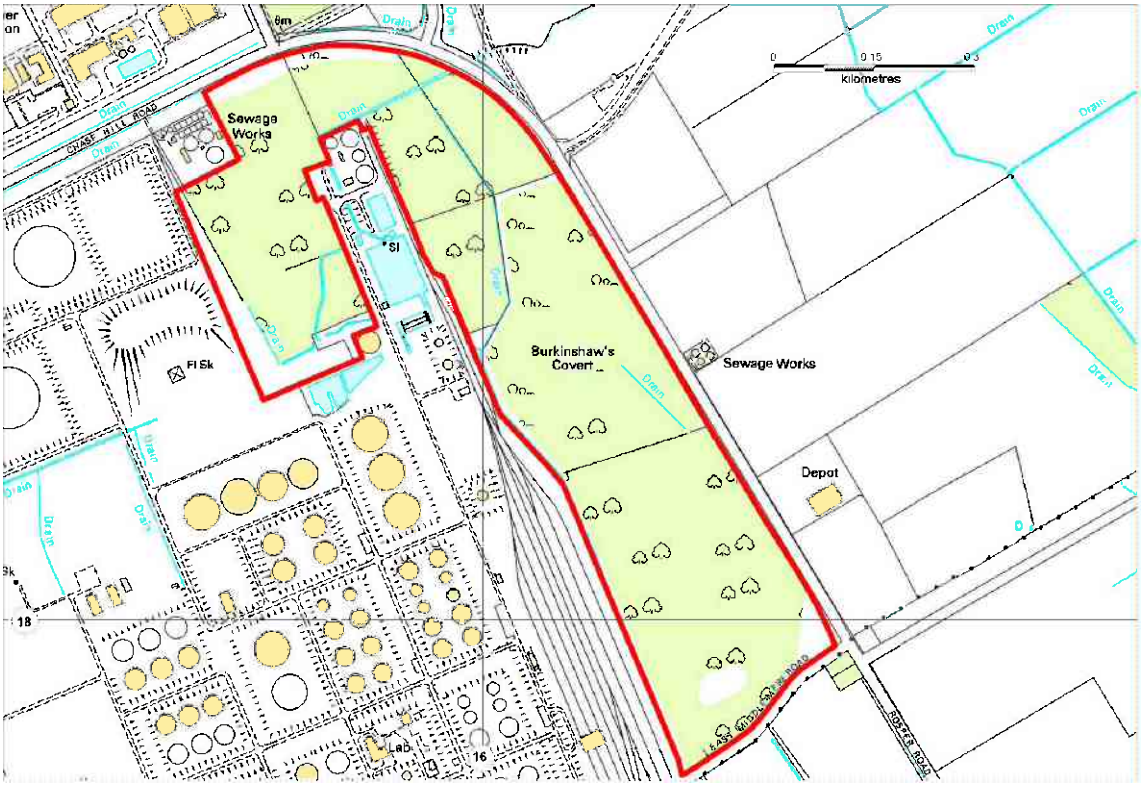
# Burkinshaw's Covert






| | | | |
|---|---|---|---|
| **Grid ref:** | **TA160183** | **Survey:** | **5 July 2007** |
| **Area:** | **35.0 ha** | **Surveyor:** | **J Fraser** |

**Main habitat:** **Woodland**
**Additional habitat:** **Scattered scrub, marsh/fen, ruderal, standing water**
**Additional features:** **Seasonally wet/damp areas**

This is a large, fairly flat wood lying at approximately 5 m above sea level. It is crossed by a series of deep, old drains and a very recently erected set of electricity transmission lines. The name Burkinshaw's Covert only refers to a central block of secondary/plantation woodland dating from the 1800s; wooded land to the north and south is mid 20th century plantation (mainly of poplar, sycamore and beech) on previously un-wooded land. In many parts of the site there is evidence of ground surface modification, including ridge-and-furrow that was presumably created shortly before planting. There are also many lower-lying wet areas, a large bank close to the southern boundary, and a surfaced track system created at the time when the powerline was being constructed.

The lack of ancient semi-natural woodland is reflected in the plant populations. Indeed, apart from a moderately interesting ground flora mostly restricted to the central section, the main interest is in the open and/or wet habitats, including the wide strip of cleared land along the electricity line corridor.

Damp or wet habitat with little shading under the powerlines supports a rapidly changing flora that is currently dominated by tall-growing species such as water figwort, marsh thistle, angelica, common fleabane, great willowherb, hard rush, soft rush and compact rush. Shorter species may disappear in the absence of appropriate management within a few years, but currently include square-stalked St John's-wort, meadow vetchling, hairy buttercup and

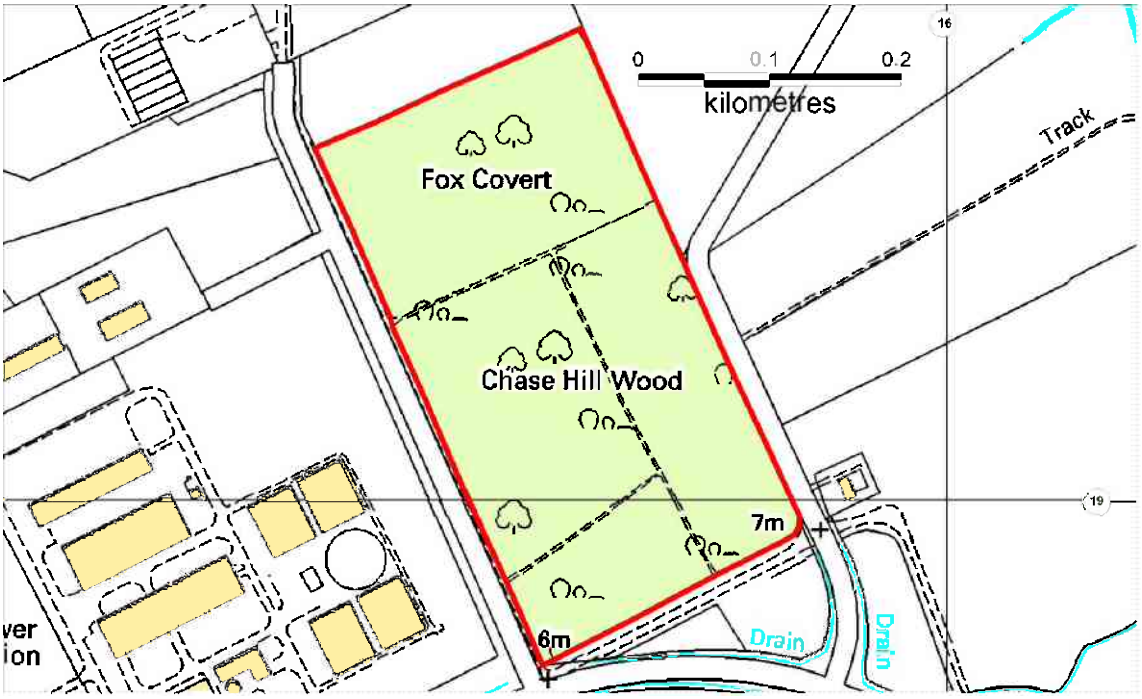
glaucous sedge. Other wetland vegetation is mostly shaded and much less liable to rapid change.

Woodland ground flora species of note include six species of fern; with large populations of male fern and broad buckler-fern, and small amounts of lady fern, narrow buckler-fern, scaly male fern and hart's-tongue fern. Other interesting records are enchanter's nightshade, dog-violet, wild arum, common spotted-orchid, honeysuckle and false brome. Trees and shrubs other than those already mentioned include ash, oak, Norway maple, silver birch, elm, elder, hawthorn, grey willow and goat willow.

There is a good range of common woodland birds, including blackcap and willow tit.

**Criteria passed: WD4, NG1, Sw2**

# Chase Hill Wood






**Grid ref:** TA157191 **Survey:** 5 July 2007, 14 May 2008
**Area:** 9.5 ha **Surveyor:** J.Fraser

**Main habitats:** Woodland
**Additional habitats:** Scattered/dense scrub, Neutral grassland, Running water, Marsh
**Additional features:** Fallen dead wood, Badger sett

This is a moderately-sized, rectangular wood on almost flat land, lying between the 5m and 10m contours. There are a few old rides, but it is evident that no significant management has taken place for some time. Most of the canopy consists of even-aged trees that have not yet reached maturity.

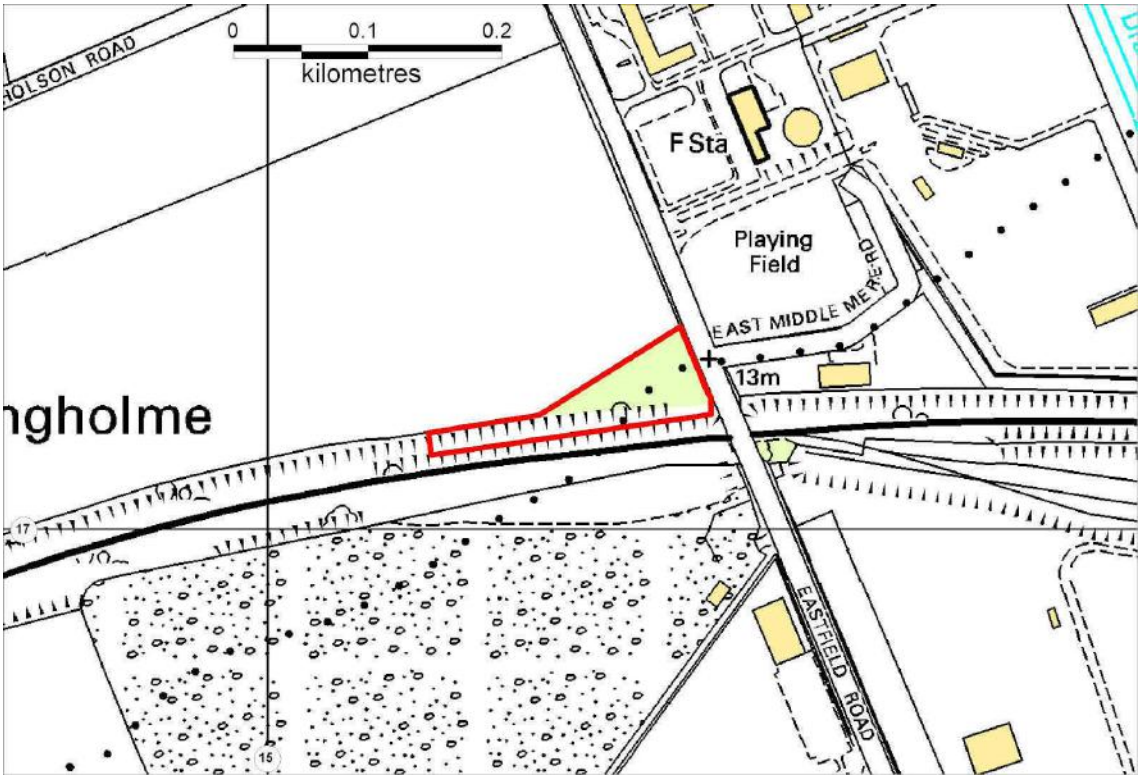
Ash is the most numerous canopy tree, with smaller numbers of sycamore, Norway maple, beech, oak and pine. These cast a significant amount of shade on the woodland floor, where there is a sparse shrub layer including wild privet, field maple, holly, gooseberry, honeysuckle and a little bramble. The ground flora is dominated by ivy, but many other species of interest are present, including enchanter's nightshade, wood avens, dog-violet, common spotted-orchid, red campion and large numbers of early-purple orchid. The minimal ride system is also very shaded, but supports a rich flora including common fleabane, common twayblade, false brome, hairy-brome, giant fescue, wood-sedge and an abundance of goldilocks.

An elongate glade crossing the south-western corner of the wood demarcates the course of a buried pipeline carrying sea water. The vegetation structure here is varied, ranging from patches of sparse sward on almost bare ground, through longer grass, to scattered and dense scrub. Further features are a small marsh and a stream that appear to originate as upwelling salty water of uncertain provenance. All of these habitat elements and the shelter afforded by surrounding trees provide opportunities for a diverse flora and fauna. Wetland plants present include water figwort, angelica, hard rush, glaucous sedge and false fox-sedge. Plants of drier grassland and scrub are common bird's-foot-trefoil, yarrow, common knapweed, wild carrot, oxeye daisy, hoary ragwort, field rose, bramble and gorse.

The site supports a range of common woodland birds, for example blackcap, chiffchaff and great spotted woodpecker.

**Criteria passed: Mos1(NG1, CG1), Mos4 (Badger sett, breeding willow tits, fallen dead wood)**
**Recommended as a Local Wildlife Site: 10 September 2009**

# Eastfield Road Railway Embankment





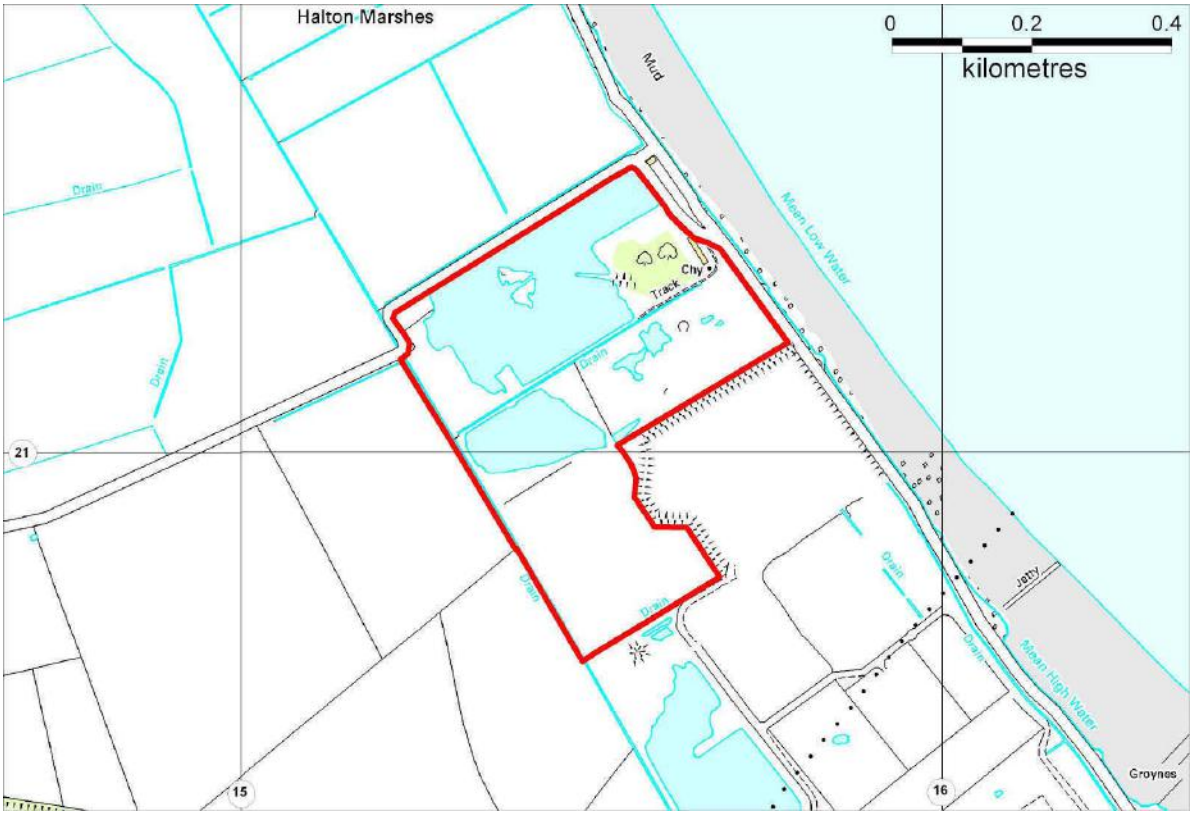

**Grid ref:** **TA153171** **Survey:** **18 Jul 2007**
**Area:** **0.7 ha** **Surveyor:** **J Fraser**

**Main habitat:** **Neutral & calcareous grassland, woodland**
**Additional habitat:** **Scattered & dense scrub**
**Additional features:** **Abundant nectar sources, varied sward height, anthills, south facing slopes, earthworks/hummocky ground**

This is a small Lincolnshire Wildlife Trust nature reserve on the northern side of a railway line. It is basically a strip of sheltered, botanically-rich woodland glades. Amongst the many grassland species present are abundant spiny restharrow, and smaller amounts of rough hawkbit (suggesting a calcareous soil), common spotted-orchid, bee orchid, lady's bedstraw, common bird's-foot-trefoil, eyebright, cowslip and quaking-grass. Damper patches support common fleabane, water figwort and tufted hair-grass. Sunny scrubby edges hold gorse, elder and abundant hawthorn, beneath which are species such as upright hedge-parsley, agrimony, marjoram, nipplewort, stone parsley and false brome. Under more shade occurs much spurge laurel, again indicating a calcareous influence.

**Criteria passed: NG1, CG1**
**Recommended as a Local Wildlife Site: 9 December 2008**

# Halton Marsh Clay Pits






**Grid ref:** **TA155211** **Survey:** **10, 11 July 2007**
**Area:** **19.8 ha** **Surveyor:** **J.Fraser**

**Main habitat:** **Neutral grassland, damp grassland, standing water, reedbed**
**Additional habitat:** **Running water, scattered & dense scrub, woodland, species-poor hedgerows**
**Additional features:** **Seasonally wet/damp areas**

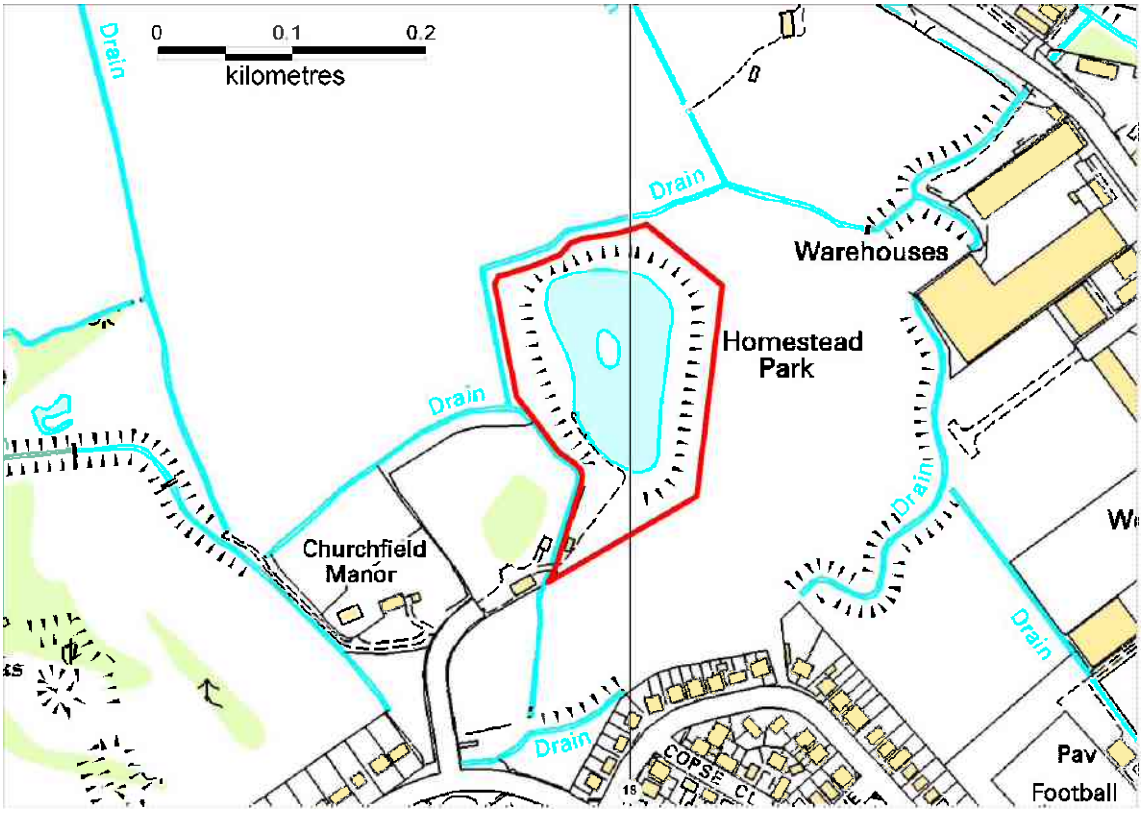
This is a large area where clay extraction used to take place. Today the main features are a large fishing lake, a smaller lake to the south, several pools, damp pasture, ungrazed wetland, and developing scrub and planted woodland. The whole complex of habitats is important for breeding, wintering and migrating birds and also has much potential for invertebrates and other fauna.

Aquatic plants include common duckweed, ivy-leaved duckweed, water-starwort, fan-leaved water-crowfoot, spiked water-milfoil and at least one species of pondweed. Further wetland plants include water-plantain, water-cress, sea club-rush, grey club-rush, mare's-tail, pink water-speedwell, water figwort and false fox-sedge. There are two small islands of common reed in the centre of the fishing lake. Some lake margins support abundant common reed, whereas others are marked by willows and other woody vegetation. Two mixed plantations are located beside the fishing lake, the larger one to the east and the smaller one to the west.

South-east of the large plantation is an unmanaged mixture of pools, dense and scattered scrub, and other coarse vegetation. Species present in the drier parts include hawthorn, blackthorn, bramble, great willowherb, creeping thistle, bindweed and common nettle, while wetter land holds much common reed and reed sweet-grass, amongst others.

**Criteria passed: Sta2, Mos2**
**Recommended as a Local Wildlife Site: 9 December 2008**

# Homestead Park Pond






**Grid ref:** **TA179155** **Survey:** **17 July 2008**
**Area:** **2.83 ha** **Surveyor:** **J.Fraser**

**Main habitat:** **Scattered/dense scrub, semi-improved neutral grassland, standing water**

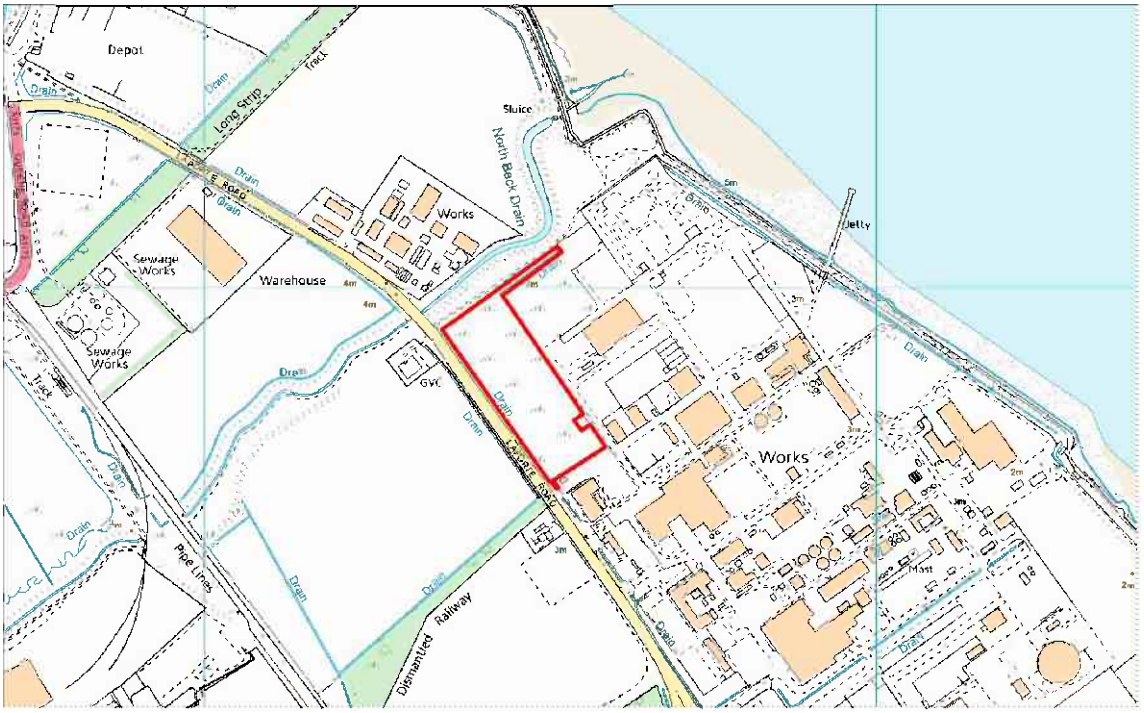
This is a large angling pond surrounded by scrubby embankments on which are a series of impressive interpretative panels detailing wildlife interest of the site. South of the pond is an area of flat improved grassland and a building.

Lesser bulrush is a prominent species around the pond edge, together with smaller amounts of common reed, yellow iris, branched bur-reed, reed sweet-grass and celery-leaved buttercup. An adjacent narrow strip of flat land is maintained for use by anglers, and here can be found several plants liking damp conditions, such as meadowsweet, amphibious bistort, clustered dock, false fox-sedge and jointed rush. Embankment vegetation is dominated by scrub spreading from initial planting into un-managed mostly coarse grassland. In spite of this, a few interesting neutral grassland species have survived, such as common knapweed, lady's bedstraw, common bird's-foot-trefoil, oxeye daisy, crested dog's-tail, yellow oat-grass, meadow barley and red fescue.

A grass pathway beside the interpretative panels on the embankment top is in places obscured by encroaching scrub. Woody species across the site include ash, blackthorn, sycamore, Norway maple, horse chestnut, holly, hawthorn, dogwood, yew and pine.

**Criterion passed: NG1**
**Recommended as a Local Wildlife Site: 10 September 2009**

# Laporte Road Brownfield Site






**Grid ref: TA214148**
**Area: 3.07 ha**

**Survey: 27 August 2008**
**Surveyor: J.Fraser**
**Monitoring survey: 26 May 2015**

**Main habitat:** Brownfield mosaic, Coarse or rank grassland, Scrub - scattered / dense
**Additional habitat:** Acid grassland - semi-improved, Drain, Neutral grassland - semi-improved

This is a former industrial site within 0.5km of the Humber Estuary. The structurally diverse vegetation is rich in both flora and fauna and comprises: stony areas with a sparse sward; flower-rich denser turf; plants typical of wet grassland in a shallow depression; standing water in drains, coarse grassland with brambles and tall herbs; scrub; and trees. No habitat management takes place, other than grazing and burrowing by rabbits.

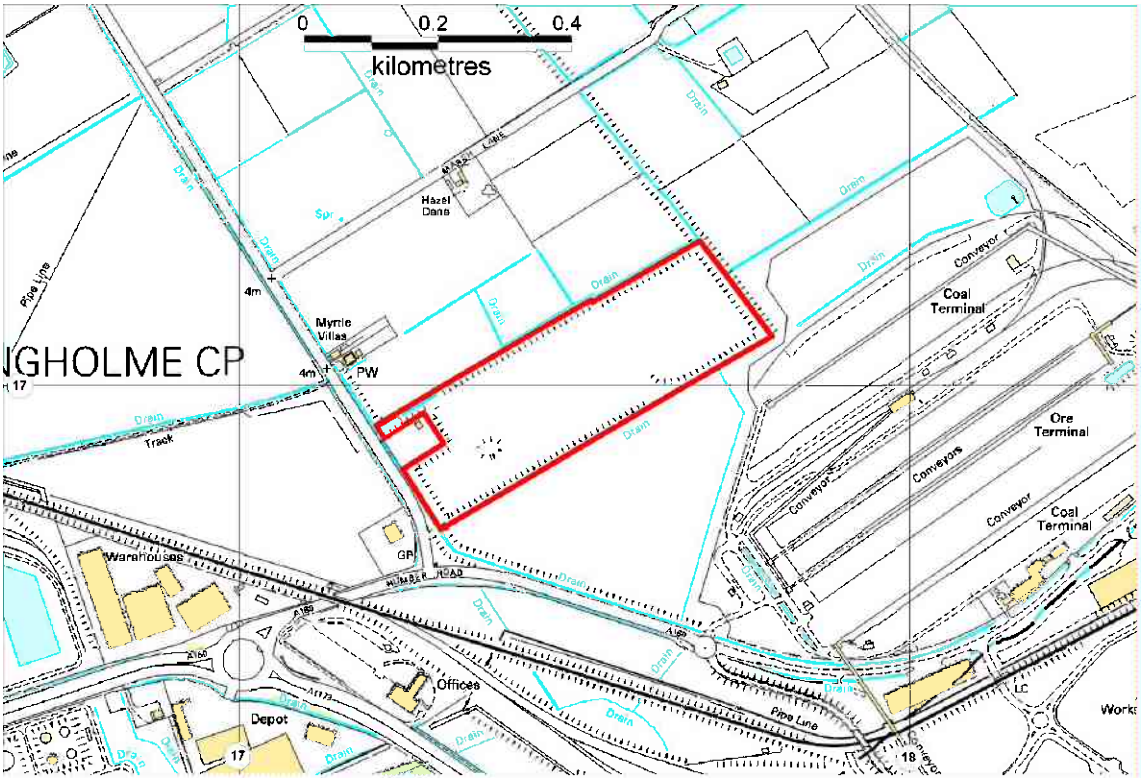
The sparsest vegetation is botanically-rich, comprising species such as wall speedwell, procumbent pearlwort, thyme-leaved sandwort, common whitlowgrass, changing forget-me-not, black medick, little mouse-ear, thale cress and silver hair-grass. Other interesting grassland supports cat's-ear, common knapweed, meadow vetchling, cowslip, common bird's-foot-trefoil, tufted vetch, smooth hawk's-beard, creeping cinquefoil, yarrow, narrow-leaved & smooth meadow-grass, and red fescue. Damper land is characterised by the uncommon hairy buttercup, plus common fleabane, clustered dock, hoary willowherb, common winter-cress, false fox-sedge, compact & hard rush, and tufted hair-grass. A drain on the north-western margin is subject to considerable shading by dense hawthorn on both banks, but more open stretches hold common reed, bulrush, sea club-rush and common duckweed. A much drier drain of less wildlife interest marks the south-western boundary of the site.

Substantial areas support plants typical of wasteland or un-managed grassland, such as rosebay willowherb, mugwort, hogweed, thistles, common nettle, bristly oxtongue, tall melilot, teasel and tall fescue. Trees and shrubs appear to be slowly encroaching and include grey & crack willow, osier, wild cherry, hybrid black poplar, apple, silver birch, rowan, elder, hawthorn, bramble and dog-rose. Male-fern, broad buckler-fern and a small clump of lady-fern are present within open scrub.

A diverse fauna includes common whitethroat, blackcap, chaffinch, chiffchaff, blue tit, robin, wren and a range of common butterflies. There is also evidence of a thriving water vole population in the north-western boundary drain.

**Criterion passed: BM1**
**Recommended as a Local Wildlife Site: 10 September 2009**

# Rosper Road Pools






**Grid ref:** TA175170 **Survey:** 12, 18 July 2007
**Area:** 9.7 ha **Surveyor:** J.Fraser

**Main habitat:** Neutral grassland, marsh/fen, reedbed, standing water, scattered and dense scrub
**Additional habitat:** Damp grassland
**Additional features:** Seasonally wet/damp areas, earthworks/hummocky ground, tussocky vegetation

The site comprises two very different parts. Grassland and scrub occupy the north-eastern third, while the remainder is dominated by an artificial, straight-sided, flood-relief reservoir, surrounded by a strip of grassland (and some scrub) above steep but quite low banks. The grassy margins of the reservoir are between 10 m and 50 m wide, with a sward varying from wet to dry and from botanically-poor to botanically-rich. A major drain follows the south-western site boundary; elsewhere the perimeter is marked by smaller ditches which are for most of their length beside prominent hedges.

It is assumed that the reservoir was created by excavation, with spoil dumped on the north-eastern part of the site. This would account for the straight sides of the reservoir and the raised and rather hummocky nature of the land to the north-east. Wetland in the reservoir is an excellent mixture of about 10% open water and 90% swamp vegetation. The latter is dominated by single-species stands of sea club-rush, mare's-tail and common reed. Also present are grey club-rush, bulrush, common spike-rush, water-plantain, water-starwort, common duckweed and ivy-leaved duckweed. The marginal grassland sward includes species such as meadow vetchling, common bird's-foot-trefoil, lesser trefoil, crested dog's-tail, narrow-leaved meadow-grass, yellow oat-grass and large amounts of meadow barley. Damp ground north-west of the reservoir supports hairy buttercup, where horses reach through the wire fence

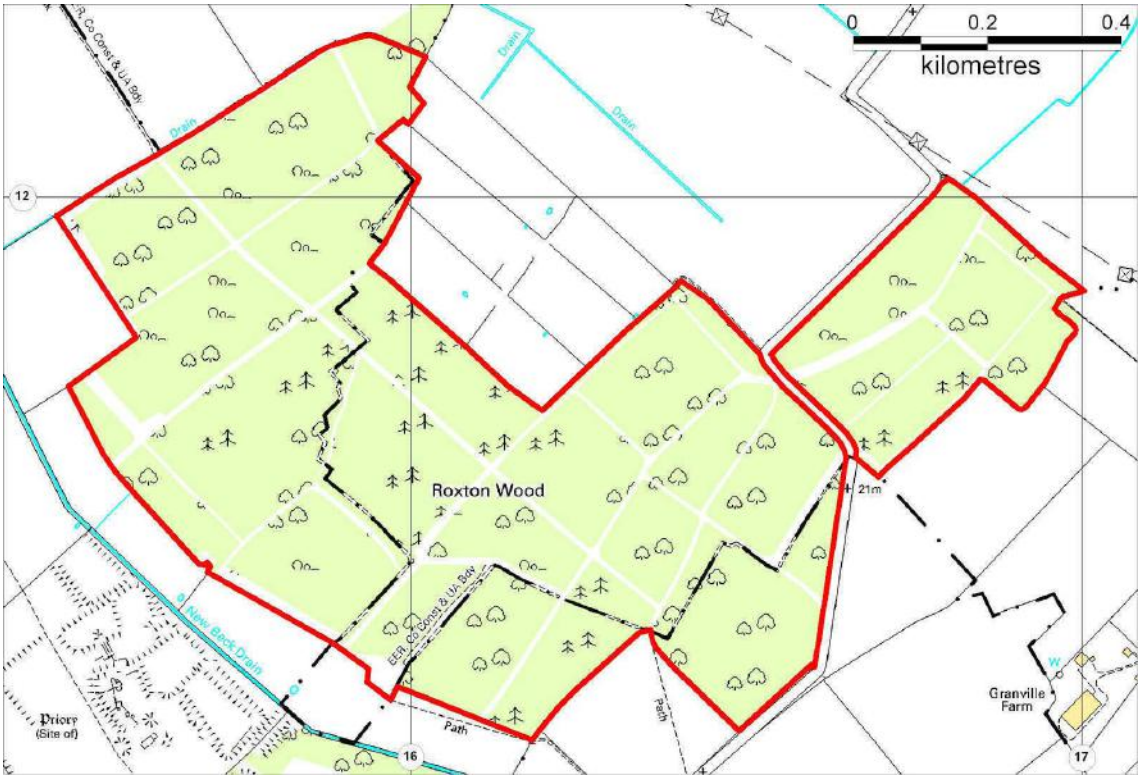
to graze. Also of note is plentiful stone parsley along the south-eastern edge, next to an overgrown hawthorn hedge.

The north-eastern part of the site is separated from the reservoir and its marginal grassland by a line of scattered scrub where the land rises several metres. Similar banks are located on other sides of this area, which is dominated by botanically-poor coarse grassland with scattered scrub, mainly of hawthorn. Denser scrub occurs alongside overgrown boundary hedges.

Rosper Road Pools supports many breeding, wintering and migrant birds, associated with both wetland and scrubby habitat. Water vole was recorded in 2002, and the fauna as a whole is likely to be rich.

**Criteria passed: Sta2, Mos2**
**Recommended as a Local Wildlife Site: 9 December 2008**

# Roxton Wood






**Grid ref:** **TA161116** **Survey:** **5 June 2008**
**Area:** **76.4 ha** **Surveyor:** **B.Parker**

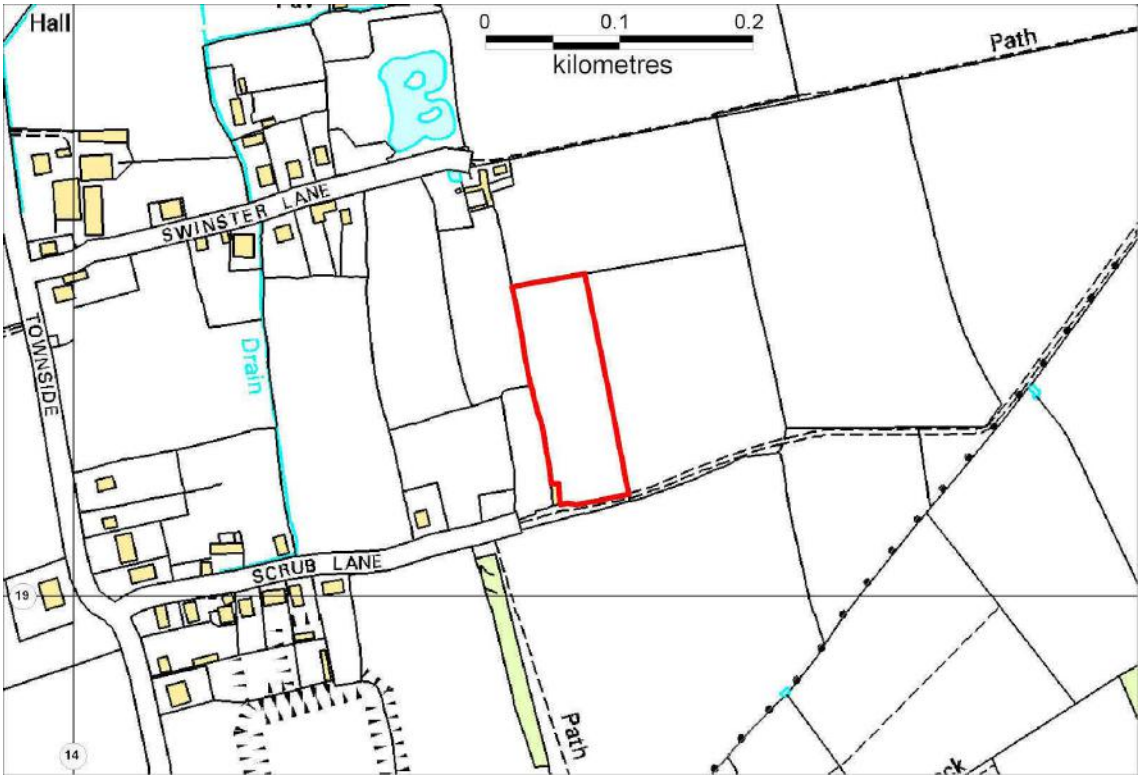
**Main habitat:** **Woodland**
**Additional habitat:** **Standing water**
**Additional features:** **Standing/fallen dead wood, earthworks, seasonally wet/damp areas**

Roxton Wood comprises woodland thought to have been planted on the site of old ridge and furrow. The woodland has a network of ditches and banks that may indicate medieval origins. The current boundaries are almost identical to those in the first edition OS map of 1891. There has been some planting of non-native coniferous trees.

There is a varied shrub layer, although sycamore is now the dominant under-story species in the areas of re-planting. The majority of the site has a poor ground flora with large areas dominated by brambles. The best remaining flora is now found in the vicinity of the ridge and furrow areas and along the ditches, these including early purple orchid and pignut.

**Criterion passed: WD3**
**Recommended as a Local Wildlife Site: 10 September 2009**

# Scrub Lane East Field






**Grid ref:** **TA143192** **Survey:** **24 July 2007**
**Area:** **0.9 ha** **Surveyor:** **J.Fraser**

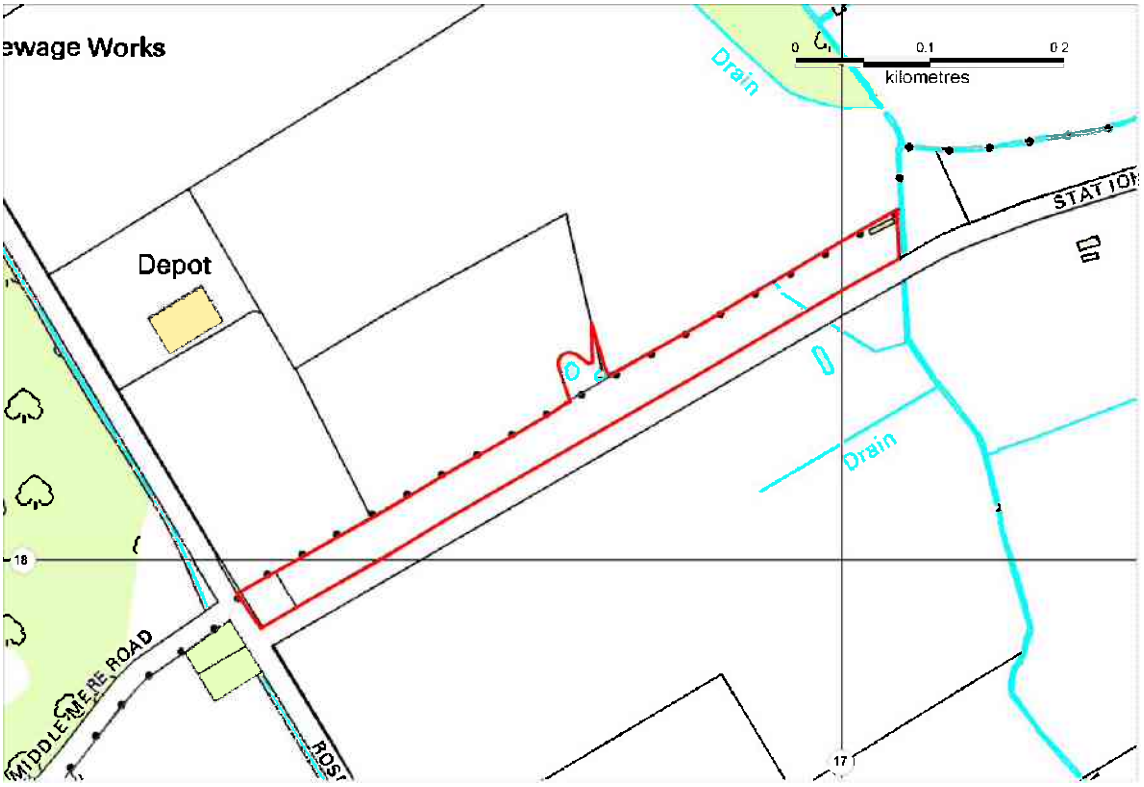
**Main habitat:** **Neutral grassland**
**Additional features:** **Seasonally wet / damp areas, ridge-and-furrow**

The site is a rectangular field of neutral grassland, with ridge-and-furrow aligned north-south. It is currently un-managed since a recent change in ownership, but annual hay-making and/or grazing may have taken place until the end of 2006. Overgrown dense hedges surround the field.

The flora is typical of somewhat neglected neutral grassland that may have received some applications of artificial fertiliser. Only relatively small areas are herb-rich, but common knapweed is prominent on ridges. Smaller amounts of meadow buttercup, common bird's-foot-trefoil, meadow vetchling, common sorrel, sweet vernal-grass and the scarce pepper-saxifrage are also present. Furrows hold meadow foxtail, marsh foxtail and tufted hair-grass.

**Criterion passed: NG1**
**Recommended as a Local Wildlife Site: 9 December 2008**

# Station Road Field






**Grid ref:** TA168181 **Survey:** 5 July 2007
**Area:** 1.7 ha **Surveyor:** J.Fraser

**Main habitat:** Neutral grassland, ruderal
**Additional habitat:** Scattered scrub, running water, species-poor hedgerows
**Additional features:** Varied sward height, seasonally wet/damp areas, lichens

This narrow, straight-sided site measures approximately 550 m by 30 m, with the long axis aligned south-west to north-east. It is almost flat and is crossed by the 5 m contour. Adjacent land is road verge to the south-east and south-west, and farmland to the north-west and north-east.

Almost all the site is grassland, comprising from south-west to north-east: a small square area that is mostly old hardstanding; a long, thin horse pasture; and small area of horse pasture with some ungrazed land and old stables. The whole area is surrounded by hedges, and the three components are separated from each other by short hedges. Ditches occur beside some of the hedges.

During the visit it appeared that grassland was being grazed on rotation, so that fresh grass was available from time to time. Consequently, some land was very heavily grazed and poached, some was well grazed, some held trampled vegetation, and some had not been grazed in 2007. Botanical richness was most easy to evaluate where no recent grazing had taken place, and here the survey revealed a situation typical of horse grazing – very coarse and poor vegetation in some places and short herb-rich areas between.

The patches of short vegetation had presumably been hard grazed by horses in the past, possibly annually. Here there is an abundance of relatively few plant species such as ribwort plantain, cat's-ear, autumn hawkbit, creeping buttercup, selfheal, common bent and yellow

oat-grass. Less commonly encountered are bird's-foot-trefoil, red bartsia, common centaury, agrimony, common sorrel, crested dog's-tail and sweet vernal-grass. The coarse vegetation supports a large number of docks of four species – curled, broad-leaved, wood and clustered – as well as small amounts of common nettle and thistles. Other associated species include common vetch, cut-leaved crane's-bill, hogweed, cock's-foot, Yorkshire-fog and false oat-grass.

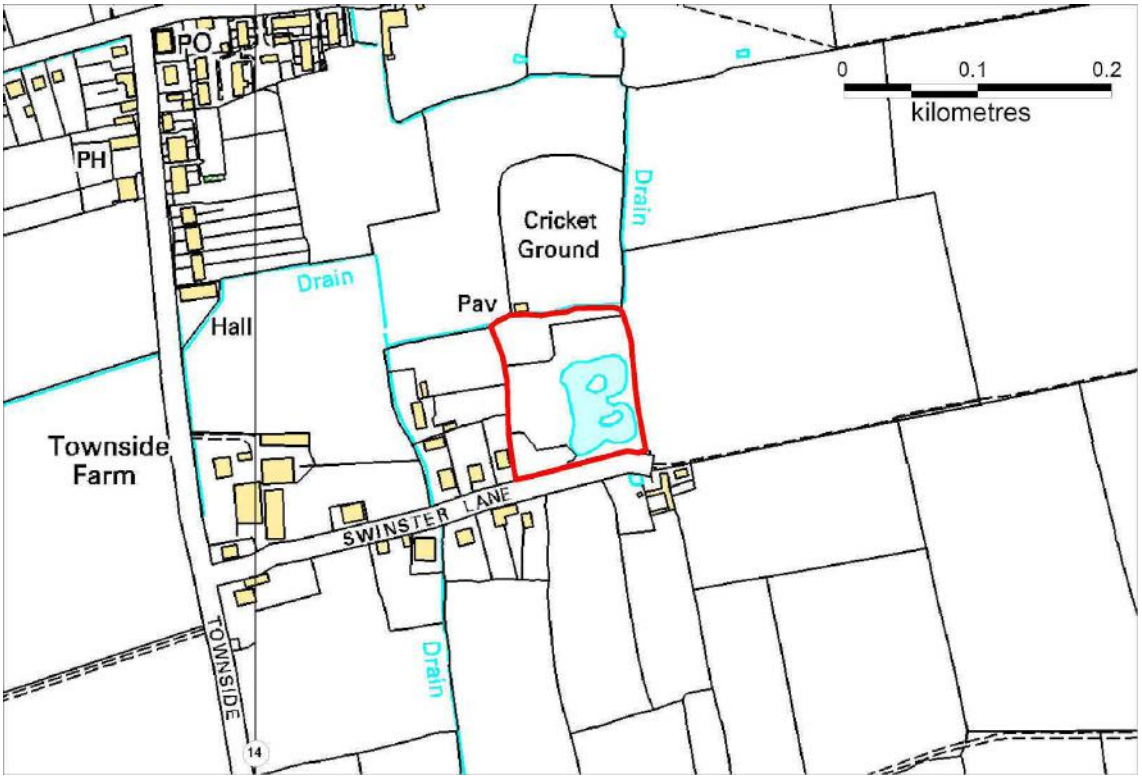
Wetland adds to the interest of the site, and is mostly restricted to boundary ditches and one internal ditch. Some of the plants present are fool's water-cress, pink water-speedwell, common fleabane, woody nightshade and hairy buttercup, the latter on damp, grazed land nearby. Boundary hedges are primarily of long un-managed hawthorn, but there is also a scatter of wych elm, elder, blackthorn, field maple and dog-rose.

The small area of hardstanding is being colonised by a good range of typical plants, including thyme-leaved sandwort, common cudweed, procumbent pearlwort, white stonecrop, small-flowered crane's-bill, black medick, red fescue, squirrel-tail fescue and fern-grass. Neutral grassland and scrub around the edge provide structural diversity.

The site supports a good range of common farmland birds and butterflies, for instance yellowhammer, meadow brown and ringlet. Two ponds are located within a patch of dense scrub approximately midway along and just outside the north-western boundary. One of these ponds held breeding great crested newts in 2006.

**Criterion passed: Mos1(NG1, CG1)**
**Recommended as a Local Wildlife Site: 9 December 2008**

# Swinster Lane Field






**Grid ref:** **TA142193** **Survey:** **10 July 2007**
**Area:** **1.1 ha** **Surveyor:** **J.Fraser**

**Main habitat:** **Neutral grassland, standing water**
**Additional features:** **Varied sward height, amphibians**

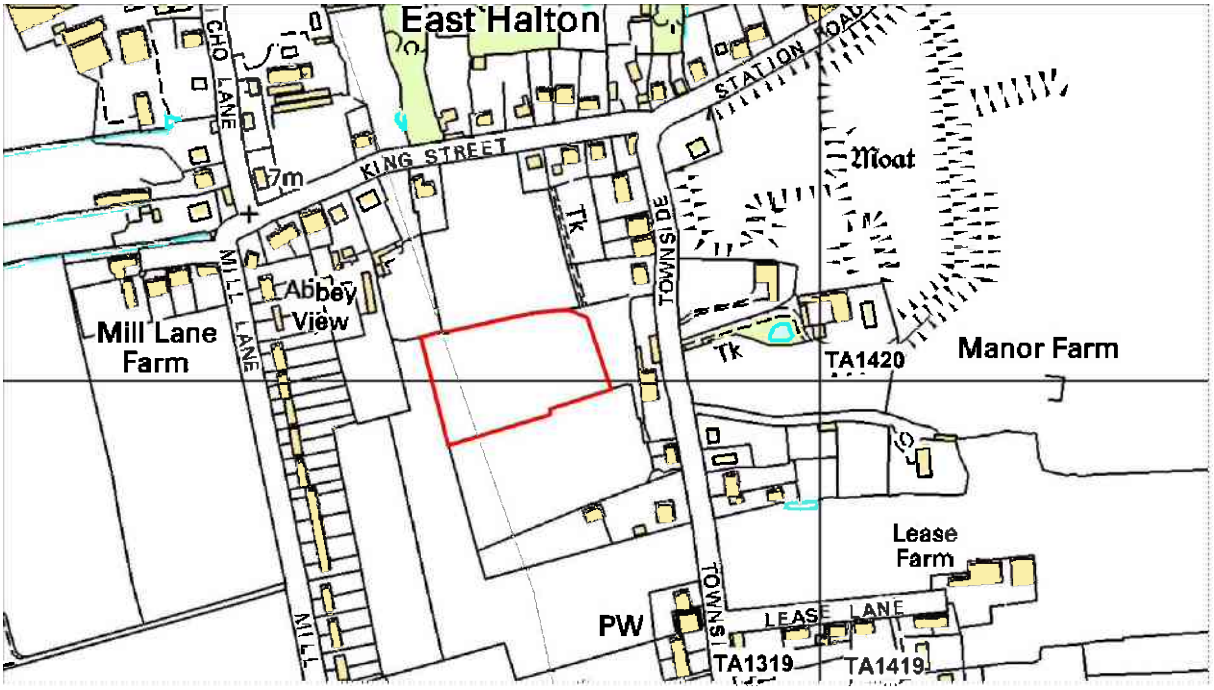
When surveyed in 1987 this site supported moderately interesting grassland, two small ponds and boundary hedges. In 1994 a large fishing lake was created with two small islands. Today, the lake and ponds are still present, together with what are presumably mounds of excavated soil and sub-soil, now grassed over. Some remnants of the original grassland are also likely to be present, plus probably some extra planted trees and scrub encroachment.

The lake is stocked with roach, bream, rudd, carp and pike for fishing, but all three native newt species were recorded in June 2006, while one of the ponds held palmate and great crested newts.

Wetland plants include sea club-rush, fool's water-cress, yellow iris, common reed, common spike-rush, water-cress, floating sweet-grass, common duckweed and fat duckweed. A few interesting grassland plants are common spotted-orchid, common bird's-foot trefoil, meadow vetchling, lesser trefoil, meadow barley, yellow oat-grass and meadow fescue.

**Criterion passed: NG1**
**Recommended as a Local Wildlife Site: 9 December 2008**

# East View Meadow






| | | | |
|---|---|---|---|
| **Grid ref:** | **TA137200** | **Survey:** | **1 July 2008, 7 September 2011** |
| **Area:** | **0.8 ha** | **Surveyor:** | **A,Taylor, J.Fraser** |

**Main habitat:** **Unimproved neutral grassland**
**Additional habitat:** **Ancient species-rich hedgerows**
**Additional features:** **Abundant nectar sources, Ridge and furrow, Seasonally wet/damp areas**

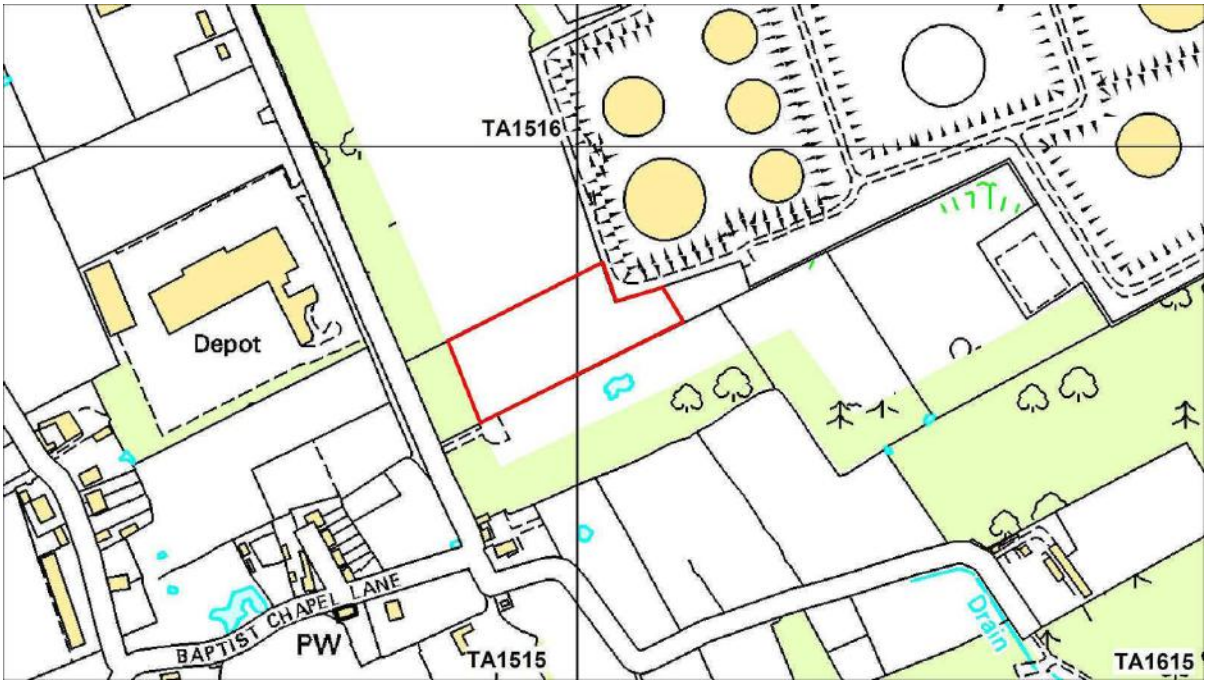
This is a fairly small field of neutral grassland on ridge-and-furrow, surrounded by thick un-managed hedges to the north and west, and fences elsewhere. A hay crop is removed in summer, from all but a strip of wet ground parallel and close to the southern boundary fence. In most years a horse grazes the field in autumn.

Botanically-rich dry grassland on the ridges is characterised by common knapweed, common bird's-foot-trefoil, pignut, oxeye daisy, meadow vetchling, common sorrel, ribwort plantain, sweet vernal-grass, common bent and red fescue. The wet strip supports yellow iris, great, hoary and square-talked willowherb, tufted hair-grass and the locally scarce small sweet-grass. Other plants typical of damp conditions, some of which occur in the furrows, include soft-rush, compact rush, meadow and marsh foxtail and creeping bent.

Hedges add considerably to the biodiversity of the site. Woody species are ash, elm, blackthorn, hawthorn, elder, dog-rose, bramble, ivy, and at least one bush of the uncommon Midland hawthorn. A range of woodland and woodland-edge ground flora species here include wood dock, cow parsley, ground ivy and hairy-brome.

**Criterion passed: NG1**
**Recommended as a Local Wildlife Site: 29 March 2012**

# Mayflower Wood Meadow






**Grid ref:** TA159158 **Survey:** 9 June 2011
**Area:** 0.9 ha **Surveyor:** J.Fraser

**Main habitat:** Unimproved neutral grassland, Coarse grassland
**Additional habitat:** Semi-natural woodland
**Additional features:** Abundant nectar sources, Structural diversity, Ridge and furrow

This is a small ridge-and-furrow neutral grassland field to the south-east of South Killingholme. The field used to be larger, until the adjacent oil refinery complex expanded into the now-destroyed north-eastern corner. Thick un-managed hedges, scrub and deciduous woodland surround the site on all sides, with some encroachment into the field itself.

The grassland is coarse at the western end, with a predominance of species such as false oat-grass and creeping thistle. Central and eastern parts support a much more diverse mixture of longer and shorter turf that appears to be partly maintained by rabbit grazing.

Amongst the many interesting plants present on the ridges are common bird's-foot-trefoil, cowslip, common knapweed, meadow vetchling, lady's bedstraw, field wood-rush, sweet vernal-grass, yellow oat-grass and common bent. Furrows are less diverse, but support further species typical of damp conditions, such as cuckooflower, creeping buttercup, tufted hair-grass, marsh and meadow foxtail, meadow fescue and hard rush. Woody plants on the margins include ash, blackthorn, hawthorn, elder, ivy, bramble and dog-rose.

Sympathetic management of the meadow is the key to improving and then maintaining the habitat. The central element of ideal management would be annual cutting and removal of a hay crop in July, followed by aftermath grazing during the late summer and autumn.

**Criterion passed: NG1**
**Recommended as a Local Wildlife Site: 29 March 2012**

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# APPENDIX 13A.3

## EDNA RESULTS

SureScreen Scientifics

Folio No: E10450
Report No: 1
Purchase Order: ES78
Client: ESL
Contact: Dave Hughes

# TECHNICAL REPORT

## ANALYSIS OF ENVIRONMENTAL DNA IN POND WATER FOR THE DETECTION OF GREAT CRESTED NEWTS (TRITURUS CRISTATUS)

### SUMMARY

When great crested newts (GCN), *Triturus cristatus*, inhabit a pond, they continuously release small amounts of their DNA into the environment. By collecting and analysing water samples, we can detect these small traces of environmental DNA (eDNA) to confirm GCN habitation or establish GCN absence.

### RESULTS

**Date sample received at Laboratory:** 19/05/2021
**Date Reported:** 20/05/2021
**Matters Affecting Results:** None

| Lab Sample No. | Site Name | O/S Reference | SIC | DC | IC | Result | Positive Replicates |
|---|---|---|---|---|---|---|---|
| 5244 | ES78 Pond 5 | | Pass | Pass | Pass | Negative | 0 |
| 5245 | ES78 Pond 6, Immingham | | Pass | Pass | Pass | Negative | 0 |
| 5246 | ES78 Pond 4, Immingham | | Pass | Pass | Pass | Negative | 0 |
| 5247 | ES78 Pond 3, Immingham | | Pass | Pass | Pass | Negative | 0 |
| 5248 | ES78 Pond 1, Immingham | | Pass | Pass | Pass | Negative | 0 |
| 4249 | ES78 Pond 2, Immingham | | Pass | Pass | Pass | Negative | 0 |

If you have any questions regarding results, please contact us: ForensicEcology@surescreen.com

**Reported by:** Chris Troth **Approved by:** Chris Troth

## METHODOLOGY

The samples detailed above have been analysed for the presence of GCN eDNA following the protocol stated in DEFRA WC1067 'Analytical and methodological development for improved surveillance of the Great Crested Newt, Appendix 5.' (Biggs et al. 2014). Each of the 6 sub-sample tubes are first centrifuged and pooled together into a single sample which then undergoes DNA extraction. The extracted sample is then analysed using real time PCR (qPCR), which uses species-specific molecular markers to amplify GCN DNA within a sample. These markers are unique to GCN DNA, meaning that there should be no detection of closely related species.

If GCN DNA is present, the DNA is amplified up to a detectable level, resulting in positive species detection. If GCN DNA is not present then amplification does not occur, and a negative result is recorded.

Analysis of eDNA requires scrupulous attention to detail to prevent risk of contamination. True positive controls, negative controls and spiked synthetic DNA are included in every analysis and these have to be correct before any result is declared and reported. Stages of the DNA analysis are also conducted in different buildings at our premises for added security.

SureScreen Scientifics Ltd is ISO9001 accredited and participate in Natural England's proficiency testing scheme for GCN eDNA testing. We also carry out regular inter-laboratory checks on accuracy of results as part of our quality control procedures.

## INTERPRETATION OF RESULTS

**SIC:** **Sample Integrity Check** [Pass/Fail]
When samples are received in the laboratory, they are inspected for any tube leakage, suitability of sample (not too much mud or weed etc.) and absence of any factors that could potentially lead to inconclusive results.

**DC:** **Degradation Check** [Pass/Fail]
Analysis of the spiked DNA marker to see if there has been degradation of the kit or sample between the date it was made to the date of analysis. Degradation of the spiked DNA marker may lead indicate a risk of false negative results.

**IC:** **Inhibition Check** [Pass/Fail]
The presence of inhibitors within a sample are assessed using a DNA marker. If inhibition is detected, samples are purified and re-analysed. Inhibitors cannot always be removed, if the inhibition check fails, the sample should be re-collected.

**Result:** **Presence of GCN eDNA** [Positive/Negative/Inconclusive]
**Positive:** GCN DNA was identified within the sample, indicative of GCN presence within the sampling location at the time the sample was taken or within the recent past at the sampling location.
**Positive Replicates:** Number of positive qPCR replicates out of a series of 12. If one or more of these are found to be positive the pond is declared positive for GCN presence. It may be assumed that small fractions of positive analyses suggest low level presence, but this cannot currently be used for population studies. In accordance with Natural England protocol, even a score of 1/12 is declared positive. 0/12 indicates negative GCN presence.
**Negative:** GCN eDNA was not detected or is below the threshold detection level and the test result

should be considered as evidence of GCN absence, however, does not exclude the potential for GCN presence below the limit of detection.