Frodsham Solar

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Appendix 7-2: Protected Ecological Species Baseline Report

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on behalf of Axis PED

Technical Appendix 7.2: Protected Ecological Species Baseline Report

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1 INTRODUCTION

1.1 Background and Scope

1.1.1 This Technical Appendix has been prepared to accompany **Chapter 7: Terrestrial Ecology [EN010153/DR/6.1]** of the Frodsham Solar Environmental Statement (ES).

1.1.2 It presents detailed methodologies and results of desk studies and field surveys completed to establish baseline conditions with regards to protected and notable faunal species.

1.1.3 For the avoidance of doubt, the following areas associated with this Appendix are defined below, and shown in **ES Volume 3 Figure 1-2 [EN010153/DR/6.3]**:

- the 'Solar Array Development Area (SADA)' comprising the area that would include solar photovoltaic (PV) modules and support frames, internal access tracks, cabling, inverters, transformers, the solar array substation (known as the 'Frodsham Solar Substation') and the BESS;
- the 'Non-Breeding Bird Mitigation Area (NBBMA)' comprising land primarily within Cell 3, which currently forms part of the Frodsham Wind Farm mitigation. This area of land would be used as a mitigation area for the anticipated displacement of wetland birds associated with the Mersey Estuary;
- the 'SPEN/National Grid Substation and Access' comprising the existing SPEN/National Grid Substation and access road;
- the 'Skylark Mitigation Area' comprising land where it is anticipated that neutral grassland would be created during the operational lifetime of the Proposed Development for the benefit of skylarks;
- the 'Main Site Access with Private Wire Connection' comprising the access road with Protos private wire connection to the west of the SADA; and,
- the 'Main Site Access without Private Wire Connection' comprising the access road without private wire connection to the west of the SADA.

1.1.4 The objectives of this report are to:

- Provide baseline information on the current ecological features both within the Main Development Area and in the immediately surrounding area;
- Identify the proximity of any designated sites for nature conservation interest with faunal interests; and,
- Identify the presence or potential presence of any protected species, including Species of Principal Importance (SPI).

1.1.5 The report has been informed by a desk-based review of relevant ecological information, extended habitat survey, water vole crossing point preliminary habitat suitability assessment, otter and water vole survey and an invertebrate assessment. Reference is made to relevant legislation, planning policy and guidance, as appropriate.

1.1.6 The desk-based review included a review of RSK Biocensus reports written for this Proposed Development (as detailed in **Table 2-1**). The Preliminary Ecological Appraisal, together with further ecological surveys, undertaken by RSK Biocensus were based on a Preliminary Site Boundary; this Preliminary Site Boundary is shown on **Figure 2** within **Annex 3**.

1.1.7 The desk-based review also included a review of ecological baseline reports included within the Preliminary Environmental Information Report (PIER) for the proposed HyNet North West Hydrogen Pipeline (as detailed in **Table 2-1).**

1.1.8 Consideration has been given to the potential presence of rare, protected, or notable species, and the location of nearby features including designated sites for nature conservation.

1.1.9 Throughout this report, common names for species are favoured over scientific names unless there is potential for confusion and in which case scientific names are also presented.

2 METHODOLOGY

2.1 Desk Study

2.1.1 A desk study was undertaken to identify the proximity of the Main Development Area to any statutory or non-statutory designated sites for nature conservation with faunal qualifying interest, and to obtain any existing records of protected and/or non-native fauna within the Main Development Area and the surrounding area.

2.1.2 Key desk study sources, search areas and information obtained are summarised in **Table 2-1**.

Table 2-1: Desk study sources

Key Source	Date of Consultation	Information Sought	Study Area
The Multi Agency Geographic Information for the Countryside (MAGIC) website[1], Natural England's Site Search[2], and Joint Nature Conservation Committee (JNCC)[3]	April 2025	Proximity to statutory designated sites, with faunal interests.	Within 2 km of the Main Development Area (extending to 10 km for internationally protected sites).
District Level Licencing Data[4] and MAGIC	September 2024	Results of great crested newt (GCN) eDNA Pond Surveys for District Level Licensing. Existing records of granted European Protected Species Mitigation Licence ('EPSML') and GCN Class Survey Licence Returns.	Within 2 km of the Main Development Area.
RECORD (Local Environmental Records Centre for Cheshire, Halton, Warrington and Wirral)	September 2024	Existing records of protected and notable fauna[5]. Non-statutory designated sites, with faunal interests.	Within 2 km of the Main Development Area.
Cheshire Wildlife Trust Local Wildlife Citation for Frodsham, Helsby and Ince Marshes	May 2025	Records of protected species	Frodsham, Helsby and Ince Marshes

[1] Available at: https://magic.defra.gov.uk/MagicMap.aspx [Accessed 30/04/2025]
[2] Available at https://designatedsites.naturalengland.org.uk/ [Accessed 30/04/2025]
[3] http://jncc.defra.gov.uk/ [Accessed 30/04/2025]
[4] https://naturalengland-defra.opendata.arcgis.com/datasets/great-crested-newts-edna-pond-surveys-for-district-level-licensing-england?geometry=-1.451%2C51.749%2C-1.002%2C51.823 [Accessed 25/07/2024]
[5]Only records dated within the last 10 years (dated from 2014 or later) were used, unless pre-2014 records were considered pertinent to the Proposed Development.

Key Source	Date of Consultation	Information Sought	Study Area
Cheshire West and Chester Public Interactive Map[6]	April 2025	Non-statutory designated sites, with faunal interests.	Within 2 km of the Main Development Area.
Frodsham Renewable Energy Development: • Preliminary Ecological Appraisal (PEA) Report (RSK Biocensus, 2023)[7]; • Bat Activity Survey Report (RSK Biocensus, 2023)[8]; • GCN Survey Report (RSK Biocensus, 2023)[9]; • Water Vole Habitat Assessment Report (RSK Biocensus, 2023)[10]; and, • Reptile Surveys Letter Report (RSK Biocensus, 2023)[11].	August 2024	PEA: to provide context as to habitats present within the Preliminary Site Boundary. Species specific surveys: existing protected species records from baseline field surveys.	PEA: The Preliminary Site Boundary. Species specific surveys: species-specific search areas used for baseline surveys.
Frodsham Windfarm GCN Survey Report (RSK Carter Ecological, 2010)[12].	September 2024	Existing records of GCN from baseline field surveys.	Species-specific search areas used for baseline survey.
HyNet North West Hydrogen Pipeline: • Otter and Water Vole Survey Report (October 2024)[13]; • Great Crested Newt Survey Report (October 2024)[14]; • Reptile Survey Report (October 2024)[15]; and, • Aquatic Ecology Survey Report (October 2024)[16].	March 2025	Existing protected species records from baseline field surveys.	Species-specific search areas used for baseline surveys.

[6] Available at: Public Map Viewer (cheshirewestandchester.gov.uk) [Accessed 30/04/2025]
[7] RSK Biocensus (2023). Frodsham Renewable Energy Development Preliminary Ecological Appraisal Report. RSK Biocensus
[8] RSK Biocensus (2023). Frodsham Renewable Energy Development Bat Activity Survey Report. RSK Biocensus.
[9] RSK Biocensus (2023). Frodsham Renewable Energy Development GCN Survey Report. RSK Biocensus.
[10] RSK Biocensus (2023). Frodsham Renewable Energy Development Water Vole Habitat Assessment Report. RSK Biocensus.
[11] RSK Biocensus (2023). Frodsham Renewable Energy Development Reptile Surveys Letter Report. RSK Biocensus.
[12] RSK Carter Ecological (2010). Frodsham Windfarm GCN Survey Report. RSK Carter Ecological.
13 WSP UK Limited for Cadent Gas Limited (2024). HyNet North West Hydrogen Pipeline. Appendix 5I: Otter and Water Vole Survey Report. WSP UK Limited for Cadent Gas Limited.
[14] WSP UK Limited for Cadent Gas Limited (2024). HyNet North West Hydrogen Pipeline. Appendix 5F: Great Crested Newt Survey Report. WSP UK Limited for Cadent Gas Limited.
[15] WSP UK Limited for Cadent Gas Limited (2024). HyNet North West Hydrogen Pipeline. Appendix 5I: Reptile Survey Report. WSP UK Limited for Cadent Gas Limited.
[16] WSP UK Limited for Cadent Gas Limited (2024). HyNet North West Hydrogen Pipeline. Appendix 5k: Aquatic Ecology Survey Report. WSP UK Limited for Cadent Gas Limited.

2.2 Field Surveys

Field Survey Design

2.2.1 Desk study results (**Table 2-1**) informed the scope of protected species surveys required, to enable a robust and proportionate assessment of the suitability of the Proposed Development area for protected species.

2.2.2 Badger survey methodology, results and assessment are reported in a confidential annex (Annex 8) of this chapter. Bat survey, methodology and results are reported in Technical Appendix 7.3 Bat Activity Survey Report **[EN010153/DR/6.2].**

Water Vole Preliminary Habitat Suitability Assessment

2.2.3 A preliminary habitat suitability assessment of the proposed crossing point locations (as detailed in **ES Vol 2 Appendix 2-1: Indicative Watercourse Crossing Schedule (inc. figures) [EN010153/DR/6.2]**) was undertaken in 2023 and repeated in 2024/2025.

2.2.4 The 2023 assessment was undertaken on the 13th September 2023 by J. Stevens *BSc Hons* and C. Wood *MSc ACIEEM*, and on the 18th September 2023 by K. Love *MSc*. The 2024 assessment was undertaken on the 14th June 2024 by A. Crone and A. Tomlinson *MSc* and on the 13th September by K. Love *MSc* and A. Tomlinson *MSc*. Three proposed crossing points (U, W and X; shown in **Figure 2**) were surveyed on the 20th January 2025 by K. Love *MSc* and A. Hulme *BSc (Hons).*

2.2.5 The preliminary habitat suitability assessment was undertaken at each proposed crossing point location to determine whether or not habitats preferred by water voles were present. Surveyors used professional judgement to assess the suitability of ditches based on the available water levels, food sources and suitability of banks for burrow creation. Each crossing point was assigned a suitability score of 'suitable', 'sub-optimal' or 'unsuitable'; due to visibility constraints, for example due to the presence of dense bank top vegetation, a suitability score of 'potentially suitable' was also used where appropriate.

2.2.6 This preliminary habitat assessment was also undertaken to determine feasibility of conventional surveys with regards to access to the ditches and Health and Safety constraints.

Otter and Water Vole Survey

2.2.7 A combined otter and water vole survey was undertaken, where access was possible, on the 13th September 2024 and also on the 18th March 2025.

2.2.8 The survey was undertaken by K. Love *MSc* and A. Tomlinson *MSc,* both of whom are competent in the identification of field signs of otters and water voles, as well as using the appropriate survey methodologies.

2.2.9 The survey area is shown in **Figure 3.**

<u>Otter</u>

2.2.10 The survey comprised an assessment of the relative habitat suitability of the waterbodies and ditches within the Survey Area. Notes were also taken on any field signs encountered including spraints, footprints, feeding remains, slides and potential holts (or other resting or breeding place).

Water Vole

2.2.11 The water vole survey methodology was designed using methods detailed within Dean (2021)[17] and Dean *et al.* (2016)[18]. A search for field signs was undertaken, indicating the presence or possible presence of water vole.

2.2.12 The survey visits were undertaken in September 2024 and March 2025, within the water vole breeding season, which is generally considered to be between mid-April and September (Dean, 2021 & Dean *et al.,* 2016).

2.2.13 A search of the waterbodies and ditches within the survey area was undertaken predominantly by walking along the waterbody's/ditch's edge, and where this was not possible, undertaking spot checks and searches from the bankside to record the location of any water vole field signs. Searches for field signs were undertaken from the toe[19] of the waterbody/ditch bank within each section, up to at least 1 m out into the water and at least 1 m up the bank, in accordance with guidance (Dean *et al*., 2016).

2.2.14 Searches for the following field signs of water vole presence as per Strachan *et al*. (2011)[20] were undertaken along each survey section:

- Sightings
- Droppings/latrines;
- Burrows;
- Footprints;
- Pathways;
- Feeding stations; and,
- Lawns.

2.2.15 The presence of water vole droppings/latrines is the only field sign that can be used reliably on its own to confirm species presence.

Population Density Estimates

2.2.16 The number of latrines recorded during a survey is also able to provide an indication of relative population densities and identify the most important parts of a study area for water vole for the purposes of assessing impacts and approach to mitigation.

2.2.17 **Table 2-2** outlines an approach to estimating the relative population densities on the basis of latrine counts in accordance with current guidance (Dean et al., 2016). The guidance notes that counts of latrines for each survey section are made until a count of 10 or more during the first half of the survey season or 20 or more during the second half of the survey season is reached at which point a high population density can be concluded.

[17] Dean, M. (2021) *Water Vole Field Signs and Habitat Assessment; A Practical Guide to Water Vole Survey.* Pelagic Publishing, Exeter.
[18] Dean, M., Strachan, R., Gow, D. & Andrews, R. (2016) *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series)*. Eds Fiona Mathews and Paul Chanin. The Mammal Society, London.
[19] In accordance with Dean *et al.* (2016) the toe of the bank is defined here as the area of the bank at, and immediately above, water level.
[20] Strachan R., Moorhouse T.P. & Gelling M. (2011). *Water Vole Conservation Handbook* 3rd Edition. Wildlife Conservation Research Unit, Oxford.

Table 2-2: Relative Water Vole Population Densities on the Basis of Latrine Counts *(as adapted from Dean et al. (2016)*

Relative Population Density	**Approximate number of latrines per 100 m of bankside habitat**	
	First half of survey season (mid-April to end of June)	**Second half of survey season (July to September)**
High	10 or more	20 or more
Medium	3-9	6-19
Low	≤2 (or non, but with other confirmatory field signs)	≤5 (or non, but with other confirmatory field signs)

Invertebrate Assessment

2.2.18 An invertebrate assessment was undertaken by Peter Brash Ecology in 2023; the first visit was undertaken in May 2023 and covered the whole Invertebrate Assessment Area, as shown on **Figure 7.** The initial visit identified areas of higher invertebrate potential that would be subject to further survey visits; this was determined by habitat suitability and initial findings.

2.2.19 Areas of higher invertebrate potential (as shown on **Figure 7**) were then subject to three targeted survey visits between May and September 2023. The targeted survey visits entailed a combination of survey methods, including sweep netting, suction sampling, visual searching and beating tray.

2.2.20 Most specimens were identified in the field; where this was not possible, the specimens were euthanized using ethyl acetate and stored in 7 ml glass snap top vials, for identification using specialist equipment.

2.2.21 The species list was entered into Pantheon, a software application which assesses the importance of invertebrate assemblages (developed by Natural England and Centre for Ecology and Hydrology).

Limitations

2.2.22 The first otter and water vole survey visit (13th September 2024) was undertaken following a period of prolonged rainfall. As such, some evidence pertaining to the presence of otter and/or water vole may have been washed away during recent rainfall.

2.2.23 A second otter and water vole survey was undertaken on 18th March, 2025, this survey was undertaken prior to the typical survey season for the species (mid-April to September), however given generally favourable (dry and warm) weather conditions in the preceding weeks and given confirmatory evidence was found the earlier date is considered sufficient to confirm presence.

2.2.24 The Water Vole Preliminary Habitat Suitability Assessment was undertaken to determine the feasibility of conventional water vole survey; both the 2023 and 2024/2025 visits found that the relevant ditches were generally steep sided, with heavily vegetated banks and dense reed coverage, and which precludes safe access. As such, where access was not possible, further surveys, including relative population size surveys, were not undertaken. These limitations have been discussed with Cheshire West and Chester Council (CWaCC) Biodiversity Officer. Furthermore, a Site visit attended by representatives from Avian Ecology, Axis and CWaCC on the 4th September 2024 demonstrated to

CWaCC the Health and Safety restrictions related to water vole surveys (see **Table 1-1** in **Appendix 7-4 Consultation and Engagement**)

2.2.25 It is recognised that the GCN and reptile survey data is classified as invalid in accordance with CIEEM[21] advice. However, based on lack of historical records, surveys undertaken to date and significant barriers to dispersal (M56, industrialised areas and the River Mersey) the age of the survey data is deemed to not be a significant constraint to the assessment for GCN and reptiles, as it is extremely unlikely that GCN and reptiles would colonise the Proposed Development due to the barriers to movement.

2.2.26 No substantive limitations to invertebrate survey were experienced.

[21] CIEEM (2019). Advice Note On The Lifespan of Ecological Reports and Surveys. Available at: https://www.bing.com/search?qs=UT&pq=cieem+advice+not&sk=CSYN1&sc=2-16&q=cieem+advice+note+on+the+lifespan&cvid=ef9847c622904231a30448e2a5352fac&gs_lcrp=EgRlZGdlKgcIABAAGPkHMgcIABAAGPkHMgYIARBFGDkyCAgCEOkHGPxV0gEIMjczNGowajSoAgiwAgE&FORM=ANAB01&PC=DCTS. Accessed on [02/05/2025]

3 RESULTS

3.1 Designated Sites for Nature Conservation

Statutory Designated Sites for Nature Conservation

3.1.1 A summary of statutory designated sites with qualifying faunal interest located within 2 km of the Main Development Area (extending to 10 km for internationally protected sites) is presented in **Table 3-1** and locations are presented in **Figure 8.**

Table 3-1: Statutory Designated Sites

Designated Site	Distance and Direction from the Main Development Area	Faunal Qualifying Features
Midland Meres & Mosses - Phase 1 Ramsar site	6.59 km southeast	Ramsar criterion 2: Assemblage of rare wetland invertebrates (three endangered insects and five other British Red Data Book species of invertebrates.
Midland Meres & Mosses Phase 2 Ramsar site	8.05 km southeast	Ramsar criterion 2: Assemblage of invertebrates including several rare species. There are 16 species of British Red Data Book insects listed for this site including the following endangered species: the moth *Glyphipteryx lathamella*, the caddisfly *Hagenella clathrata* and the sawfly *Trichiosoma vitellinae*.

Non-statutory Designated Sites

3.1.2 A summary of non-statutory designated sites with qualifying faunal interest located within 2 km of the Main Development Area is presented in **Table 3-2** and locations are shown in **Figure 9.**

Table 3-2: Non-statutory Designated Sites *(LWS: Local Wildlife Site)*

Designated Site	Distance and Direction from the Main Development Area	Description of Faunal Qualifying Features
Frodsham, Helsby and Ince Marshes LWS	Within the Main Development Area	Invertebrates.
Frodsham Field Studies Centre LWS	Within the Main Development Area (SADA and NBBMA)	Invertebrates.
Clifton Lagoon LWS	0.07 km northeast	Invertebrates.

3.3 Desk Study Review of HyNet North West Hydrogen Pipeline Reports

Otter

3.3.1 An otter survey was undertaken at potential watercourse crossings within the HyNet North West Hydrogen Pipeline boundary between 2022 and 2023. Of the 108 watercourse crossings surveyed for the presence/likely absence of otter, four are located within the Main Development Area, 25 are located within 2 km of the Main Development Area, and a further crossing point is located beyond 2 km but along a watercourse which flows into the 2 km buffer. No evidence for the presence of otter was recorded on or within 2 km of the Main Development Area.

Water Vole

3.3.2 A water vole survey was undertaken at potential watercourse crossings within the HyNet North West Hydrogen Pipeline boundary between 2022 and 2023. Of the 108 watercourse crossings surveyed for the presence/likely absence of water vole, four are located within the Main Development Area, 25 are located within 2 km of the Main Development Area, and a further crossing point is located beyond 2 km but along a watercourse which flows into the 2 km buffer. No evidence, or potential evidence, for the presence of water vole was recorded within the Main Development Area. However, evidence, or potential evidence, was recorded at 11 crossing point locations within 2 km of the Main Development Area. The closest evidence, or potential evidence, was of potential latrines and burrows located along two ditches immediately south of the SADA (one of these ditches forms the eastern boundary of the Skylark Mitigation Area, the second is approximately 125 m west of the Skylark Mitigation Area). Water vole population density estimates calculated for both lengths of ditches was low.

3.3.3 Mammals, including water vole, were detected as 'non-target vertebrate taxa' within the fish eDNA analysis (see below under fisheries). European water vole was identified at a single sample point; located 2 km southwest of the Main Development Area, along an unnamed ditch.

Amphibians

3.3.4 No amphibian, including GCN, surveys were undertaken for the HyNet North West Hydrogen Pipeline project within 2 km of the Main Development Area boundary.

Reptiles

3.3.5 A reptile survey was undertaken for the HyNet North West Hydrogen Pipeline project between 2022 and 2023. Of the 11 areas surveyed for reptiles for the HyNet North West Hydrogen Pipeline, two survey areas overlap with the Main Development Area boundary; Sutton Causeway and East Clifton Tip, both of which overlap the access road to the SPEN/National Grid Substation and Access. No reptiles were recorded wither either the Sutton Causeway or East Clifton Tip survey areas. The closest reptile was recorded at Sandiway Golf Course and LWS, approximately 13 km southeast of the Main Development Area.

Fisheries

3.3.6 Environmental DNA (eDNA) surveys were undertaken for the HyNet North West Hydrogen Pipeline project between 2022 and 2023. Forty-one locations were surveyed, none of which are located within the Main Development Area boundary, however, seven sample points are located within 2 km of the Main Development Area boundary (including along the River Weaver, which flows through the Main

Development Area), and a further two located beyond 2 km but along a watercourse which flows into the 2 km buffer. Samples collected from the 41 sample locations were analysed for the presence of:

- Freshwater fish (excluding sharks & rays);
- Freshwater unionid mussels;
- Freshwater bivalves (excluding unionid mussels); and,
- Signal crayfish.

3.3.7 Positive eDNA results for the presence of European eel was returned from two sample points within 2 km of the Main Development Area, including along the River Weaver which flows through the Main Development Area, and along a ditch located approximately 1 km south of the Main Development Area (NBBMA). Positive results for the presence of European eel was also returned from a single sample point located beyond 2 km but along a watercourse which flows into the 2 km buffer (Hornsmill Brook).

3.3.8 The eDNA surveys returned no invasive non-native species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended) within 2 km of the Main Development Area.

3.4 Protected and Notable Species

Otter

Desk Study

3.4.1 RECORD returned a single record of otter within 2 km of the Main Development Area; detailing two otters sighted approximately 1.6 km southwest of the Main Development Area. The locations of both records are hydrologically connected to the Main Development Area. A review of MAGIC identified no granted EPSML for otter within 2 km of the Main Development Area.

3.4.2 Habitat Suitability

3.4.3 The majority of the ditches, watercourses and waterbodies present within Main Development Area are considered sub-optimal for resting, foraging or commuting otter as they are shallow and densely vegetated in many places. However, the larger ditches and watercourses located along the southeastern boundary of the SADA, together with the series of ponds and ditches located within the NBBMA, may be suitable for resting, foraging or commuting otter.

3.4.4 Watercourses, including the River Weaver, Weaver Navigation and Manchester Ship Canal, as well as the extensive ditch network neighbouring the Main Development Area, offer suitable habitat to support foraging and commuting otters; their associated terrestrial habitats may also be used as sleeping and resting places. Taking into account the desk study records, the presence of suitable habitat within and adjacent to the Main Development Area and the extensive home range of otters, it is considered likely that otters are utilising watercourses located within the Main Development Area, and may occasionally utilise the ditch network.

Otter Survey

3.4.5 During the first visit of the combined otter and water vole survey undertaken on the 13th September 2024, three undetermined mustelid scats were recorded; taking into account the consistency, contents and smell, all three scats may be that of otter, however this could not be confirmed. The first

(Annex 1 - Photograph 1) was recorded adjacent to pond P24, whilst the second (Annex 1 - Photograph 2) and third (Annex 1 - Photograph 3) were recorded adjacent to ditch D30, here a mammal path was also recorded entering the ditch (see **Figure 4**).

3.4.6 During the second visit of the combined otter and water vole survey undertaken on the 18th March 2025, no definitive evidence pertaining to the presence of otter was recorded within the survey area. However, four unidentified mammal holes were recorded within the NBBMA; the locations of which are illustrated on **Figure 3: Otter and Water Vole Survey Results**, and example photograph included in **Annex 1** (Photograph 27). All four holes were located adjacent to either a ditch, a waterbody or reedbed; due to their locations, shape and size, these holes may be those of otter. However, due to the lack of definitive evidence, this could not be confirmed.

Water Vole

Desk Study

3.4.7 RECORD returned eight records of water vole within 2 km of the Main Development Area. Of these, four were recorded within or directly adjacent to the SADA (adjacent to Moorditch Lane and Brook Furlong), comprising feeding stations and latrines. The remaining four records were of water vole sightings, approximately 1.6 km southwest of the Main Development Area.

3.4.8 Full methodologies and results of the RSK Biocensus water vole habitat assessment survey undertaken as part of the Preliminary Site Boundary are included in **Annex 3.** In summary, a water vole habitat assessment survey was undertaken in 2022. The habitat suitability assessment identified 22 of the 36 ditches and five of the eight waterbodies as having suitability to support water vole. One ditch was assessed as having optimal suitability, 12 ditches and four waterbodies were assessed as having good suitability, and nine ditches and one waterbody were assessed as suitable but poor. The remaining 14 ditches and three waterbodies were assessed as having negligible suitability to support water vole.

Field Surveys

Crossing Point Preliminary Habitat Suitability Assessment

3.4.9 Results of the Crossing Point Preliminary Habitat Suitability Assessment are detailed in **Table 3-3** and shown in **Figure 2.** Where results of the 2023 visit differ from the 2024 visit, these are detailed below; otherwise, the results of the 2023 visit were similar to those of the 2024 visit. Results for crossing points U, W and X are from the 2025 survey visit.

Table 3-3: Crossing Point Preliminary Habitat Suitability Assessment Results

Crossing ID	Description and Preliminary Suitability Score	Photo No
A	Dry ditch west of an unmanaged hedgerow. Approximately 1 m wide at the base with 1 m deep banks. The ditch is overgrown with tall herb and scrub. No water present. **Unsuitable for water vole.**	4
B	Wet static ditch located on the western side of an unmanaged hedgerow. Shallow water depth north of crossing and dry to the south. Approximately 1 m wide at base, with 1.5 m deep banks that are covered in tall herb, scrub and grass. Dense areas of scrub and hedgerow prevents access along the majority of the ditch. **Potentially suitable for water vole (visibility limited).**	**5**
C	Wet static ditch with access only at the existing footbridge. Depth appears deeper than 0. 5m. Width is between 1.5-2 m. Almost vertical 0.5 m banks. Dense unmanaged hedgerow shades the ditch and limits visibility and access. **Potentially suitable for water vole (visibility limited).**	**6**
D	Wet static ditch with water depth likely to be approximately 0.5 m deep. 1.5 m wide, with steep 1 m deep banks. Banks dominated by bramble and tall herb, with scattered unmanaged scrub either side of the ditch limiting access. **Potentially suitable for water vole (visibility limited).**	**7**
E	Wet static ditch with deep water, 1.5-2 m wide, with steep 1 m deep bramble and common reed dominated banks. Dense bankside vegetation. Southern section is similar but covered with dense common reed **Potentially suitable for water vole (visibility limited).**	**8**
F	Wet static ditch with low water levels. The ditch is dominated by dense common reeds and scrub, limiting access. Small mammal holes recorded during the 2023 visit at SJ 51389 78573 (the only open water section accessible). No definitive evidence of water vole (such as latrines) recorded. **Potentially suitable for water vole (visibility limited).**	**9**
G	Very shallow ditch. To the east of the crossing point the channel is densely vegetated with reeds. To the west of the crossing point, the ditch is dry and follows a mature hedgerow which limits visibility and accessibility. **Potentially suitable for water vole (visibility limited).**	**10**
H	Largely inaccessible due to dense reed and scrub; visible sections identified shallow water and dense vegetation within the channel. **Potentially suitable for water vole (visibility limited).**	**11**
I	Similar to crossing E and part of the same ditch channel. Wet static ditch with deep water, approximately 1.5-2 m wide, with steep 1 m deep bramble and common reed dominated banks. **Suitable for water vole.**	**12**
J	Not accessed in 2024 due to the presence of cattle. Dense scrub and common reeds recorded on the bank tops limiting access and visibility during the 2023 visit. **Potentially suitable for water vole (visibility limited).**	**13**
K	Not accessed in 2024 due to the presence of cattle. Dense scrub and common reeds recorded on the bank tops limiting access and visibility during the 2023 visit. **Potentially suitable for water vole (visibility limited).**	**14**
L	Not accessed in 2024 due to the presence of cattle. Dense scrub and common reeds recorded on the bank tops limiting access and visibility during the 2023 visit. **Potentially suitable for water vole (visibility limited).**	**15**
M	Not accessed in 2024. Dense scrub and common reeds recorded on the bank tops limiting access and visibility during the 2023 visit. **Potentially suitable for water vole (visibility limited).**	**16**
N	Not accessed in 2024. Dense scrub and common reeds recorded on the bank tops limiting access and visibility during the 2023 visit. **Potentially suitable for water vole (visibility limited).**	**17**
O	No direct access, viewed from closest available vantage point. From the closest vantage point, the area looks similar to crossing points P, Q, R and S, and is situated along the same ditch channel. Scrub and dense reed restricting visibility and access. **Potentially suitable for water vole (no access to adjacent field).**	**n/a**

P	No direct access, viewed from closest available vantage point. From the closest vantage point, the area looks similar to crossing points O, Q, R and S, and is situated along the same ditch channel. Scrub and dense reed restricting visibility and access. **Potentially suitable for water vole (visibility limited).**	**n/a**
Q	Wet ditch likely to be 1 – 1.5 m deep. Dense vegetation present within the ditch which limits visibility. **Potentially suitable for water vole (visibility limited).**	**18**
R	Dense vegetation present within the ditch which limits visibility. **Potentially suitable for water vole (visibility limited).**	**19**
S	Wet ditch with steep banks. Dense vegetation comprising mainly of common reed which limits visibility. **Potentially suitable for water vole (visibility limited).**	**20**
T	Wet ditch with shallow water. Ditch is heavily shaded from dense scrub and adjacent hedgerow. **Suitable for water vole.**	**21**
U	A shallow wet ditch no deeper than 15 cm that is likely seasonally wet. Approximately 1 m wide with dirty and slightly polluted water. Accessible only from the western side of the hedgerow. Earth banks are shallow, comprise tall grasses, scrub and tall fobs. **Sub-optimal for water vole.**	**22**
V	Wet ditch with steep bank approximately 1.5 m tall. Dense scrub and reed vegetation limits visibility. **Suitable for water vole.**	**23**
W	A 2 m wide wet ditch, with water approximately 0.5 m deep up to the top of the bank. Accessible from the northern side of the hedgerow. Mostly shaded under the 3-4 m high hedgerow, and includes common reed and bramble along the bank tops. Bankside availability for burrowing is limited. **Suitable for water vole.**	**24**
X	A shallow wet ditch no deeper than 15 cm that is likely seasonally wet. Approximately 0.75 - 1 m wide and located on the western side of an unmanaged hedgerow. Therefore, accessible only from the west. Banks are approximately 60 cm deep and comprise earth, with common reed and willowherb frequent. A lack of open water, and shallow depths limits suitability for water vole. **Sub-optimal for water vole.**	**25**
Y	Shallow water, possibly seasonally wet ditch. Banks are approximately 1.5 m tall. **Suitable for water vole.**	**26**

3.4.10 *Water Vole Survey*During the first visit of the combined otter and water vole survey undertaken on the 13th September 2024 no field evidence of water vole was recorded. Two ditches are present within the water vole survey area (shown on **Figure 3**); D29 and D30. D29 ranges from having shallow water to being approximately 0.5 m deep; the banks are approximately 1 m tall and are vegetated with grassland. D30 ranges from having shallow water to being approximately 1 m deep, and is densely vegetated by reeds, which limit access to and visibility of the ditch. Both ditches D29 and D30 were considered suitable for use by water vole.

3.4.11 The scrapes located towards the east and southeast of the NBBMA (P3, P4, P5, P6, P7, P9,10 and P15) are unsuitable for use by water vole due to the shallow nature of the water (approximately 20 – 30 cm deep). The waterbodies along the northwestern boundary of the NBBMA (P1, P2, P22 and P24) are considered suitable for use by both foraging and sheltering water vole due to the presence of deeper water and bank-side vegetation. P13 and the surrounding reedbed, which is located within the SADA, adjacent to Frodsham Marsh Farm, is also considered suitable for use by water vole due to the presence of vegetation suitable for both foraging and sheltering; however, dense vegetation and wet/damp conditions underfoot limited access and visibility.

3.4.12 During the second visit of the combined otter and water vole survey undertaken on the 18th March 2025, four water vole latrines were recorded along D30 (Annex 1 - Photograph 28 & 29), located towards the southeast of the NBBMA. Water vole feeding remains were recorded to the east of D30, adjacent to a latrine (Annex 1 - Photograph 30). A single potential water vole burrow was also recorded along the northern bank D30 (Annex 1 - Photograph 31), towards the centre of the ditch; no other

signs of water vole were recorded directly adjacent to this burrow, however, the shape and size are consistent with those of water vole burrows.

Incidental Records

3.4.13 A single water vole was incidentally observed within the Main Development Area during an ornithology survey visit undertaken on the 28th March 2023. The water vole was recorded within D41 which runs parallel to Moordich Lane, and along the north of the Skylark Mitigation Area (at approximately SJ 50601 78086).

3.4.14 Several potential water vole burrows were recorded along D41 on the 18th March 2025 during the badger survey. Several small mammal burrows were recorded at two separate locations immediately north of the Skylark Mitigation Area (Annex 1 - Photographs 31 & 33), and a further potential burrow was recorded east of the Skylark Mitigation Area (Annex 1 - Photograph 34) (locations illustrated on **Figure 3**). These burrows were not accessible and as such a close inspection for the presence of additional water vole field signs was not possible. However, the shape and size are consistent with those of water vole burrows.

3.4.15 For the purposes of the assessment water vole are considered to be present within the ditch network across the Proposed Development area.

Badger

3.4.16 Discussed separately within **Annex 7: Confidential Badger Report.**

Amphibians

Desk Study

3.4.17 RECORD returned eight records of amphibians within 2 km of the Main Development Area. In summary, a single record of common toad was returned, located directly adjacent to the SPEN/National Grid Substation and Access; two records of common frog were returned, located 1.22 km northeast and 1.64 km south. RECORD returned no positive records of GCN within 2 km of the Main Development Area, however, records relating to five locations within 2 km of the Main Development Area were noted to be absent for the presence of GCN. A review of MAGIC returned no granted EPSML for GCN within 2 km of the Main Development Area.

3.4.18 Full methodologies and results of the RSK Biocensus GCN surveys undertaken of the Preliminary Site Boundary are included in **Annex 4.** In summary, GCN surveys were undertaken on and within 0.5 km of the Preliminary Site Boundary in 2022. The survey comprised Habitat Suitability Index (HSI) Assessments of ponds and ditches on and within 0.5 km of the Preliminary Site Boundary (excluding any which are separated from the Preliminary Site Boundary by major dispersal barriers) between 5th and 6th April 2022. Environmental DNA (eDNA) surveys of ponds on and within 0.5 km of the Preliminary Site Boundary (excluding any which were dry at the time of the survey, or separated from the Preliminary Site Boundary by major dispersal barriers) were undertaken between the 20th and 22nd April 2022. Seven ditches located on or within 0.5 km of the Preliminary Site Boundary were also subject to eDNA surveys between the 20th and 22nd April 2022; these ditches were sampled based on their HSI score and whether they were safely accessible. Of the ponds and ditches subject to eDNA surveys, ten ponds and seven ditches returned negative results for the presence of GCN, and a further three ponds either returned indeterminate results (from laboratory analysis), or were dry at the time

of survey. Furthermore, a number of ponds and ditches were not subject to eDNA sampling due to not holding water at the time of survey and/or H&S constraints.

3.4.19 A summary of the RSK Biocensus HSI and eDNA survey results (as detailed within Appendix B of the GCN Survey Report (RSK Biocensus, 2023)) are included in **Annex 2**. **Annex 2** includes the ditch/watercourse numbers used within RSK Biocensus' GCN Survey Report together with an updated numbering system used for the purpose of this ES. The results of the RSK Biocensus HSI and eDNA surveys are also shown on **Figure 5 Great Crested Newt Habitat Suitability Index Assessment Results** and **Figure 6 Great Crested Newt eDNA Survey Results,** using the updated ES numbering.

3.4.20 These results are consistent with surveys undertaken in 2010 to inform the Frodsham Wind Farm planning application[22]; 27 water bodies were surveyed, all of which returned negative results for the presence of GCN. On balance, given recent and historical negative survey results, and the absence of recent positive desk study data, it is considered that GCN are reasonably unlikely to be present within the Main Development Area.

3.4.21 A small number of common toads were recorded within the Preliminary Site Boundary during the RSK Biocensus PEA and reptile surveys.

Reptiles

Desk Study

3.4.22 RECORD returned no records of reptiles within 2 km of the Main Development Area.

3.4.23 Full methodologies and results of the RSK Biocensus reptile survey undertaken of the Preliminary Site Boundary are included in **Annex 5.** In summary, a reptile survey was undertaken of the Preliminary Site Boundary in 2022. A total of 600 artificial refuges were deployed across the Preliminary Site Boundary in March 2022; seven visits were then carried out between April and June 2022, during which the refuges were checked for the presence of reptiles. No reptiles were recorded during any of the survey visits.

3.4.24 On balance, reptiles are considered reasonably likely to be absent from the Main Development Area, or present only in very low numbers.

Other Notable Mammals

3.4.25 RECORD returned records of other notable mammal species including brown hare (12 records), hedgehog (11 records), polecat (one record) and harvest mouse (one record) within 2 km of the Main Development Area. Of these, four brown hare records were within the Main Development Area.

3.4.26 Habitats within the Main Development Area, including hedgerows, tree lines, grassland and reedbed, provide suitable habitats for breeding, foraging and sheltering brown hare, hedgehog, Western polecat and harvest mouse.

Fish

[22] RSK Carter Ecological (2010). Frodsham Windfarm; GCN Survey Report. RSK Carter Ecological.

3.4.27 RECORD returned no records of protected or notable fish species within 2 km of the Main Development Area.

3.4.28 Watercourses and ditches located within and immediately adjacent to the Main Development Area may support notable fish species. Eels are likely to be present within permanently wet waterbodies (including ditches) that are hydrologically connected to any main watercourse, and may also be present withing nearby ponds. Targeted fish surveys have not been undertaken and are not proposed due to measures embedded in the project to avoid impacts on watercourses, as detailed within **Chapter 7: Terrestrial Ecology**.

3.4.29 For the purposes of the assessment fish (including eels) are assumed to be present within the ditch network and ponds across the Proposed Development area.

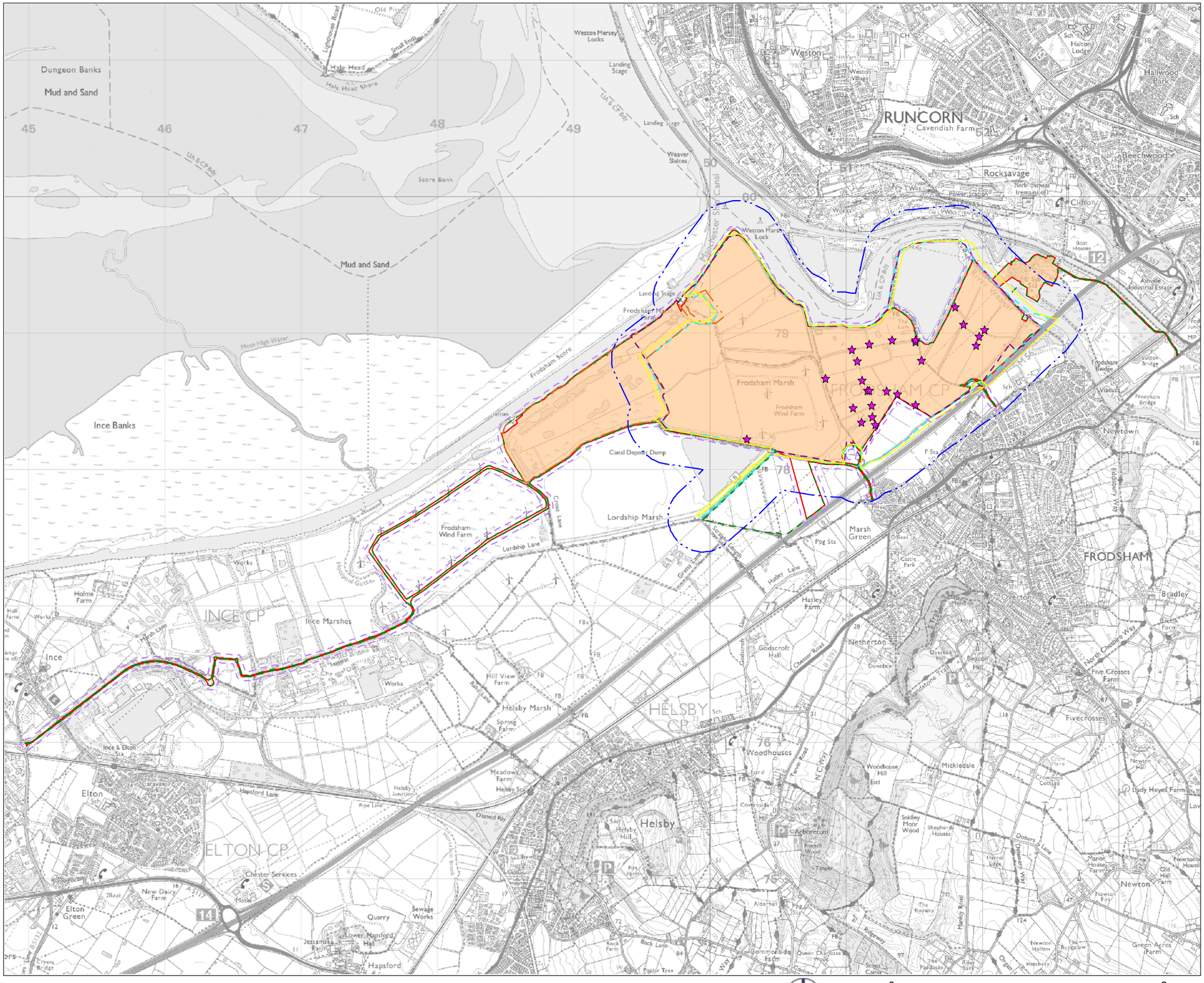
Invertebrates

Desk Study

3.4.30 RECORD returned 2,128 records of invertebrates within 2 km of the Main Development Area; of these, one species is listed under Schedule 5 of the Wildlife and Countryside Act, comprising a single record of white-letter hairstreak located approximately 1 km east of the Main Development Area. An additional ten species are listed as LBAP species and/or SPI; comprising blood-vein, buff ermine, cinnabar, dot moth, dusky thorn, garden tiger, large wainscot, mouse moth, ringlet and small square-spot. Of these, one record of cinnabar and nine records of ringlet were returned from the Main Development Area.

Field Survey

3.4.31 Full results of the invertebrate assessment are included in **Annex 6: Invertebrate Assessment Report.** In summary, a total of 386 invertebrate species were recorded; of these, two species are listed as SPIs (cinnabar and blood-vein moths), two are listed as Nationally rare (a pill beetle *Curimopsis setigera* and alder leaf beetle), one is listed as Nationally Notable category A (a weevil *Rhinocyllus conicus*) and three are listed as Nationally Notable category B (a weevil *Oxystoma cerdo*, a weevil *Sitona waterhousei* and bull's-horn stem-moth). None of the invertebrate assemblages recorded within the survey area were found to be in favourable condition in accordance with Pantheon assemblage scores, although two assemblages came close; 'rich flower resource' (based on bee species) had 14 of the 15 qualifying species, whilst 'scrub edge' had nine of 11 qualifying species.



🟥	Order Limits
🟨	Preliminary Site Boundary
🟧	Main Development Area
★	Water Vole Crossing Point Habitat Preliminary Suitability Assessments (Avian Ecology 2023/2024)
▭	Otter and Water Vole Survey (Avian Ecology 2024)
▭	Badger Survey (Avian Ecology 2023/2024)
▭	Badger Survey (Avian Ecology 2025)
▭	Great Crested Newt Survey (RSK Biocensus)
▭	Reptile Survey (RSK Biocensus)
▭	Invertebrate Assessment (Avian Ecology 2023)

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FRODSHAM SOLAR ENVIRONMENTAL STATEMENT

Figure Number

1

Figure Title

Survey Areas (Protected Ecological Species)

Scale

1:26000@A3

Date

May 2025

N

0 2
kilometers

Order Limits

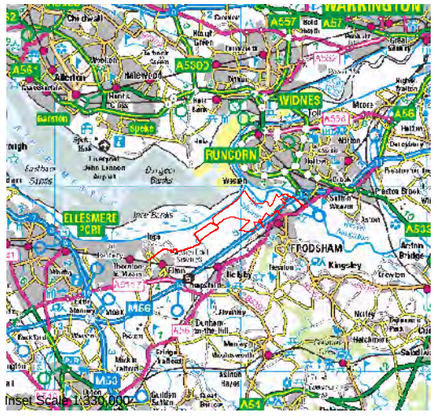
Main Development Area

Main Rivers

Ditches

Crossing Point

- Suitable
- Potentially suitable (visibility limited)
- Potentially suitable (no access to adjacent field)
- Sub-optimal
- Unsuitable



Inset Scale 1:330,000

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FRODSHAM SOLAR ENVIRONMENTAL STATEMENT

Figure Number

2

Figure Title

Water Vole Crossing Point Preliminary Habitat Suitability Assessment

Scale

1:8000@A3

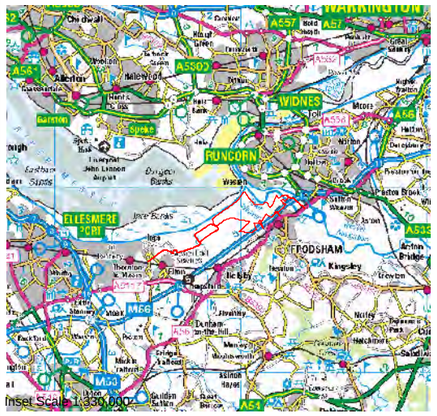
Date

May 2025

N

0 600

meters



🟥 Order Limits

🟧 Main Development Area

▨ Water Vole and Otter Survey Area

🟦 Pond

— River

— Ditch

Results from Avian Ecology Survey 2024

● Mustelid Scat

→ Mammal Path

Results from Avian Ecology Survey 2025

● Water Vole - Latrine

● Water Vole - Latrine & Feeding Remains

● Water vole - Potential Burrow

Incidental Records

● Water vole (recorded during an ornithology survey on the 28th March 2023)

● Water vole - Potential Burrow (recorded during a badger survey on the 18th March 2025)

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FRODSHAM SOLAR ENVIRONMENTAL STATEMENT

Figure Number

3

Figure Title

Otter and Water Vole Survey Results

Scale

1:8000@A3

Date

May 2025

Order Limits

Main Development Area

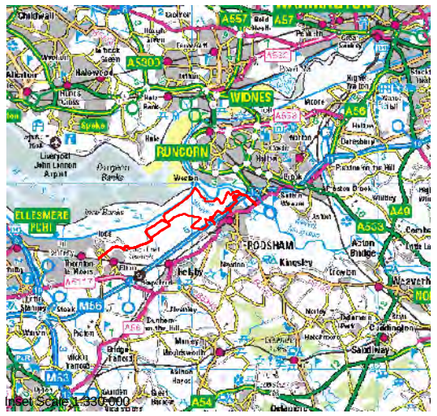
250m Main Development Buffer

HSI Assessment - Ponds

- Pond (no HSI)
- Excellent
- Good
- Average
- Below Average
- Poor

HSI Assessment - Ditches and Rivers

- Ditch/River (no HSI)
- Good
- Average
- Below Average
- Poor
- Unsuitable
- Dry



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FRODSHAM SOLAR ENVIRONMENTAL STATEMENT

Figure Number

5

Figure Title

Great Crested Newt Habitat Suitability Index Assessment Results

Scale

1:18000@A3

Date

May 2025

N

0 1

kilometers

Order Limits

Main Development Area

250m Main Development Buffer

eDNA Assessment - Ponds

Not Surveyed

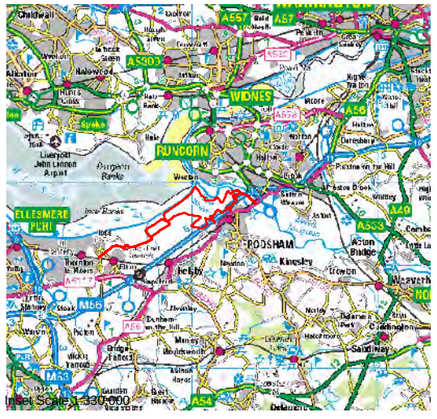
Indeterminate

Negative

eDNA Assessment - Ditches and Rivers

Not Surveyed

Negative



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FRODSHAM SOLAR ENVIRONMENTAL STATEMENT

Figure Number

6

Figure Title

Great Crested Newt e DNA Survey Results

Scale

1:18000@A3

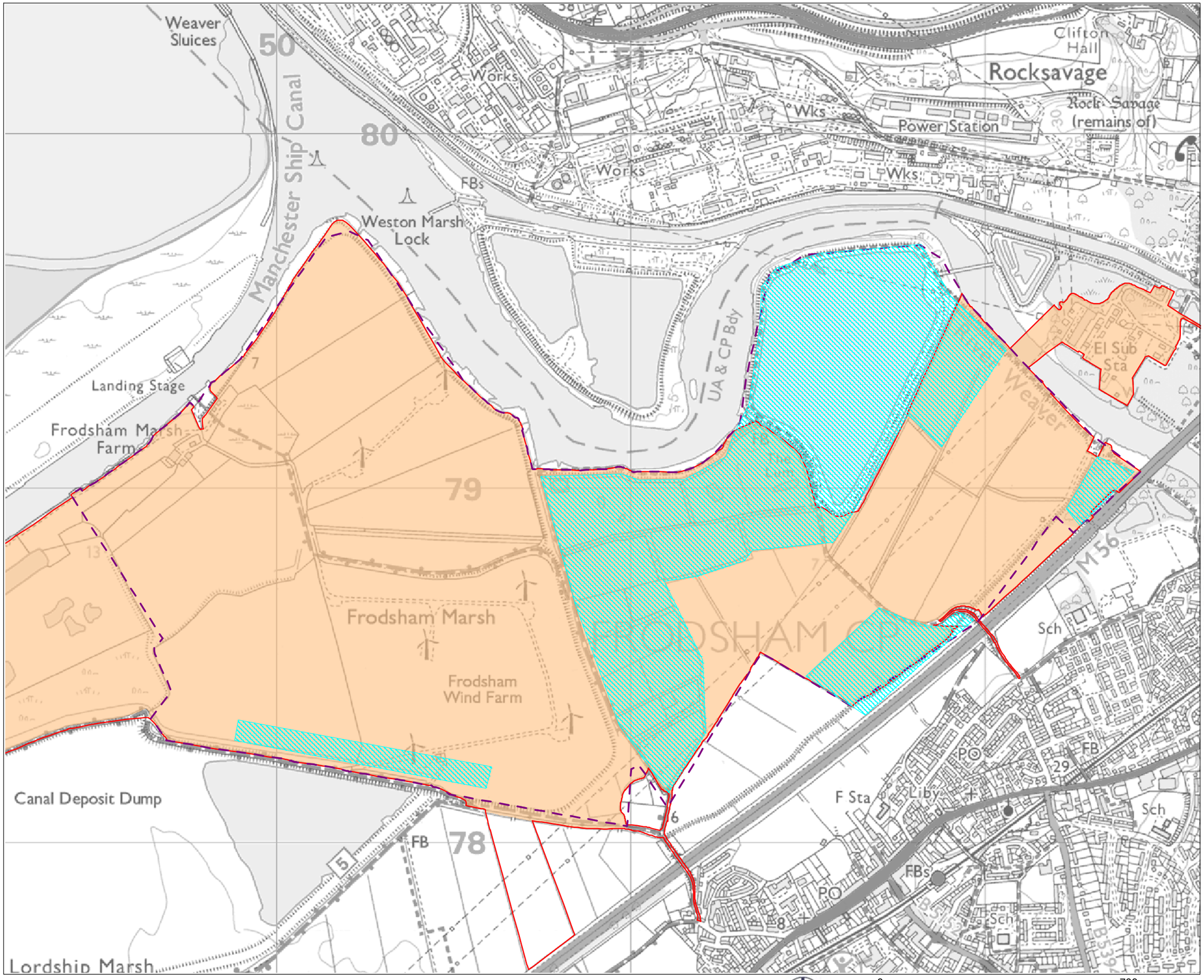
Date

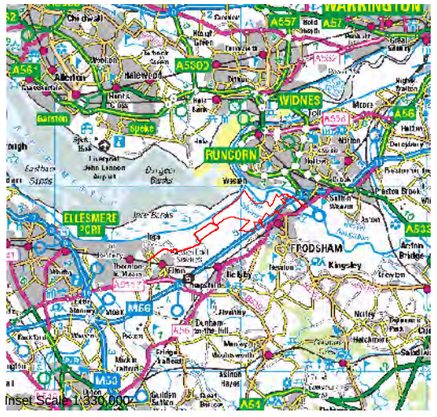
May 2025

N

0 1

kilometers





Order Limits

Main Development Area

Invertebrate Assessment (Avian Ecology 2023)

Areas of Higher Invertebrate Potential

N

0 700

meters

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FRODSHAM SOLAR ENVIRONMENTAL STATEMENT

Figure Number

7

Figure Title

Invertebrate Assessment Survey Areas

Scale

1:10000@A3

Date

May 2025

Order Limits

Main Development Area

2km Main Development Buffer

5km Main Development Buffer

10km Main Development Buffer

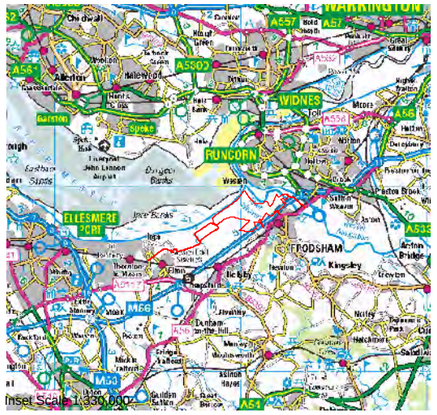
Statutory Designated Sites Cited for Ecological Interest – National

Site of Special Scientific Interest (SSSI)

Local Nature Reserve (LNR)

Statutory Designated Sites Cited for Ecological Interest – International

Ramsar Site



Inset Scale 1:350,000

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FRODSHAM SOLAR ENVIRONMENTAL STATEMENT

Figure Number

8

Figure Title

Satutory Designated Sites Cited for Ecological Interest

Scale

1:85000@A3

Date

May 2025

0 5

kilometers

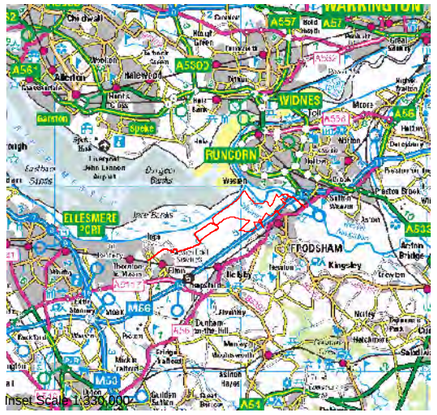
Order Limits

Main Development Area

2km Main Development Buffer

Local Wildlife Sites Cited for Ecological Interest

- Beechwood
- Blackamoor Wood and Coppice
- Clifton Cloughs
- Clifton Lagoon
- Clough Wood
- East Clifton Tip
- First Pit, Ellis Lane
- Frodsham and Overton Woods
- Frodsham Field Studies Centre
- Frodsham, Helsby and Ince Marshes
- Hob Hey Wood
- Land North of Hallwood Park
- Lower Weaver Valley Floodplain
- Lower Weaver Valley Woods
- Lowes Wood
- Runcorn Hill
- South Verge Embankment
- Sutton Bridge Unused Lagoon
- The Glen
- Upper Mersey Estuary
- Weston Marsh Lagoon



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FRODSHAM SOLAR ENVIRONMENTAL STATEMENT

Figure Number

9

Figure Title

Non-Statutory Designated Sites Cited for Ecological Interest

Scale

1:30000@A3

Date

May 2025

N

0 2

kilometers

Annex 1
Photographs

Photo No	Photographs	Description
1		Mustelid scat recorded adjacent to P24.
2		Mustelid scat recorded adjacent to D30.

Photo No	Photographs	Description
3		Mustelid scat recorded adjacent to D30.
4		Crossing Point A
5		Crossing Point B

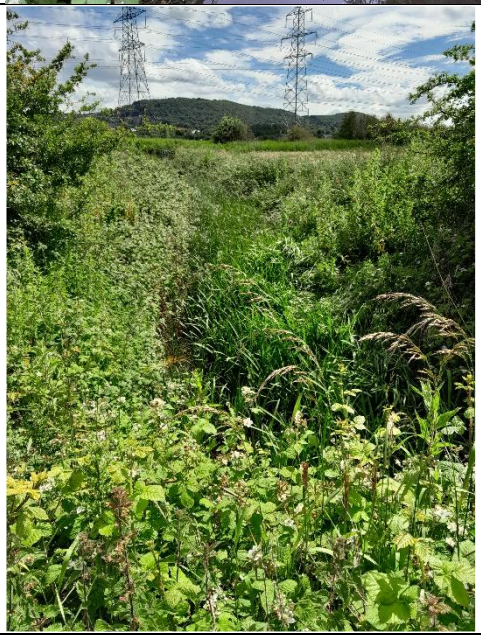
Photo No	Photographs	Description
6		Crossing Point C
7		Crossing Point D
8		Crossing Point E

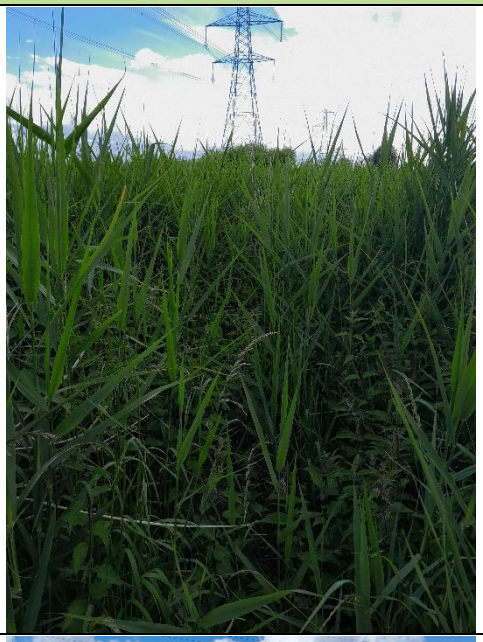
Photo No	Photographs	Description
9		Crossing Point F
10		Crossing Point G

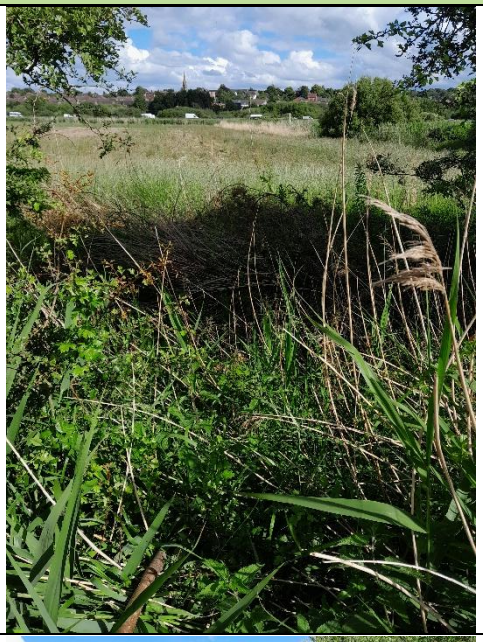
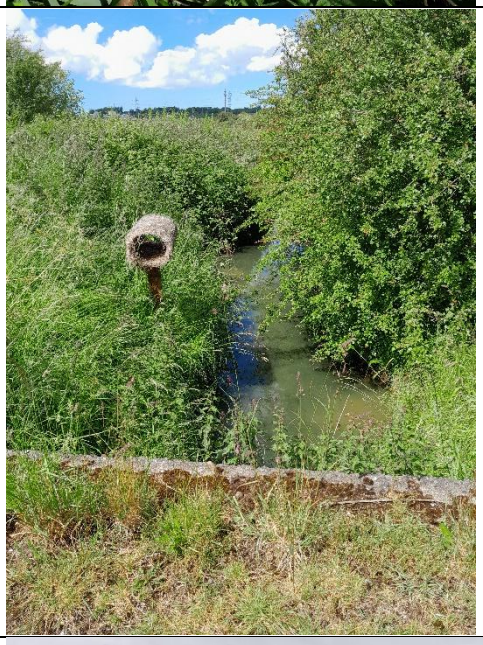
Photo No	Photographs	Description
11		Crossing Point H
12		Crossing Point I
13		Crossing Point J (Annex 1 - Photograph from 2023 survey)

Photo No	Photographs	Description
14		Crossing Point K (Annex 1 - Photograph from 2023 survey)
15		Crossing Point L (Annex 1 - Photograph from 2023 survey)
16		Crossing Point M (Annex 1 - Photograph from 2023 survey)

Photo No	Photographs	Description
17		Crossing Point N (Annex 1 - Photograph from 2023 survey)
18		Crossing Point Q
19		Crossing Point R

Photo No	Photographs	Description
20		Crossing Point S
21		Crossing Point T
22		Crossing Point U

Photo No	Photographs	Description
23		Crossing Point V
24		Crossing Point W
25		Crossing Point X

Photo No	Photographs	Description
26		Crossing Point Y
27		Example of unidentified mammal hole recorded within the NBBMA.
28		Example of water vole latrine recorded within the NBBMA (along D30).

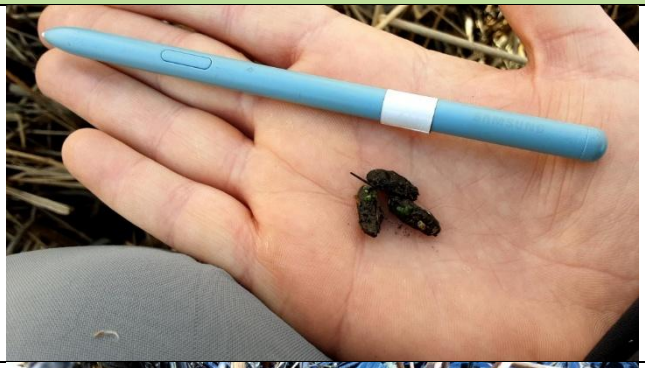
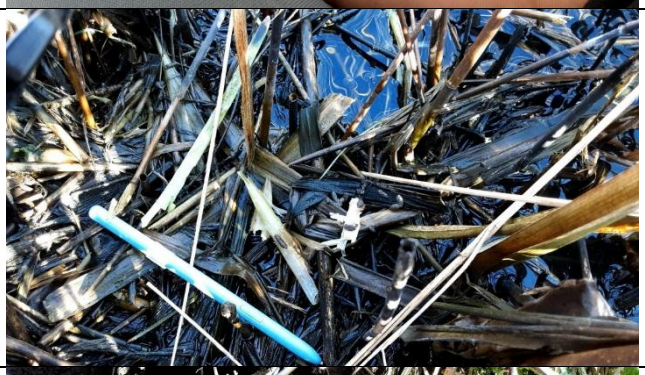
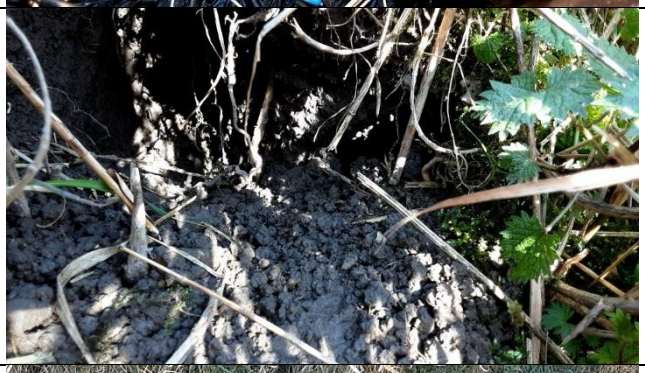
Photo No	Photographs	Description
29		Example of water vole latrine recorded within the NBBMA (along D30).
30		Water vole latrine and feeding remains recorded within the NBBMA (along D30).
31		Potential water vole burrow recorded within the NMMBA (along D30).
32		Potential water vole burrow recorded north of the Skylark Mitigation Area (along D41).
33		Potential water vole burrow recorded north of the Skylark Mitigation Area (along D41).

Photo No	Photographs	Description
34		Potential water vole burrow recorded east of the Skylark Mitigation Area (along D41).

Annex 2

Tabulated Great Crested Newt Survey data (Adapted from RSK Biocensus Great Crested Newt Survey Report)

ES Reference	RSK Biocensus Reference	HSI Score	eDNA Result
P1	P1	Poor	Indeterminate
P2	P2	Poor	Negative
P3	P3	Below Average	Negative
P4	P4	Below Average	Negative
P5	P5	Below Average	Not Surveyed
P6	P6	Poor	Not Surveyed
P7	P7	Poor	Not Surveyed
P9	P9	Below Average	Negative
P10	P10	Below Average	Not Surveyed
P12	P12	Poor	Not Surveyed
P13	P13	Average	Negative
P15	P15	Poor	Not Surveyed
P16	P16	Not Surveyed	Not Surveyed
P17	P17	Not Surveyed	Not Surveyed
P18	P18	Not Surveyed	Not Surveyed
P19	P19	Not Surveyed	Not Surveyed
P20	P20	Not Surveyed	Not Surveyed
P21	P21	Not Surveyed	Not Surveyed
P22	P22	Not Surveyed	Not Surveyed
P23	P23	Not Surveyed	Not Surveyed
P24	P24	Not Surveyed	Not Surveyed
P25	P25	Not Surveyed	Not Surveyed
P26	P26	Not Surveyed	Not Surveyed
P27	P27	Not Surveyed	Not Surveyed
P28	P28	Not Surveyed	Not Surveyed
P29	P29	Not Surveyed	Not Surveyed
P30	P30	Not Surveyed	Not Surveyed
P31	P31	Not Surveyed	Not Surveyed
P32	P32	Not Surveyed	Not Surveyed
P33	P33	Not Surveyed	Not Surveyed
P34	P34	Not Surveyed	Not Surveyed
P35	P35	Not Surveyed	Not Surveyed
P36	P36	Not Surveyed	Not Surveyed
P37	P37	Not Surveyed	Not Surveyed
P38	P38	Not Surveyed	Not Surveyed
P39	W2	Good	Negative
P40	W3	Poor	Negative
P41	W4	Good	Indeterminate
P42	W5	Good	Negative
P43	W6	Below Average	Not Surveyed
P44	W7	Excellent	Indeterminate
P45	W8	Poor	Not Surveyed

ES Reference	RSK Biocensus Reference	HSI Score	eDNA Result
P46	n/a	Not Surveyed	Not Surveyed
P47	n/a	Not Surveyed	Not Surveyed
P48	n/a	Not Surveyed	Not Surveyed
P49	n/a	Not Surveyed	Not Surveyed
P50	n/a	Not Surveyed	Not Surveyed
P51	n/a	Not Surveyed	Not Surveyed
P52	n/a	Not Surveyed	Not Surveyed
P53	n/a	Not Surveyed	Not Surveyed
P54	n/a	Not Surveyed	Not Surveyed
P55	n/a	Not Surveyed	Not Surveyed
P56	n/a	Not Surveyed	Not Surveyed
P57	n/a	Not Surveyed	Not Surveyed
P58	n/a	Not Surveyed	Not Surveyed
P59	n/a	Not Surveyed	Not Surveyed
P60	n/a	Not Surveyed	Not Surveyed
D1	D24	Poor	Not Surveyed
D2	D23	Below Average	Negative
D3	D22	Below Average	Not Surveyed
D4	D21	Poor	Not Surveyed
D5	D20	Average	Not Surveyed
D5	D17	Below Average	Not Surveyed
D6	D29	Average	Not Surveyed
D7	na	Not Surveyed	Not Surveyed
D8	D1	Poor	Not Surveyed
D9	D11	Average	Negative
D10	D10	Average	Not Surveyed
D11	D35	Below Average	Not Surveyed
D13	D16	Poor	Not Surveyed
D14	D15	Poor	Not Surveyed
D15	D34	Poor	Not Surveyed
D16	D26	Poor	Not Surveyed
D17	D25	Average	Negative
D18	D14	Average	Not Surveyed
D19	D18	Below Average	Not Surveyed
D20	D2	Good	Negative
D21	D2	Good	Negative
D22	D7	Average	Negative
D23	D6	Poor	Not Surveyed
D24	D5	Below Average	Not Surveyed
D25	D3	Poor	Not Surveyed
D29	P8	Below Average	Not Surveyed
D30	D33	Poor	Not Surveyed
D30	P14	Average	Not Surveyed
D31	D31	Dry	Not Surveyed
D31	D32	Dry	Not Surveyed
D32	D4	Below Average	Not Surveyed
D33	D8	Average	Not Surveyed

ES Reference	RSK Biocensus Reference	HSI Score	eDNA Result
D34	D2	Good	Not Surveyed
D35	D36	Poor	Not Surveyed
D36	n/a	Not Surveyed	Not Surveyed
D37	n/a	Not Surveyed	Not Surveyed
D38	n/a	Not Surveyed	Not Surveyed
D39	D13	Average	Not Surveyed
D40	n/a	Not Surveyed	Not Surveyed
D41	D27	Average	Not Surveyed
D42	n/a	Not Surveyed	Not Surveyed
D43	n/a	Not Surveyed	Not Surveyed
D44	n/a	Not Surveyed	Not Surveyed
D45	n/a	Not Surveyed	Not Surveyed
D46	n/a	Not Surveyed	Not Surveyed
D47	n/a	Not Surveyed	Not Surveyed
D48	n/a	Not Surveyed	Not Surveyed
D49	n/a	Not Surveyed	Not Surveyed
D50	n/a	Not Surveyed	Not Surveyed
D51	n/a	Not Surveyed	Not Surveyed
D52	n/a	Not Surveyed	Not Surveyed
D53	n/a	Not Surveyed	Not Surveyed
D54	n/a	Not Surveyed	Not Surveyed
D55	n/a	Not Surveyed	Not Surveyed
D56	n/a	Not Surveyed	Not Surveyed
D57	n/a	Not Surveyed	Not Surveyed
D58	n/a	Not Surveyed	Not Surveyed
D59	n/a	Not Surveyed	Not Surveyed
D60	n/a	Not Surveyed	Not Surveyed
D61	n/a	Not Surveyed	Not Surveyed
D62	n/a	Not Surveyed	Not Surveyed
D63	n/a	Not Surveyed	Not Surveyed
D64	n/a	Not Surveyed	Not Surveyed
D65	n/a	Not Surveyed	Not Surveyed
D66	n/a	Not Surveyed	Not Surveyed
D67	n/a	Not Surveyed	Not Surveyed
D68	n/a	Not Surveyed	Not Surveyed
D69	n/a	Not Surveyed	Not Surveyed
D70	n/a	Not Surveyed	Not Surveyed
D71	n/a	Not Surveyed	Not Surveyed
D72	n/a	Not Surveyed	Not Surveyed
D73	n/a	Not Surveyed	Not Surveyed
D74	n/a	Not Surveyed	Not Surveyed
D75	n/a	Not Surveyed	Not Surveyed
D76	n/a	Not Surveyed	Not Surveyed
D77	n/a	Not Surveyed	Not Surveyed
D78	n/a	Not Surveyed	Not Surveyed
D79	n/a	Not Surveyed	Not Surveyed
D80	n/a	Not Surveyed	Not Surveyed

ES Reference	RSK Biocensus Reference	HSI Score	eDNA Result
D81	n/a	Not Surveyed	Not Surveyed
D82	n/a	Not Surveyed	Not Surveyed
D83	n/a	Not Surveyed	Not Surveyed
D84	n/a	Not Surveyed	Not Surveyed
D85	n/a	Not Surveyed	Not Surveyed
D86	n/a	Not Surveyed	Not Surveyed
D87	n/a	Not Surveyed	Not Surveyed
D88	n/a	Not Surveyed	Not Surveyed
D89	n/a	Not Surveyed	Not Surveyed
D90	n/a	Not Surveyed	Not Surveyed
D91	n/a	Not Surveyed	Not Surveyed
D92	n/a	Not Surveyed	Not Surveyed
D93	n/a	Not Surveyed	Not Surveyed
D94	n/a	Not Surveyed	Not Surveyed
D95	n/a	Not Surveyed	Not Surveyed
D96	n/a	Not Surveyed	Not Surveyed
D97	n/a	Not Surveyed	Not Surveyed
D98	n/a	Not Surveyed	Not Surveyed
D99	n/a	Not Surveyed	Not Surveyed
D100	n/a	Not Surveyed	Not Surveyed
D101	n/a	Not Surveyed	Not Surveyed
D102	n/a	Not Surveyed	Not Surveyed
D103	n/a	Not Surveyed	Not Surveyed
D104	n/a	Not Surveyed	Not Surveyed
D105	n/a	Not Surveyed	Not Surveyed
D106	n/a	Not Surveyed	Not Surveyed
D107	n/a	Not Surveyed	Not Surveyed
D108	n/a	Not Surveyed	Not Surveyed
D109	n/a	Not Surveyed	Not Surveyed
D110	n/a	Not Surveyed	Not Surveyed
D111	n/a	Not Surveyed	Not Surveyed
D112	n/a	Not Surveyed	Not Surveyed
D113	n/a	Not Surveyed	Not Surveyed
D114	n/a	Not Surveyed	Not Surveyed
D115	n/a	Not Surveyed	Not Surveyed
D116	n/a	Not Surveyed	Not Surveyed
D117	n/a	Not Surveyed	Not Surveyed
D118	n/a	Not Surveyed	Not Surveyed
D119	n/a	Not Surveyed	Not Surveyed
D120	n/a	Not Surveyed	Not Surveyed
D121	n/a	Not Surveyed	Not Surveyed
D122	n/a	Not Surveyed	Not Surveyed
D123	n/a	Not Surveyed	Not Surveyed
D124	n/a	Not Surveyed	Not Surveyed
D125	D30	Unsuitable	Not Surveyed
D126	n/a	Not Surveyed	Not Surveyed
W1	D12	Average	Negative

ES Reference	RSK Biocensus Reference	HSI Score	eDNA Result
W1	D9	Below Average	Not Surveyed
W1	D28	Average	Not Surveyed
W2	D19	Average	Negative
W3	W1	Average	Not Surveyed
W4	n/a	Not Surveyed	Not Surveyed
W5	n/a	Not Surveyed	Not Surveyed
W6	n/a	Not Surveyed	Not Surveyed
W7	n/a	Not Surveyed	Not Surveyed
W8	n/a	Not Surveyed	Not Surveyed
W9	n/a	Not Surveyed	Not Surveyed
W10	n/a	Not Surveyed	Not Surveyed
W11	n/a	Not Surveyed	Not Surveyed
W12	n/a	Not Surveyed	Not Surveyed
W13	n/a	Not Surveyed	Not Surveyed
W14	n/a	Not Surveyed	Not Surveyed

Annex 3

Frodsham Renewable Energy Development Preliminary Ecological Appraisal Report (RSK Biocensus, 2023) (Redacted)

Peel Cubico Renewables Limited

Frodsham Renewable Energy Development

Preliminary Ecological Appraisal Report

2483418

JANUARY 2023

RSK biocensus
EXPERTS IN ECOLOGY

RSK GENERAL NOTES

Project No.: 2483418

Title: Frodsham renewable energy development – Preliminary Ecological Appraisal Report

Client: Peel Cubico Renewables Limited

Date: January 2023

Office: Helsby

Status: Rev01

Author	Emily Clark	**Technical & quality reviewer**	Will Holden
Signature	[redacted]	Signature	
Date:	30 January 2023	Date:	30 January 2023

Project manager	Will Holden
Signature	[redacted]
Date:	30 January 2023

Switchboard: +44 (0)330 223 1074 Company contact: Enquiries@biocensus.co.uk

EXECUTIVE SUMMARY

This report presents the results of a preliminary ecological appraisal (PEA), comprising a background data search (BDS) and a Phase 1 habitat survey with assessment for protected species at the Frodsham renewable energy development site in Frodsham, Cheshire.

The report identifies ecological constraints on the project, specifies any further survey or mitigation requirements, gives recommendations for avoidance and protection through design changes, and suggests opportunities for ecological enhancement. The appraisal was carried out for Peel Cubico Renewables Limited on behalf of any future project specific Special Purpose Vehicle (SPV) company.

The site is *c*.285 ha and contains predominantly marshy grassland (grazed by sheep and cattle), agricultural grassland fields and arable land with a grid of interconnected ditches forming the field boundaries. A large portion of the western section of the site is also utilized as a wind farm. The development area is to the north-west of the M56 motorway and 200m north-west of the town of Frodsham. The site is bordered by the Manchester Ship Canal and River Weaver to the north and east, and the M56 motorway and Frodsham to the south.

The results of the survey and desk study have highlighted the requirement for further work in relation to the following habitats and species, however some surveys may not be necessary if impacts can be avoided by development design:

- Amphibians and reptiles – reasonable avoidance measures (RAMs) to be implemented during the construction phase of the development.
- Badger – There are two main setts and five outlier setts present on the site. Appropriate development design may avoid impacts, but if the construction works are within 30m of the setts, further surveys are required to assess the usage of the setts.
- Bats (roosting) –. If the building on the site is to be impacted or if any trees are to be removed, further surveys will be required to assess the building / trees potential to support roosting bats on stie. There are a number of brick-built structures present within the western section of site that have been assessed as having low potential to support roosting bats. If the brick-built structures are impacted, further presence / absence surveys are required to assess whether bats are using the site for roosting purposes.
- Bats (foraging and commuting) – The quality of foraging and commuting habitat on the site is low. Further activity and static bat detector surveys are required to determine the species assemblage present on the site and identify any important foraging and commuting habitat on the site.
- Birds (breeding and wintering) – The site supports important breeding and wintering bird assemblages. Due to the importance of the bird populations recorded within the site, both in the context of the adjacent Mersey Estuary SPA/Ramsar site, and at a geographical level, a detailed Ecological Impact

Assessment of the potential effects of the proposed development on birds will be required. In addition, an HRA will be required to identify any potential adverse effects on the integrity of Mersey Estuary SPA/Ramsar site. Any future development will need to be designed carefully with proportionate mitigation to provide the range of habitat types required to support the current breeding bird assemblage.

- Designated sites – A habitat regulations assessment (HRA) should be undertaken to fully assess the impacts on designated sites as a result of the proposed development. The proposed development site also lies within a SSSI Impact Risk Zone (IRZ) within which Natural England request that they are consulted on all types of planning applications. Therefore, it is recommended that the local planning authority (LPA) consult with Natural England for any proposals.
- Habitats – Hedgerows, trees, ponds and areas of reedbed should be retained where possible or replaced as part of a detailed landscaping scheme. Root protection areas (RPAs) for trees and hedgerows should be maintained. Specific procedures and control measures to be implemented to ensure that there is no risk of pollution into watercourses, ponds or ditches on the site, including the retention of a buffer zone. The measures should be set out by the contractors prior to commencement of any works and agreed with the LPA and other statutory consultees.
- Invasive species – Cotoneaster (*Cotoneaster* sp), Variegated Yellow Archangel (*Lamium galeobdolon*) and New Zealand Pigmyweed (*Crassula helmsii*) should be subject to control measures prior to the commencement of works and are to be eradicated as part of the development.
- Otters – Appropriate development design may avoid impacts, but if large waterbodies or ditches are directly or indirectly impacted, RAMs will need to be implemented, which will include a pre-commencement inspection to assess whether any holts are present on the site.
- Water vole – If any ditches are impacted by the proposed development, further surveys are required to establish presence or likely absence of water vole.

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1.0 INTRODUCTION

1.1 Purpose of this report

1.1.1 This report presents the results of a preliminary ecological appraisal (PEA), comprising a background data search (BDS) and a Phase 1 habitat survey with assessment for the potential presence of protected species at the Frodsham renewable energy development site in Frodsham, Cheshire (OS grid reference: SJ 510 786). The survey area included the land within the red-line boundary (called 'the site' from this point forward – as shown in *Figure 1*), plus adjacent land up to 30 m where access allowed. Due to the size and scale of the development, the site has been split into ten monad 1km 'Plots', as shown in *Figure* . Plots 1 - 10 are referenced throughout the report for ease of reference.

1.1.2 The report identifies ecological constraints on the project and specifies any further surveys which may be required. The appraisal was carried out for Peel Cubico Renewables Limited on behalf of any future project specific Special Purpose Vehicle (SPV) company.

1.2 Landscape context

1.2.1 The site is *c.*285 ha and contains predominantly marshy grassland (grazed by sheep and cattle), agricultural grassland fields and arable land with a grid of interconnected ditches forming the field boundaries. A large portion of the western section of the site is also utilized as a wind farm. The development area is to the north-west of the M56 motorway and 200m north-west of the town of Frodsham. The site is bordered by the Manchester Ship Canal and River Weaver to the north and east, and the M56 motorway and Frodsham to the south.

1.3 Validity of data

1.3.1 According to Chartered Institute of Ecology and Environmental Management (CIEEM) advice (CIEEM 2019), survey data are valid for a period of 12 to 18 months from the date of the survey. The report highlights any circumstances where data may be valid for less than 18 months. Between 18 months and 3 years a professional ecologist will need to undertake a site visit and may also need to update desk study information (effectively updating the PEA) and then review the validity of the report.

2.0 METHODS

2.1 Overview

2.1.1 The preliminary ecological appraisal (PEA) was undertaken in line with guidance from the Chartered Institute of Ecology and Environmental Management (CIEEM, 2017), and it therefore included:

- a desk study (including records of designated sites, protected and notable species; a review of aerial photographs; obtaining information from the DEFRA and JNCC websites, and the local authority website; and requesting data from the local records centre) here called a background data search (BDS); and
- a field survey that informed phase 1 habitat mapping, an assessment of the possible presence of protected or priority species, and the likely importance of habitat features.

2.1.2 The PEA report includes an ecological description of the site and information about species that may occur there. Notes and mapping of any incidental sightings of invasive non-native plant species and protected or priority species are also provided.

2.1.3 The survey was carried out between 22 and 24 March 2022 by Emily Clark and Shona Redman of RSK Biocensus. Emily is a senior ecological consultant with over six years' experience in ecological consultancy. She is an associate member of CIEEM and has botanical skills rated at Field Identification Skills Certificate (FISC) level 4.

2.2 Background data search

2.2.1 A search was made in March 2022 for reference materials relating to the ecology of the Frodsham renewable energy development site, and a list of sources is given in *Table 1*.

Table 1: Data sources.

Information Obtained	Available From
Protected and noteworthy species-records	Record – The Biodiversity Information System for Cheshire, Halton, Warrington and Wirral
Designated site locations and citations	Natural England website Record – The Biodiversity Information System for Cheshire, Halton, Warrington and Wirral
Designations and legal protection of noteworthy species	Joint Nature Conservation Committee (JNCC) website
Details of species and habitats listed on the LBAP	Local BAP website https://www.cheshirewildlifetrust.org.uk/wildlife/priority-species-and-habitats

2.2.2 A search was made for information on statutory designated sites (often internationally and nationally important sites for ecology) within 2 km and non-statutory designated

sites (often important in a local context) within 1 km of the site boundary. The search was extended to 10 km for Ramsar sites, special areas of conservation (SACs) and special protection areas (SPAs). A search was also made for records of noteworthy species within 1 km of the site boundary.

2.2.3 Species included in the search parameters were:

- European protected species (listed on Schedules 2 and 5 of The Conservation of Habitats and Species Regulations 2017);
- nationally protected species under Schedules 1, 5 and 8 of The Wildlife & Countryside Act 1981 and The Protection of Badgers Act 1992;
- species listed as critically endangered, endangered or vulnerable based on the IUCN Red List Categories and Criteria 2001;
- all species listed on the RSPB Birds of Conservation Concern 5 as red or amber;
- nationally rare or nationally scarce species;
- notable invertebrates; and
- species of principal importance under The Natural Environment and Rural Communities (NERC) Act (2006) or are priority species under the local biodiversity action plan.

2.3 Plants and habitats

Phase 1 habitat survey

2.3.1 The field survey was based on the phase 1 habitat survey approach (Joint Nature Conservation Committee 2010) as extended for use in environmental impact assessment (Institute of Environmental Assessment, 1995). This field survey was undertaken in line with CIEEM (2017) and involved the following elements:

- habitat mapping using a set of standard colour codes to indicate habitat types on a phase 1 habitat map (*Figure 1*); and
- a description of features of possible ecological or nature conservation interest in notes relating to numbered locations on the habitat map, called 'target notes'.

2.3.2 Phase 1 habitat survey methods are described in Joint Nature Conservation Committee (JNCC 2010). There are no firm guidelines to specify what extended phase 1 habitat survey involves, but the Institute of Environmental Assessment (1995) suggests that it simply involves more extensive and detailed target notes.

2.3.3 Vascular plant species were recorded during the survey, although no attempt was made to produce an exhaustive species list (additional species would almost certainly be found during more detailed surveys or repeat surveys at various times of the year).

2.3.4 Plant nomenclature in this report follows Stace (2019) for native and naturalised species of vascular plant, and mosses and liverworts follow Hill *et al*. (2008). Introduced species and garden varieties were identified using relevant Floras. Plant names in the text are given with common names with the scientific name (in italics) immediately following the first time it is mentioned. Doubtful identifications are preceded by 'cf.' placed before

the specific epithet where the plant is very probably the species indicated, but it could not be distinguished from similar members of the genus with certainty.

Invasive non-native species (INNS)

2.3.5 The survey did not involve exhaustive surveying for individual plant species, and various invasive species may be little in evidence at various times of year (depending on the species). A survey seeking to identify habitat types cannot therefore be relied upon to provide firm information about the presence or extent of any invasive non-native species (even though some things may be evident). However, we have noted any such species seen during the course of the survey, e.g. Giant Hogweed (*Heracleum mantegazzianum*), Himalayan Balsam (*Impatiens glandulifera*) or Japanese Knotweed (*Reynoutria japonica*) among others, as well as any invasive non-native species of animals recorded during the survey.

2.4 Protected and notable animals

General

2.4.1 The site was assessed for its suitability for the protected animals that are likely to occur in the area. Taking into account the results of the BDS, the geographic location, connectivity to natural habitats in the wider landscape, and the nature and extent of habitats at the site, specific assessment was also carried out for the species/species groups outlined below.

Invertebrates

2.4.2 The site was assessed for its suitability to support notable species and/or assemblage of invertebrates, but no specific surveys were undertaken. The habitat requirements of invertebrates are often species-specific. The assessment focused on the presence of features or habitats suitable for the notable species identified in the BDS.

Great crested newt

2.4.3 The suitability of aquatic and terrestrial habitat on the site and in the immediate vicinity to support great crested newts (*Triturus cristatus*) was considered, taking into consideration habitat connectivity between suitable habitat areas. Aerial photography and Ordnance Survey maps were examined for ponds or other suitable breeding habitat within 500 m of the site.

Reptiles

2.4.4 The site was assessed for its suitability for the four most widespread reptile species, with particular attention given to those features that provide suitable basking areas (e.g. south-facing slopes), hibernation sites (e.g. banks, walls, piles of rotting vegetation) and opportunities for foraging (e.g. rough grassland and scrub).

2.4.5 Specific habitat requirements differ between species. Common lizards (*Zootoca vivipara*) and slow-worms (*Anguis fragilis*) favour rough grassland. Grass snakes (*Natrix*

helvetica) have broadly similar requirements with a greater reliance on ponds and wetlands. Adders (*Vipera berus*) use a range of fairly open habitats with some cover but are most often found in dry heath (Beebee & Griffiths, 2000).

Birds

2.4.6 Birds nest and forage in a wide variety of habitats including scrub, woodland, hedges and trees, open ground and man-made structures. The site was assessed for its suitability to support nesting and foraging birds, with an emphasis on the Schedule 1 and notable species recorded in the BDS. This included any nests or incidental signs of nesting such as feathers or pellets in locations suitable for nests.

Bats

2.4.7 Habitats were assessed in respect of their suitability for foraging and commuting bats according to Collins (2016). Areas of particular interest vary between species, but generally include sheltered areas and habitats with good numbers of insects, such as woodland, scrub, rivers and species-rich or rough grassland.

2.4.8 A full preliminary roost assessment (PRA) was not undertaken during the survey but any trees or structures that may contain potential roosting features for bats were noted along with any incidental signs of bats or other evidence found (such as droppings, urine stains, odour, grease stains or feeding remains).

Water vole and otter

2.4.9 Watercourses on and/or adjacent to site and their surrounding habitats were assessed to determine whether they were suitable for water voles (*Arvicola amphibius*). Suitable habitats include vegetated earth banks, reed beds, flowing water and wet ditches. Incidental signs of water vole activity, including burrows, feeding platforms, food remains and latrines, were recorded if they were encountered.

2.4.10 Watercourses on and/or adjacent to site were also assessed for their suitability for otters (*Lutra lutra*). Otters require clean rivers and associated waterbodies with an abundant, varied supply of food and plenty of bank-side vegetation, offering secluded sites for their holts. Other suitable habitats include reed beds and interconnected ditches and streams. Incidental signs of otter activity, including holts, foraging signs, paths (runs), footprints and spraints, were recorded if they were encountered.

Badger

2.4.11 An initial assessment was carried out to identify areas that might be used by badgers (*Meles meles*) for commuting, foraging or setts within 30 m of all areas potentially affected by works (where access was possible). The area was systematically searched for signs of badgers including setts, foraging signs, paths (runs) and latrines where possible, and the category of sett and levels of recent activity visible at each sett recorded.

Other species of principal importance

2.4.12 The UK countries of England, Wales, Scotland and Northern Ireland are obliged by their individual laws to maintain lists of species and habitats of principal importance for biodiversity conservation. In England, this obligation derives from Section 41 of the NERC Act 2006. An assessment of the suitability and likelihood of the site supporting such species was made (for example, hedgehog (*Erinaceus europaeus*)).

2.5 Constraints and limitations

2.5.1 This preliminary appraisal as to whether protected species might occur on the site is based on the suitability of habitat, the known distribution of relevant species in the local area (from on-line sources and desk study), and any signs of the relevant species. It does not constitute a full and definitive survey of any protected species group.

2.5.2 Field signs for protected and valuable species are often difficult to find or absent from a site. The survey conducted was not intended to be a comprehensive presence/absence survey for all species, but rather to provide an indication of the likely presence of such species based on the field signs found, and the nature of the habitats present.

3.0 RESULTS

3.1 Background data search

Biodiversity action plans

3.1.1 Habitats classified as swamp on the site qualify as the priority habitat 'reedbeds' under Section 41 of the NERC Act 2006.

3.1.2 The latest Cheshire local biodiversity action plan (LBAP) lists 5 habitat action plans (HAPs) and 25 species and species group action plans (SAPs). None of the local HAPs are relevant to the proposed development. The local SAPs that are relevant to the proposed development are;

- Black-necked grebe (*Podiceps nigricollis)*
- Barn owl (*Tyto alba)*
- Club tailed dragonfly (*Gomphus vulgatissimus)*
- Cuckoo bee (*Bombus campestris)*
- Downy emerald (*Cordulia aenea)*
- Lesser silver water beetle (*Hydrochara caraboides)*
- Mining bee (*Andrena fulva)*
- Ringlet (*Aphantopus hyperantus)*
- Variable damselfly (*Coenagrion pulchellum)*
- Common pipistrelle (*Pipistrellus pipistrellus)*
- Whiskered bat (*Myotis mystacinus)*
- Brandt's bat *Myotis brandti)*
- Daubenton's bat (*Myotis daubentonii*
- Leisler's bat (*Nyctalus leisleri)*
- Natterer's bat (*Myotis nattereri)*
- Serotine (*Eptesicus serotinus)*

Designated sites

3.1.3 There are four statutory designated sites (designated for biological reasons) and two internationally designated sites within 2 km of the site boundary: Mersey Estuary Ramsar, Mersey Estuary special protection area (SPA), Mersey Estuary site of special scientific interest (SSSI), Flood Brook Clough SSSI, Runcorn Hill local nature reserve (LNR) and Dunsdale Hollow SSSI. Frodsham Railway and Road Cuttings SSSI is also present but it is designated for geological reasons and not ecological reasons.

3.1.4 The search was extended to 10 km for Ramsar sites, SACs and SPAs; with two additional sites identified; Midland Meres & Mosses - Phase 1 Ramsar and Midland Meres & Mosses - Phase 2 Ramsar. All sites are listed in Table 2 with their reasons for designation and distance from the site. See Figure 2 for plot reference.

Table 2: Statutory designated sites within 2 and 10 km of the site boundary.

Site Name	Designation	Approximate distance and direction
Mersey Estuary	SSSI	60m north-west of Plot 5
The Mersey Estuary is an internationally important site for wildfowl and consists of large areas of intertidal sand and mudflats. The site also includes an area of reclaimed marshland, salt-marshes, brackish marshes and boulder clay cliffs with freshwater seepages. The Manchester Ship Canal forms part of the southern boundary of the site and separates a series of pools from the main estuary. These pools together with Hale Marsh are important roosting sites for wildfowl and waders at high tide.		
Mersey Estuary	Ramsar	100m north-west of Plot 1
The estuary includes large areas of saltmarsh, and intertidal sand and mudflats, with limited areas of brackish marsh, boulder clay cliffs and rocky shore. Internationally important numbers of waterfowl feed and roost on the site in winter and nationally important numbers occur during passage periods. The latter include common ringed plover (*Charadrius hiaticula*), redshank (*Tringa totanus*), dunlin (*Calidris alpina*). The Mersey Estuary also regularly supports over 20,000 waterfowl in winter. The site also supports nationally important wintering numbers of wigeon (*Anas penelope*), grey plover (*Pluvialus squatarola*), black-tailed godwit (*Limosa limosa*), and curlew (Numenius *arquata*).		
Mersey Estuary	SPA	100m north-west of Plot 1
The special protection area (SPA) covers an estuarine area of 50.23 km^2 including large areas of saltmarsh and extensive intertidal sand and mudflats, with limited areas of brackish marsh, rocky shoreline and boulder clay cliffs, within a rural and industrial environment. The intertidal flats and saltmarshes provide feeding and roosting sites for large populations of waterbirds. During the winter, the site is of major importance for ducks and waders. The site is also important during the spring and autumn migration periods, particularly for wader populations moving along the west coast of Britain.		
Flood Brook Clough	SSSI	1km north-east of Plot 4
Flood Brook Clough is a deep wooded valley cutting through Keuper Marl with an Ash (*Fraximus excelsior*) and Wych Elm (*Ulmus glabra*) woodland. Many of the plants present are characteristic of ancient woodland on base-rich soils, and are comparatively rare in Cheshire.		
Dunsdale Hollow	SSSI	1.5km south of Plot 7
Dunsdale Hollow occurs on a steep north-west facing escarpment of Upper Mottled and		

Site Name	Designation	Approximate distance and direction
Keuper Sandstone. It is an acidic lowland Birch (*Betula spp*). and Sessile Oak (*Quercus petraea*) woodland. This type of woodland is often found in the uplands but its occurrence in a lowland landscape is very unusual and it is found on only one other site in Cheshire on the Peckforton Hills.		
Runcorn Hill	LNR	1.7km north of Plot 3
Runcorn Hill LNR includes the largest area of lowland heath in North Cheshire. The woodlands, ponds and scrub along with its geological structure complete a unique mosaic of habitats.		
Midland Meres & Mosses – Phase 1	Ramsar	6.7km south-east of Plot 8
The Meres and Mosses form a geographically diverse series of lowland open water and peatland sites in the north-west Midlands of England and north-east Wales. These have developed in natural depressions in the glacial drift left by receding ice sheets which formerly covered Cheshire/Shropshire Plain. The 18 component sites include open water bodies, the majority of which are nutrient rich with associated fringing habitats, reed swamp, fen, carr and damp pasture. The wide range of habitats support national important flora and fauna.		
Midland Meres & Mosses – Phase 2	Ramsar	7km south-east of Plot 8
As above.		

SSSI Impact Risk Zones

3.1.5 The proposed development site lies within a SSSI Impact Risk Zone (IRZ) within which Natural England request that they are consulted on all types of planning applications. Therefore, it is recommended that the planning authority consult with Natural England for this development.

Non-statutory sites

3.1.6 There are 10 non-statutory designated sites within 1 km of the site boundary, which are both local wildlife sites (LWSs). These sites are listed in *Table 3* along with their proximity to the site.

Table 3: Non-statutory designated sites within 1 km of the site boundary.

Site Name	Designation	Approximate Distance and direction
Frodsham, Helsby and Ince Marshes	LWS	0m, immediately adjacent to the boundary of Plot 5
Frodsham Field Studies centre	LWS	30m north-east of Plot 4

Site Name	Designation	Approximate Distance and direction
Easton Clifton Tip	LWS	80m south-east of Plot 4
Weston Marsh Lagoon	LWS	114m east of Plot 3
Upper Mersey Estuary	LWS	297m north of Plot 2
Clifton Lagoon	LWS	484m east of Plot 4
Clifton Cloughs_B	LWS	528m north of Plot 4
Clifton Cloughs_A	LWS	692m north of Plot 4
Sutton Bridge Unused Lagoon	LWS	877m south-east of Plot 4
Frodsham and Overton Woods	LWS	981m south of Plot 7

Habitats

3.1.7 On the UK Government Magic Maps website, there are two areas which are mapped as good quality semi-improved grassland on the site, located within the central section of the site, one area which is mapped as reedbed in the northern section of the site and one area is mapped as deciduous woodland, in the south-eastern corner of the site.

3.1.8 There are several areas of 'coastal saltmarsh', mudflats, good quality semi-improved grassland, lowland calcareous grassland, lowland fens, reedbeds and deciduous woodland, which are all listed under Section 42 of the NERC Act 2006 within 1 km of the site. The closest of which is the areas of coastal saltmarsh *c.* 100m north-west of the site.

Protected and noteworthy species

3.1.9 At least 241 protected and noteworthy species are recorded from places within 1 km of the site boundary. Noteworthy species include species of principal importance that are listed under Section 41 of the NERC Act 2006.

3.1.10 Of these, 15 are plants, 4 are lichens, 5 are amphibians, 4 are reptiles, 46 are invertebrates, 146 are birds and 21 are mammals. Species that are protected by law under Schedules 2 and 5 of The Conservation of Habitats and Species Regulations 2017 (as amended), Schedules 1, 2, 5 and 8 of The Wildlife and Countryside Act 1981 (as amended) or The Protection of Badgers Act 1992 that have been recorded in the search area are highlighted in the full species list given in *Appendix B.* Those of relevance to the site and the current proposals are discussed in *Section 3.3*.

3.2 Plants and habitats

3.2.1 The Phase 1 Habitat map is provided as *Figure 1* and shows the location of the target notes referred to in the text below. A full description for each of the target notes is given in *Appendix A*. Due to the size and scale of the site, it has been split into 10 1km monad 'plots' which are referenced throughout the below subsections, see Figure 2 for Plot locations. The following habitat types (with Phase 1 habitat codes in brackets) are present on and around the site:

- Broadleaved woodland, plantation (A1.1.2)
- Scrub, dense / continuous (A2.1)
- Scrub, scattered (A2.2)
- Broadleaved scattered trees (A3.1)
- Semi-improved neutral grassland (B2.2)
- Improved grassland (B4)
- Marsh / marshy grassland (B5)
- Poor semi-improved grassland (B6)
- Tall ruderal (C3.1)
- Swamp (F1)
- Marginal vegetation (F2.1)
- Standing water (G1)
- Arable (J1.1)
- Introduced shrub (J1.4)
- Intact hedge, species poor (J1.1.2)
- Fence (J2.4)
- Dry ditch (J2.6)
- Buildings (J3.6)
- Bare ground (J4)
- Hardstanding (J5)

Broadleaved woodland, plantation (A1.1.2)

3.2.2 There is a small area of plantation woodland in the north-eastern section of Plot 6 (see Figure 2 for Plot locations) (TN 1, see Page 1 on Figure 1), adjacent to a footpath. All trees are young – semi-mature and comprise Silver Birch (*Betula pendula)*, Black Pine (*Pinus nigra)*, Grey Willow (*Salis cinerea),* and Horse-chestnut (*Aesculus hippocastanum).* The ground flora comprise Ivy (*Hedera helix)*, Herb-Robert (*Geranium robertianum),* Cleavers (*Galium aparine)*, Cock's-foot (*Dactylis glomerata)* and Yorkshire-fog (*Holcus lanatus)*. A small number of introduced shrubs were also noted within the area of

woodland, including Flowering Currant (*Ribes sanguineum*) and Variegated Yellow Archangel (*Lamiastrum galeobdolon subsp. argentatum*)

Scrub, dense / continuous (A2.1)

3.2.3 There are a number of areas of dense, mixed scrub scattered across the site. The largest area is in Plot 3 while most of the other areas are along field boundaries or along the edges of pathways.

3.2.4 The area of scrub within Plot 3 (TN2, see Page 4 of 4 on Figure 1) is a large area containing a mixture of semi-improved neutral grassland and scrub habitat. The area also has areas of bare earth where motorbikes have illegally accessed the site and small patches of tall ruderal and swamp scattered throughout. The patches of scrub are a mixture of young – semi-mature trees with a height of *c.* 2 – 7m and as such have been mapped as dense scrub. Tree species present include Goat Willow (*Salix caprea*), Grey Willow, Ash (*Fraxinus excelsior*), Elder (*Sambucus nigra*), Aspen (*Populus tremula*), Dogwood (*Cornus sanguinea*) and Silver Birch (*Betula pendula*), but Goat and Grey Willow are the most frequent species present. There are also small areas with Bramble (*Rubus fruticosus*), Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), Dog-rose (*Rosa canina*) and Field-rose (*Rosa arvensis*) are also present.

Plate 1 - Example of dense scrub in the north-eastern corner of the site.

3.2.5 The other areas of scrub are predominantly along field boundary edges within Plots 3, 4, 7 and 8. The most frequent species present are Bramble, Hawthorn and Blackthorn, but other species present include Broad-leaved Dock (*Rumex obtusifolius*), Common Nettle (*Urtica dioica*) and Creeping Thistle (*Cirsium arvense*), Gorse (*Ulex europaeus*), Willowherb (*Epilobium sp.*), Rosebay Willowherb (*Chamaenerion angustifolium*), Crack-willow (*Salix euxina*), Elder, Yorkshire-fog, Cleavers, Field-rose, Dog-rose, Poplar species (*Populus sp.*), Ash, Cock's-foot, Hogweed (*Heracleum sphondylium*), Cow Parsley (*Anthriscus sylvestris*) and Colt's-foot (*Tussilago farfara*).

Plate 2 – Example of dense scrub along field boundary edges.

Scrub, scattered (A2.2)

3.2.6 There are several areas of scattered scrub across the site, particularly within the areas of swamp or marginal vegetation. Species are similar to those described above, and the most frequent species present are Bramble, Hawthorn and Blackthorn, Grey Willow, Ash, Wild Cherry (*Prunus avium*), Elder and Field-rose.

3.2.7 However, the area of scattered scrub within Plot 6 (TN3, see Page 2 of 4 on Figure 1) contains scattered young – semi-mature trees, which are all below a height of 5m and as such have been mapped as scrub. Species present within the south-western section of site include Willow species (*Salix sp.)*, Grey Willow and Elder.

Plate 3 – View of scattered scrub within south-western section of the site.

Broadleaved scattered trees (A3.1)

3.2.8 There are a small number of broadleaved scattered trees present within Plot 6 (TN4 and TN5, see Page 1 and 2 on Figure 1), all trees are semi-mature and are in good condition. Species include Silver Birch, Hawthorn and Sycamore (*Acer pseudoplatanus*) and Crack-willow.

Plate 4 - View of scattered trees (TN12).

Semi-improved neutral grassland (B2.2)

3.2.9 There are two areas of semi-improved neutral grassland present on the site, the first is in Plot 3 (TN6) while the second is in the southern section of the site (TN7), within Plot 6, see Pages 3 and 4 Figure 2.

3.2.10 The area within Plot 3 of the site (TN6) has been mapped as semi-improved neutral, but a number of species present indicate the grassland is slightly calcareous, including Yellow-wort *(Blackstonia perfoliata*) and Fairy Flax (*Linum catharticum).* However, the majority of species present indicate neutral grassland, as the most frequent grass species present are Common Bent (*Agrostis capillaris*), Perennial Rye-grass (*Lolium perenne*), Red Fescue (*Festuca rubra*), False Oat-grass (*Arrhenatherum elatius*) and Rough Meadow-grass (*Poa trivialis*). Other species include Southern Marsh Orchid (*Dactylorhiza praetermissa*), Black Medick (*Medicago lupulina*), White Clover (*Trifolium repens*), Red Clover (*Trifolium pratense*), Common Vetch (*Vicia sativa*), Meadow Buttercup (*Ranunculus acris*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Common Figwort (*Scrophularia nodosa*) and Self-heal (*Prunella vulgaris*). Furthermore, the area has previously been used to store material which was dredged from the Manchester Ship Canal and River Weaver, which may have influenced the soil and as such the species composition. The area is currently unmanaged, but the rabbits are present which graze a large proportion of the site. The area is occasionally illegally accessed by motorbikes which create areas of bare earth and small microhabitats, adding to the diversity of the area.

Plate 5 – View of grassland within north-eastern corner of the site.

3.2.11 The second area of semi-improved neutral grassland is in the south-eastern corner section of Plot 6and is subject to low density, occasional grazing from sheep and cattle, as such the grass and rushes are still relatively tall and there is a variety of species present. Some sections are dominated by sedges and rushes, where the water table is higher, but most of the area is dominated by grasses and as such has been mapped as semi-improved neutral grassland. Species include Perennial Rye-grass, Hard Rush (*Juncus inflexus*), Red Fescue, Creeping Thistle, Common Vetch, Meadow Foxtail (*Alopecurus pratensis*), Yorkshire-fog, False Fox-sedge (*Carex otrubae*) , Common Sorrel (*Rumex acetosa*), Hairy Sedge (*Carex hirta*), Marsh Thistle (*Cirsium palustre*), Yellow Vetchling (*Lathyrus aphaca*), Thyme-leaved Speedwell (*Veronica serpyllifolia*), Rosebay Willowheb, Oval Sedge (*Carex leporine*), Tufted Hair-grass (*Deschampsia cespitosa*), Sharp-flowered Rush (*Juncus acutiflorus*), Soft-rush (*Juncus effusus*), Common Sedge (*Carex nigra*), Crested Dog's-tail (*Cynosurus cristatus*), Carnation Sedge (*Carex panicea*), Marsh Bedstraw (*Galium palustre*), Lesser Stitchwort (*Stellaria graminea*), Greater Bird's-foot-trefoil (*Lotus pedunculatus*), Field Horsetail (*Equisetum arvense*) and Common Knapweed (*Centaurea nigra*).

Plate 6 – View of grassland withing southern section of the site.

Improved grassland (B4)

3.2.12 A large proportion of the western section of the site (Plot 1, 2, 5 and 6) is currently a windfarm with improved grassland below the turbines (TN8, see Page 2 on Figure 1). The grassland is subject to high intensity grazing from both sheep and cattle. Due to the intensive grazing regime, only a small number of species were identifiable, these include Annual Meadow-grass (*Poa annua*), Perennial Rye-grass, Red Fescue, Common Nettle, Creeping Thistle and White Clover.

Plate 7 – Looking across the western section of the site.

3.2.13 Two fields within the north-eastern section of the site (within north-eastern corner of Plot 7 and eastern section of Plot 3) are also considered to be improved grassland. Some sections of the field are heavily poached, indicating that it is grazed by cattle for a proportion of the year. Species present include Perennial Rye-grass, Spear Thistle (*Cirsium vulgare*), Creeping Thistle, White Clover, Creeping Buttercup (*Ranunculus repens*), Broad-leaved Dock, Common Mouse-ear (*Cerastium fontanum*). Soft-rush and Hard Rush are also scattered throughout the fields.

3.2.14 Finally, access was not permitted to one field in the southern section of Plot 7 (TN10, see Page 3 of Figure 1). As such, it has been assessed from a distance and a precautionary approach taken when determining the likely habitat present.

Marsh / marshy grassland (B5)

3.2.15 A large proportion of Plot 7 and the eastern section of Plot 6 is species poor, marshy grassland. The sward is dominated by Soft-rush but other frequent species include; Compact Rush (*Juncus conglomeratus*), Perennial Rye-grass, Rough Meadow-grass, Smooth Meadow-grass (*Poa pratensis*), Cock's-foot, False Oat-grass, Yorkshire-fog, Crested Dog's-tail, Meadow Foxtail, White Clover, Creeping Buttercup, Creeping Thistle and Spear Thistle. Furthermore, two fields in the central, southern-western section of the site are also considered to be marshy grassland, due to the dominance of Soft-rush.

3.2.16 All the fields are also subject to low-intensity grazing, indicated by presence of cow pats and poaching.

Plate 8 – View of marshy grassland within the central, northern section of the site.

3.2.17 Two fields, within the western section of Plot 7 and eastern section of Plot 6 (TN9, located on Page 3 on Figure 1) appears to have been managed for wildfowl purposes and it is owned by Frodsham & District Wildfowlers Club Ltd The fields include areas of poor, semi-improved grassland with distinct lines of Soft and Compact Rush. The lines of rush are in shallow, man-made ditches to provide additional shelter for wildfowl species.

Plate 9 – View of fields with marshy grassland lines.

Poor semi-improved grassland (B6)

3.2.18 There are four fields within Plot 6 and 7 which have experienced a lower intensity of grazing and have a longer sward. As such, these areas have been classified as semi-improved grassland.

3.2.19 Furthermore, there are small sections of grassland at the boundaries of the improved fields within Plots 5 and 6 which have experienced a lower intensity of grazing and have a longer sward. As such, these areas are also considered to be semi-improved grassland.

Plate 10 – Poor semi-improved field in the central, southern section of the site (TN32)

3.2.20 The species in these areas are similar to those found in the improved grassland areas, but there is a greater diversity of species here and there are more patches which are succeeding into ruderal and scrub habitats. Species include Meadow Foxtail, Crested Dog's-tail, False Oat-grass, Red Fescue, Tufted Hair-grass, Cock's-foot, Common Nettle, Perennial Rye-grass, Hogweed, Common Sorrel, Creeping Buttercup, Broad-leaved Dock, Lesser Burdock (*Arctium minus*), Creeping Thistle, Teasel (*Dipsacus fullonum*), Primrose (*Primula vulgaris*), Spear Thistle, Common Ragwort (*Jacobaea vulgaris*), Daisy (*Bellis perennis*), Dandelion (*Taraxacum officinale agg.*), Yarrow (*Achillea millefolium*), Cleavers, Ribwort Plantain (*Plantago lanceolata*), Common Mouse-ear, Groundsel (*Senecio vulgaris*), Greater Plantain (*Plantago major*), Germander Speedwell (*Veronica chamaedrys*), Cow Parsley, Hairy Bittercress (*Cardamine hirsuta*), Dove's-foot Cranesbill (*Geranium mole*), Common Vetch, White Clover and Yorkshire-fog.

Tall ruderal (C3.1)

3.2.21 There are several small areas of tall ruderal vegetation in Plots 4 and 8. Species include Common Nettle, Red Dead-nettle (*Lamium purpureum*), Cleavers, Ground-ivy (*Glechoma hederacea*), Groundsel, False Oat-grass, Cow Parsley, Hogweed, Cock's-foot, Willowherb species, Rosebay Willowherb, young Hawthorn trees, Spear Thistle and Creeping Thistle.

Plate 11 – Area of tall ruderal within the north-eastern section of the site (TN15)

Swamp (F1)

3.2.22 There are a number of areas across the site which have been mapped as swamp habitat as they are 5m or wider and are dominated by Common Reed (*Phragmites australis*). Any areas less than 5m wide have been mapped as marginal vegetation. Other species recorded occasionally throughout the areas of swamp include Reed Canary-grass (*Phalaris arundinacea*), Common Nettle, Broad-leaved Dock, Creeping Thistle, Spear Thistle, Great Willowherb (*Epilobium hirsutum*) and Meadow Buttercup.

Plate 12 – View of area of swamp in the northern, central section of the site.

Marginal vegetation (F2.1)

3.2.23 There are several areas of marginal vegetation present throughout the site, particularly demarcating field boundaries within Plot 7 and surrounding the network of ditches. The areas of marginal vegetation are dominated by Common Reed and other species recorded are similar to those found within the areas of swamp.

Plate 13 – Example of marginal vegetation around one of the drainage ditches within the central section of the site.

Standing water (G1)

3.2.24 There are nine ponds and 36 ditches which hold water across the site, see Figure 3 – Pond and Ditch Plan. Most ponds are in the central section of the site while the ditches are spread across the site as field and drainage ditches creating a network between the fields. A detailed description and photographs for the ponds and ditches surveyed is provided within *RSK (2023) Frodsham renewable energy development - GCN Survey Report, REV02* and *RSK (2023) Frodsham renewable energy development – Water Vole Habitat Assessment Report, REV01*.

Arable (J1.1)

3.2.25 Several fields within the central southern section of Plot 7 and north-eastern section of Plot 7 are arable, utilised for growing crops. At the time of the survey the fields had either been recently ploughed or had seedlings growing.

Plate 14 – Example of ploughed arable field within the southern, central section of the site.

Introduced shrub (J1.4)

3.2.26 There are occasional areas across the site with scattered introduced shrub, including Cotoneaster (*Cotoneaster* sp)., Flowering Currant and Variegated Yellow Archangel. These areas tend to be near public footpaths. New Zealand Pigmyweed (*Crassula helmsii*) was also recorded within one waterbody on the site, located within eastern section of Plot 6 (TN11, see Page 3 on Figure 1).

Intact hedge, species poor (J1.1.2)

3.2.27 There are four hedges present across the site, see Figure 1 – Phase 1 Habitat Plan, located within Plot 6 and 7.

3.2.28 Hedge 1 is to the south of the central section of the site (within Plot 7, see TN12, Page 3 of 4 on Figure 1). It appears to have been recently planted and is *c.* 1m high and 0.5m wide. Hawthorn is dominant but other species include Blackthorn, Hazel (*Corylus avellana*), Wild Cherry and Holly (*Ilex aquifolium*).

Plate 15 – View of Hedge 1.

3.2.29 Hedge 2 is in between two fields of marshy grassland in the central section of the site (within Plot 7, see TN13 on Page 3 of 4 on Figure 1). The hedge is adjacent to a dry ditch and is *c.* 1m wide 4m high. Some sections of the hedge relatively young and may have been planted in last 5 years, evidenced by presence of tree guards. Hawthorn is the most frequent species, but other species include Blackthorn, Rose species (*Rosa* sp), Willow species and Holly.

Plate 16 – View of Hedge 2.

3.2.30 Hedge 3 is in between two fields of marshy grassland in the central section of the site (within Plot 7, see TN14 on Page 3 of 4 on Figure 1). The hedge is immediately adjacent to a wet ditch and is *c.* 1m wide and 4m high. Hawthorn is the dominant species but Rose, Blackthorn, Apple (*Malus sp.)* and Holly are also present. The hedge appears to have been planted or 'gapped up' recently as there are several trees with tree guards present.

Plate 17 – View of Hedge 3

3.2.31 Hedge 4 is in between two fields of marshy grassland in the central section of the site (across Plot 6 and 7, see TN 15 on Page 3 on Figure 1). The hedge is *c.* 1m wide and 4 - 5m high. Hawthorn is the dominant species but Rose, Blackthorn, Apple species and Holly are also present.

Plate 18 – View of Hedge 4

Fence (J2.4)

3.2.32 A mixture of wooden picket and barbed wire fences are present across the site. The barbed wire fences are present to demarcate the field boundaries, in between ditches and lines of scrub.

Dry ditch (J2.6)

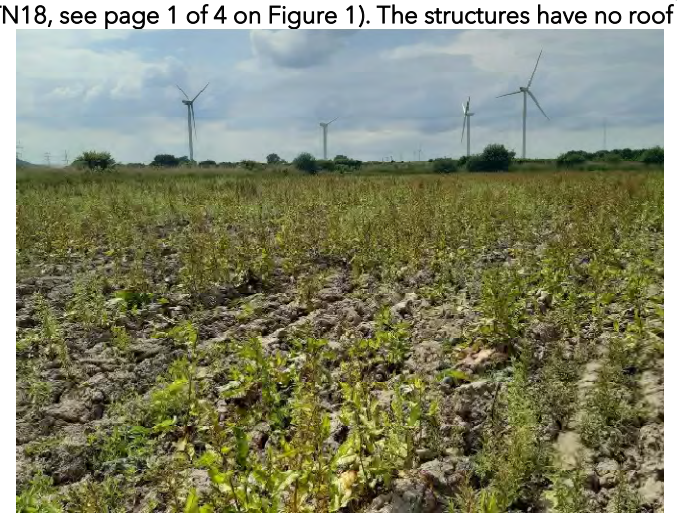
3.2.33 There are three dry ditches present across the site, all within Plot 7, see TN16 on Page 3 on Figure 1 – Phase 1 Habitat Plan for locations. All ditches are *c.* 2m wide and are filled with marginal vegetation.

Buildings (J3.6)

3.2.34 There is one building in Plot 6 (TN17, on page 2 of Figure 1), within the windfarm. The building is a substation for the windfarm. It was not accessed during the initial PEA survey but is considered unlikely to be impacted as part of the proposed works and will be buffered from the works via the surrounding fence and hardstanding.

Plate 19 – View of Building 1 in western section of the site.

There are also a number of brick-built structures located around the boundary of the improved fields within Plots 2, 5 and 6 (TN18, see page 1 of 4 on Figure 1). The structures have no roof and are three sided, see



3.2.35 Plate 22 below.

Plate 20 – Example brick-built structure within the western section of the site.

Bare ground (J4)

3.2.36 There are two fields of bare ground in the eastern section of the site (Plots 4 and 8), both of which had been recently ploughed.

Plate 21 – Area of bare ground within the eastern section of the site.

3.2.37 Additionally, there is one small field in the central section of the site (within Plot 7) which has been mapped as bare ground (TN19, see Page 1 of Figure 1). As such, there are ephemeral / short perennial species and tall ruderal plants scattered throughout but are too small to map. Species include Broad-leaved Dock, Rosebay Willowherb, Square-stalked Willowherb (*Epilobium tetragonum*), Curled Dock (*Rumex crispus*), Creeping Thistle, Spear Thistle, Perennial Sow-thistle (*Sonchus arvensis*), Scented Mayweed (*Matricaria chamomilla*), Common Field-speedwell (*Veronica persica*), Cleavers and Scarlet Pimpernel (*Anagallis arvensis* ssp. *arvensis*).

Plate 22 – Area of bare ground within the central section of the site.

Invasive non-native plant species

3.2.38 Variegated Yellow Archangel (TN1, see Page 3 on Figure 1), New Zealand Pigmyweed (TN11 see Page 3 on Figure 1) and Cotoneaster species (TN20*)* have been recorded on the site, see eastern section of Plot 6. These species are non-native invasive, listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). No other invasive non-native species were observed during the survey.

3.3 Protected and notable species

Invertebrates

3.3.1 The BDS returned hundreds of records for 59 notable invertebrate species within 1km of the site, including four species of beetles, two species of butterflies, 9 species of dragonflies, 35 species of moth and two species of true fly. Furthermore, 16 records for notable invertebrates were recorded on the site, including 10 records of dragonflies, 5 records of moths and one butterfly.

3.3.2 A large proportion of the site is Bramble, species poor marshy grassland, improved grassland and arable fields, which are considered likely to support a common assemblage of invertebrate species, typical of Bramble and grassland habitats.

3.3.3 However, the ponds, ditches and areas of semi-improved neutral grassland and swamp may support a more diverse assemblage of invertebrate species.

3.3.4 No records for white-clawed crayfish (WCC) (*Austropotamobius pallipes*) were returned from within 1km of the proposed site boundary. The ditches on the site are generally considered unsuitably for WCC as they are stagnant, relatively shallow and lack any refugia, such as large rocks or boulders. As such WCC are not discussed further within this report.

Great crested newt and other amphibians

3.3.5 The BDS returned 71 amphibian records within 1km of the site boundary including:

- 20 records for common frog (*Rana temporaria*), with the closest record from 2008 and located 25m south,
- 17 records for common toad (*Bufo bufo*), with the closest record from 2008 and for 8 individuals, located 25m south,
- 12 records for GCNs, with the closest record from 2017 for a negative eDNA result 450m south-east of the proposed site boundary. The closet record of a GCN is from 2003 and is 450m north of the site, but the River Weaver will act as a barrier to movement between this record and the site.
- 22 records for smooth newt (*Lissotriton vulgaris*), with five records from 2002 and within the proposed site boundary. Two records are in a pond in the north-eastern corner of the site (TN21) and three records are near a ditch on the site (TN22), see Figure 1 – Phase 1 Habitat Plan

3.3.6 The 36 ditches and 9 waterbodies on the site provide potential suitable breeding habitat for GCNs and other common amphibians. Furthermore, there are an additional 14 waterbodies were identified within 500m of the proposed site boundary.

3.3.7 The site provides suitable terrestrial habitat for GCNs and common amphibians as it contains predominantly marshy grassland (grazed by sheep and cattle), rough grassland, agricultural grassland fields and arable land with a grid of interconnected ditches forming the field boundaries. The areas of scrub, rough grassland, marshy grassland, emergent and swamp and rough grassland will provide foraging and

commuting opportunities for GCNs while the areas of scrub and scattered trees will also provide refuge opportunities. A large portion of the western section of the site is utilised as a wind farm and is intensively grazed by sheep and cattle, providing limited opportunities for GCNs within this section of the site. The development area is to the north-west of the M56 motorway and 200m north-west of the town of Frodsham. The site is bordered by the Manchester Ship Canal and River Weaver to the north and east, and the M56 motorway and Frodsham to the south and as such the site is relatively isolated.

3.3.8 All ditches and waterbodies on the site and within 500m were subject to a habitat suitability index (HSI) survey and water samples were collected from 21 of the most suitable and safely accessible waterbodies and analysed for the presence of GCN environmental DNA (eDNA), see RSK Biocensus (2023) *Frodsham renewable energy development Reptile Survey Report REV01*.

3.3.9 No positive eDNA results were recorded and the vast majority of the results returned were negative. Furthermore, reptile surveys were undertaken on the site between March and June 2022 and no GCNs were recorded using the refugia traps. Therefore, it is considered that GCNs are reasonably unlikely to be present on the site. However, common toads were identified on the site during the initial walkover survey and two toadlets were recorded during the reptile surveys, indicating that the site is used by common amphibians for foraging and commuting. No evidence of toads breeding within the on-site waterbodies was recorded but they were identified breeding within one off-site pond, 165m north-west of the site. Further information and detailed results can be found in *RSK Biocensus (2023) – Frodsham renewable energy development GCN Survey Report, REV02*.

Reptiles

3.3.10 The BDS returned two records for reptiles within 1km of the proposed site boundary, both of which are for common lizard from 2008 and both immediately adjacent to the to the M56 motorway, 40m south of site. Habitat suitability is similar to that described above for amphibians and the site is considered to be particularly suitable for grass snake due to the areas of ditches, swamp, marshy grassland and emergent vegetation. However, no reptiles were identified on the site during the suite of reptile surveys undertaken by RSK between March – July 2022, therefore reptiles are considered reasonably likely to be absent from the site or present in very low numbers. Further information and detailed results can be found in *RSK Biocensus (2023) – Frodsham renewable energy development Reptile Survey Report, REV01*.

Birds

3.3.11 The BDS returned numerous records for protected bird species within 1km of the site, including avocet (*Recurvirostra avosetta*), barn owl, Bewick's swan (*Cygnus columbianus bewickii*), black-necked grebe, black-tailed godwit (*Limosa limosa*), brambling (*Fringilla montifringilla*), Cetti's warbler (*Cettia cetti*), fieldfare (*Turdus pilaris*), garganey (*Anas querquedula*), goldeneye (*Bucephala clangula*), goshawk (*Accipiter gentili*), green sandpiper (*Tringa ochropus*), hobby (*Falco subbuteo*), kingfisher (*Alcedo atthis*), little

ringed plover (*Charadrius dubius*), long-tailed duck (*Clangula hyemalis*), marsh harrier (*Circus aeruginosus*), merlin (*Falco columbarius*), Mediterranean gull (*Larus melanocephalus*), peregrine (*Falco peregrinus*), pintail (*Anas acuta*), red kite (*Milvus milvus*), redwing (*Turdus iliacus*), ruff (*Calidris pugnax*), scaup (*Aythya marila*), Temminck's stint (*Calidris temminckii*) and whooper swan (*Cygnus cygnus*). Hundreds of species of conservation concern were also returned within 1km of the site.

3.3.12 The site is considered to provide suitable nesting habitat for a variety of common bird species such as song thrush (*Turdus philomelos*), robin (*Erithacus rubecula*) and woodpigeon (*Columba palumbus*), including hedgerows, scattered trees and scrub. In addition the areas of swamp, marginal vegetation and marshy grassland will provide nesting opportunities for a variety of wildfowl species.

3.3.13 Finally, the habitats on the site are broadly suitable for overwintering waders, particularly the northern central section with the areas of marshy grassland and larger areas of standing water.

3.3.14 A suite of wintering bird surveys and breeding bird were undertaken by RSK between November 2021 and June 2022. For further information and detailed results see *RSK Biocensus (2022) – Frodsham renewable energy development – Wintering Bird Survey Report* and *RSK Biocensus (2022) Frodsham renewable energy development – Breeding Bird Survey Report*.

3.3.15 The wintering bird surveys recorded a total of 84 species, including 54 specially protected and/or notable species. A diverse waterbird assemblage recorded included all seven species for which the adjacent Mersey Estuary SPA/Ramsar site is designated, with significant proportions (i.e. >1%) of the SPA and Ramsar site populations recorded for six species; notably Black-tailed Godwit (29.7% of the SPA population) and Golden Plover (19.7% of the SPA population). Thirteen wintering bird species were potentially recorded in numbers of county importance.

3.3.16 The breeding bird surveys identified that the site supports a regionally important population of breeding birds including 5 species receiving protection under the Wildlife and Countryside Act and a diverse assemblage of scarce species listed as either red or amber species of conservation concern including species such as lapwing which have suffered a drastic decline in recent decades.

3.3.17 The Frodsham section supported the greatest diversity of breeding birds, probably due to the greater habitat diversity, more scrub, and hedgerows than the Helsby section which is given over to intensive farming. However, lapwing, a bird that requires large open fields in which to breed, was present within the Helsby section and not the Frodsham section.

3.3.18 The area around the River Weaver, the flat fields adjacent to the Manchester Ship Canal and the mitigation area located between the two sections of wind turbines supports aggregations of wader and wildfowl species, many listed as interest features of the Mersey estuary. These areas therefore are functionally linked to the Mersey estuary as they provide a function (mainly high tide roosts) for these species. This usage was greatest in April as waders and wildfowl species prepare to head north for their

breeding grounds and will likely increase again over the autumn and winter months as birds head south to overwinter.

Bats

3.3.19 The BDS returned 43 records for bats within 2km of the site, including:

- Brown long-eared (*Plecotus auritus*) bat - Four field records were returned, the closest of which is *c.* 840m north-east of the site.
- Common pipistrelle (*Pipistrellus pipistrellus*) - 16 records were returned, one of which is a roost *c.* 1.9km south-west of the site. The closest field record is *c.* 350m south of the site.
- Daubenton's bat (*Myotis daubentonii*) - Two field records were returned, the closest of which is *c.* 1.3km east of the site.
- Noctule (*Nyctalus noctula*) - Five field records were returned, the closest of which is *c.* 465m north of the site.
- Pipistrelle species (*Pipistrellus sp.*) - 10 records were returned, one of which was for a roost *c.* 1.5km south of the site. The closest field record is *c.* 405m south of the site.
- Soprano pipistrelle (*Pipistrellus pygmaeus*) - Five field records were returned, two of which are in the western section of the site, west of the wind turbines.
- Whiskered bat (*Myotis mystacinus*) - One field record was returned, *c.* 2km east of the site.

3.3.20 The building (TN17 on Page 1 of Figure 1 – Plate 19) in Plot 6, within windfarm is unlikely to be impacted as part of the proposed works and will be buffered from the works via the surrounding fence and hardstanding. The habitats surrounding the building are of poor quality for foraging and commuting bats and there is no tree or hedge-line to the building, reducing its suitability for roosting bats.

3.3.21 The brick-built structures around the boundary of the improved fields within the western section of the site (Plots 2, 5 and 6 (TN18, see page 1 on Figure 1, Pate 20)) have no roof and are three sided. The structures are in poor condition, with several bricks missing or gaps in the mortar. However, on closer inspection most of the gaps are superficial. A small number of gaps are present, but these were fully inspected using a high-powered torch and no evidence of roosting bats was recorded. However, the gaps are considered suitable to support a single bat occasionally as a day roost.

3.3.22 No trees with features suitable to support roosting bats were recorded during the PEA. However, a detailed ground level tree assessment (GLTA) was not undertaken so if any trees are to be removed as part of the proposed development, it is recommended a survey of those trees is undertaken to confirm their potential to support roosting bats.

3.3.23 The development area is to the north-west of the M56 motorway and 200m north-west of the town of Frodsham. The site is bordered by the Manchester Ship Canal and River Weaver to the north and east, M56 motorway and Frodsham to the south. The areas of neutral semi-improved grassland, marshy grassland, swamp, emergent vegetation,

scrub and ponds and ditches on the site provide suitable habitat for foraging bats. Furthermore, the linear features such as areas of scrub, emergent vegetation and ditches along the field boundaries provide suitable habitat for commuting bats and connect the site to suitable habitat in the wider landscape. However, a large proportion of the site contains areas of low-quality habitat for foraging and commuting bats, with large areas of improved grassland, species poor marshy grassland, arable fields and bare ground, which provide limited opportunities for foraging and commuting bats. Therefore, site was assessed as having low suitability for foraging and commuting bats.

3.3.24 In the wider surrounding area, the habitats are similar in composition to the south, with the urban areas of Frodsham and Helsby bounded by hedge-lined fields and watercourses, however connectivity to these habitats from the site is limited by the M56 which will act as a barrier to movement. To the north and west the habitats are lower in quality with the town of Runcorn to the north and mixture of an industrial estate and agricultural fields to the west. The River Mersey to the north will provide a large area of foraging and commuting opportunities for bats.

3.3.25 At least five different species of bat were recorded during the seasonal transect surveys, in addition to Myotis species and Nyctalus species which have been taken to genus only. Recorded calls include the following species; common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, noctule and serotine.

3.3.26 Across the activity surveys bat activity was most concentrated along the Manchester Ship Canal and River Weaver and associated scrub and swamp habitats to the north and north-east of the site. Activity was also concentrated near the small portion of plantation woodland within the central-western section of site. Therefore, it is a reasonable assumption that these areas are of most value to bats using the site. Further information is provided within *RSK Biocensus (2023) Frodsham renewable energy development – Bat Activity Survey Report, REV01*.

Water vole

3.3.27 The BDS returned 32 records of water vole within 1 km of the site, including 15 records from within or immediately adjacent to the proposed site boundary, the most recent of which is from 2015. It should also be noted that three records of American mink (*Neovison vison*) were returned, including one record from within the proposed site boundary from 2009. American mink is known to predate on water voles (Dean et al 2021).

3.3.28 The central and south-eastern sections of the site (Plots 3, 4, 7 and 8 and eastern sections of Plots 2 and 6) are particularly suitable for water vole, with the network drainage ditches, ponds and areas of marshy grassland, swamp and emergent vegetation providing burrowing, foraging and commuting opportunities. However, the large areas of improved grassland and shallow ditches in the western section of the site provide limited opportunities for water vole.

Otter

3.3.29 The BDS returned two records for otter within 1 km of the site, the closest of which is *c.* 90m south-east, within Frodsham playing field ponds. The majority of the ditches and waterbodies on the site are generally considered unsuitable for otter as they do not support fish, are shallow and densely shaded. However, a number of the larger ditches (such as TN23 (within Plot 4 and 8, see page 4 on Figure 1), TN24 (within Plot 7, see Page 3 on Figure 1) and TN25 (Within Plot 10, see Page 2 of Figure 1)), have the potential to support foraging and commuting otter as they contain larger amounts of water and may support fish. No evidence of otter holts or resting places was recorded during the PEA walkover or subsequent habitat suitability surveys for both GCN and water vole.

Badger

3.3.30 The BDS returned 42 records of badger within 1 km of the site, including records for [redacted] The site contains areas of scrub and a variety of grassland habitats, which provide suitable foraging and commuting habitats for badger, as-well as sett building opportunities. Furthermore [redacted]

- Main sett 1 [redacted] – A large main sett comprising 12 entrance holes, 7 of which are active, evidenced by presence of hairs, spoil piles, prints and well-used mammal paths. [redacted]

[redacted]

Plate 23 – View of main sett 1.

Plate 24 – View of main sett 1.

Plate 25 – Example badger hairs identified outside an entrance of Sett 1.

- Main sett 2 [redacted] – A main sett comprising 6 entrance holes, all of which are active. This is evidenced by presence of hairs at each entrance, spoil piles, two prints at one entrance and well-used mammal paths. [redacted]

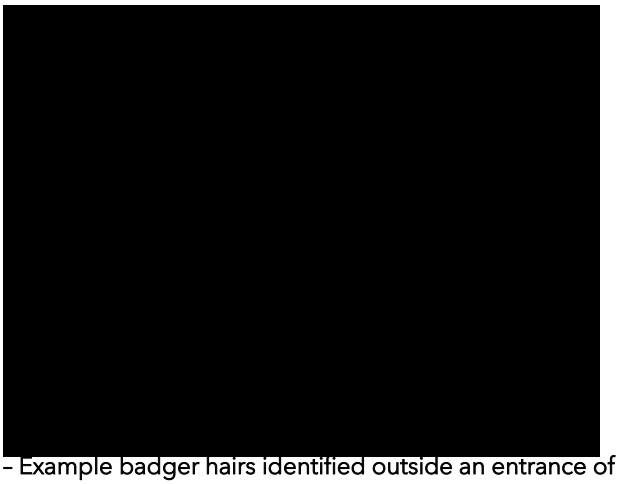


Plate 26 – Example badger hairs identified outside an entrance of Sett 1.

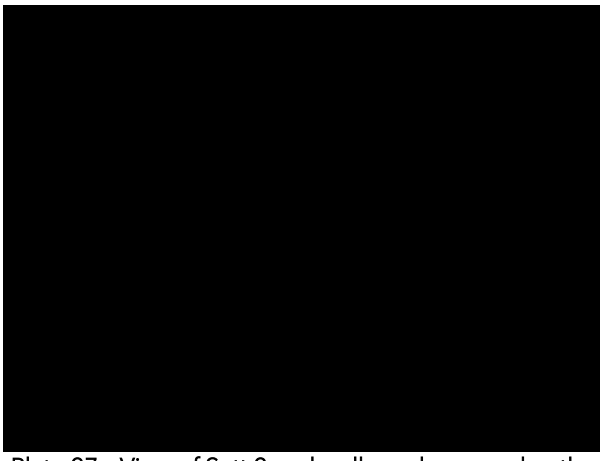


Plate 27 – View of Sett 2 and well-used mammal paths

Plate 28 – View of hair identified within entrance at Sett 2.

- Outlier 1 [redacted] – An outlier sett with one entrance hole. Sett is active as claw marks were recorded at the entrance and a fresh latrine was recorded adjacent to the entrance hole. [redacted]

Plate 29 – View of Sett 2 and well-used mammal paths

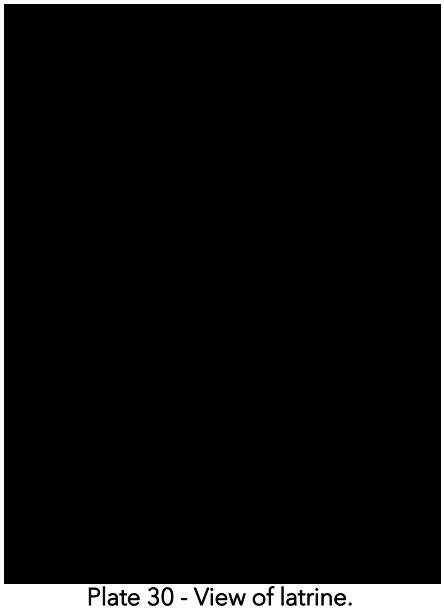


Plate 30 - View of latrine.

- Outlier 2 [redacted] – An outlier sett with one entrance hole [redacted] Old bedding and spoil were recorded at the sett entrance but there is a well-used mammal path leading from hole, as such is currently considered to be partially active.
- Outlier 3 [redacted] – An outlier sett with one entrance hole [redacted] No recent evidence was recorded within the entrance hole, but a well-used mammal path was noted outside the entrance hole heading both north and south. As such, the sett is currently considered to be partially active.
- Outlier 4 [redacted] – One mammal hole [redacted] The mammal hole had a narrow entrance (c. 10cm wide) and was filled with leaves and surrounded by dense scrub. As such, the mammal hole is considered unlikely to be used by badger and is currently disused.
- Outlier 5 [redacted] – One outlier sett with one entrance hole [redacted] No recent evidence was recorded within the entrance hole, but a well-used mammal path was noted outside the entrance hole. As such, the sett is currently considered to be partially active.

Other notable species

3.3.31 Records for both hedgehog (*Erinaceus europaeus*) and polecats (*Mustela putorius*) were returned from within 1km of the proposed site boundary. The closest record for hedgehog is *c.* 520m north of the site while the closest record for polecat is 160m west of the site.

3.3.32 Hedgehogs and polecats occupy a range of lowland habitat which enough cover to allow nesting. Hedgehogs are particularly common in parks in urban and suburban

environments, farmland and gardens. The areas of grassland, swamp and scrub offers foraging opportunities for hedgehog and will support a range of small mammals, a key food source for polecats. The areas of scrub, scattered trees and woodland provide refuge and hibernation opportunities for both species. The site is relatively isolated due to the surrounding watercourses to the north and east and M56 motorway to the south, but the site is connected to suitable habitat to the west so hedgehogs and polecats may therefore be present on the site.

4.0 EVALUATION AND RECOMENDATIONS

4.1 Statutory designated sites

4.1.1 There are four statutory designated sites and two internationally designated sites within 2km of the site boundary, including Mersey Estuary Ramsar, Mersey Estuary special protection area (SPA), Mersey Estuary site of special scientific interest (SSSI), Flood Brook Clough SSSI, Runcorn Hill local nature reserve (LNR), Dunsdale Hollow SSSI. Many of these sites are designated for their wetland habitats and/or species including wintering birds. Any future development proposals are unlikely to directly impact habitats associated with the designated sites, however the construction phase of any future development may result in indirect impacts. Furthermore, the habitats within the site may be used as functional land for the wintering bird assemblage associated with the designated sites.

4.1.2 However, it should be noted that any future development may result in an indirect positive impact on the habitats and species associated with the designated sites via reduced recreational pressure. The site is currently illegally accessed by members of the public and dog walkers by a network of paths across the site. Any future proposed development should seek to retain the public rights of way, but other pathways should be removed to reduce recreational pressure on the designated sites. Furthermore, information boards could be situated along public rights of way to inform residents of the nearby protected sites and the recreational pressure affecting them, to educate the residents and help to alleviate these pressures.

4.1.3 Therefore, a habitat regulations assessment (HRA) should be undertaken to fully assess the impacts (both negative and positive) on designated sites as a result of any future proposed development. Furthermore, the survey information gathered for breeding and wintering birds should be used to inform the HRA.

4.1.4 Additionally, the site lies within a SSSI Impact Risk Zone (IRZ) within which Natural England request that they are consulted on all types of planning applications. Therefore, it is recommended that the planning authority consult with Natural England.

4.2 Non-statutory designated sites

4.2.1 There are 10 non-statutory designated sites within 1 km of the site boundary, which are all local wildlife sites (LWSs). Two sites (Frodsham, Helsby and Ince Marshes and Frodsham Field Studies centre) are within 30m of the proposed site boundary.

4.2.2 The sites are designated for similar reasons to the statutory designated sites, including wintering birds. As such, wintering bird surveys should be undertaken to inform the impact assessment on non-statutory designated sites. However, it is anticipated that any mitigation measures required to protect statutory sites would also serve to protect the non-statutory sites.

4.3 Habitats

4.3.1 Habitats on the site qualify as the priority habitat 'reedbeds' and 'ponds' under Section 41 of the NERC Act 2006. However, the reedbed and pond habitats on the site are in generally poor condition with minimal plant species diversity, but they do provide a valuable resource for a variety of wildlife in the local area. There are a number of species-poor hedgerows and scattered trees present on the site and watercourses nearby.

4.3.2 Site clearance and setting out may involve the direct loss of trees, hedgerows, ponds and reedbeds on the site as an ecological resource. Furthermore, construction activities could cause indirect impacts on ponds, reedbeds and nearby watercourses via pollution and dust or indirect damage to root protection areas (RPA) of hedgerows and trees.

4.4 Plants

4.4.1 Variegated Yellow Archangel, New Zealand Pigmyweed and Cotoneaster were recorded on the site. These species are non-native invasive species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

4.4.2 Site clearance and setting out could result in the disturbance and dispersal of invasive species on and off the site.

4.4.3 Although not a legal requirement, it is recommended that these species are treated and/or removed by a specialist contractor to eradicate them from site and prevent their spread. As a minimum, precautions should be taken to ensure these species are not spread during the works, or into the neighbouring natural habitats.

4.5 Protected and other notable species

Amphibians

4.5.1 Following the suite of eDNA surveys for GCN, which all returned negative or inconclusive results, GCN are not considered to be present on the site. However, common toads were identified on the site during the initial walkover survey and two toadlets were recorded during the reptile surveys and records for smooth newts on the site were returned, indicating that the site is used by low numbers of common amphibians for foraging and commuting. No evidence of breeding within the on-site waterbodies was recorded but toads were identified breeding within one off site pond, 165m north-west of the site. Therefore, the works should still be completed under a suite of reasonable avoidance measures (RAMs) to ensure that other common amphibian species are not affected by the works.

Reptiles

4.5.2 No reptiles were identified on the site during the suite of reptile surveys undertaken by RSK between March – July 2022, therefore reptiles are considered reasonably likely to be absent from the site or present in very low numbers.

4.5.3 It is anticipated that the mitigation measures set out for amphibians will also serve to protect any reptiles in the unlikely event they are found on the site.

Birds

4.5.4 The field surveys for wintering birds recorded a total of 84 bird species within the site, including 54 specially protected and/or notable species. All seven species for which the adjacent Mersey Estuary SPA/Ramsar site is designated were recorded during these field surveys. Significant proportions (i.e. >1%) of the SPA and/or Ramsar site populations were recorded within the development site for six species, including particularly significant populations of Black-tailed Godwit and Golden Plover. While during the breeding season, the site supports a regionally important population of breeding birds including 5 species receiving protection under the Wildlife and Countryside Act and a diverse assemblage of scarce species listed as either red or amber species of conservation concern including species such as lapwing.

4.5.5 Development of the site could potentially result in significant negative impacts on these populations and, therefore, on the integrity of Mersey Estuary SPA/Ramsar site

4.5.6 Furthermore, the loss of habitats could potentially result in a loss of resource for both breeding and wintering birds.

Bats

4.5.7 There are a number of brick-built structures which were assessed as having low suitability to support roosting bats. However, no trees with features suitable to support roosting bats were recorded during the PEA, but a detailed GLTA was not undertaken. Furthermore, one building could not be accessed to complete a detailed assessment.

4.5.8 The areas of neutral semi-improved grassland, marshy grassland, swamp, emergent vegetation, scrub and ponds and ditches on the site provide suitable habitat for foraging bats. Furthermore, the linear features such as areas of scrub, emergent vegetation and ditches along the field boundaries provide suitable habitat for commuting bats and connect the site to suitable habitat in the wider landscape. However, a large proportion of the site contains areas of low-quality habitat for foraging and commuting bats, with large areas of improved grassland, species poor marshy grassland, arable fields and bare ground, which provide limited opportunities for foraging and commuting bats. Therefore, site was assessed as having low suitability for foraging and commuting bats.

4.5.9 If bats are roosting within the building, brick-built structures or trees, they are at risk of direct harm and disturbance and the roosts will be lost permanently during construction of a development. Any future development may also result in loss of foraging habitat for bats and inappropriate design could result in the severing of commuting corridors used by bats.

4.5.10 If the building is to be impacted as part of any future development, a detailed external and internal inspection should be undertaken by a suitably licensed ecologist to determine the buildings suitability to support roosting bats, with further presence / absence surveys undertaken if necessary.

4.5.11 If the brick-built structures are to be impacted, one bat presence / absence survey per structure should be undertaken by a suitably experienced ecologist during the peak bat survey season, May to August inclusive.

4.5.12 If any trees are to be removed, it is recommended a GLTA and tree climbing survey (where required) of those trees is undertaken by a suitably licensed ecologist to confirm their potential to support roosting bats. If the trees are identified as having moderate or high potential to support roosting bats, further presence / absence surveys will be required.

4.5.13 The need for surveys can be avoided through development design, but if required the survey results will need to be submitted as part of the planning application, and will inform further mitigation or compensation measures, if required. It should be noted that these further measures may include an application for a European protected species (EPS) mitigation licence or bat mitigation class licence (BMCL) from Natural England (NE).

4.5.14 At least five different species of bat were recorded during the seasonal transect surveys undertaken in 2022, in addition to Myotis species and Nyctalus species which have been taken to genus only. Recorded calls include the following species; common pipistrelle, soprano pipistrelle, Nathusius' pipistrelle, noctule and serotine. Spatially, the highest levels of bat activity on the walked transects were recorded along linear features such as Manchester Ship Canal, River Weaver, ditches with marginal vegetation and lines of scrub, which provide a sheltered buffer for foraging. Where possible, these features should be retained as part of any future development.

Water vole

4.5.15 The central and south-eastern sections of the site are particularly suitable for water vole, with the network drainage ditches, ponds and areas of marshy grassland, swamp and emergent vegetation providing burrowing, foraging and commuting opportunities.

4.5.16 Any future development could potentially cause direct harm, injury and / or death to individuals. It could also cause disturbance and the direct loss of suitable habitat, as well as indirect habitat degradation through changes in the water quality.

4.5.17 If construction activities go within 10m of the ditches or cross any ditches, a suite of water vole surveys should be undertaken within the ditches which will be impacted by a suitably experienced ecologist to identify any burrows, latrines or other field signs indicating water vole presence. Surveys can be conducted mid-April to mid-September, but the optimal time to carry out surveys is in May and June during the peak breeding season. The results of this survey will then inform any further mitigation or compensation that may be required.

Otter

4.5.18 The majority of the ditches and waterbodies on the site are generally considered unsuitable for otter as they do not support fish, are shallow and densely shaded. No otter holts or evidence of otter was recorded during the PEA survey, but the larger ditches and waterbodies have the potential to support otter.

4.5.19 If any future development is undertaken within 10m of the larger waterbodies and ditches, the development could potentially cause direct harm, injury and / or death to individuals. It could also cause disturbance and the direct loss of suitable habitat, as well as indirect habitat degradation through changes in the water quality.

4.5.20 If the works are going to be within 10m of the larger waterbodies, an otter survey should be undertaken by a suitably experienced ecologist to identify any holts or other signs of how otters may be using the site. The results of this survey will then inform any further mitigation or compensation that may be required.

4.5.21 For works over 10m from the larger waterbodies, reasonable avoidance measures should be implemented to protect otters during the construction phase of the development.

Badgers

4.5.22 The site contains areas of scrub and a variety of grassland habitats, which provide suitable foraging and commuting habitats for badger, as-well as sett building opportunities. Furthermore, [redacted] see Section 3.3.28 for further information.

4.5.23 Construction activities without mitigation could result in direct harm to badgers, disturbance, sett collapse, sett abandonment and loss of foraging habitats.

4.5.24 If the construction activities associated with any future development go within 30m of the setts, further badger activity surveys are required for each sett, The surveys should monitor the setts to determine the level of activity, the number of badgers using the setts and confirm the type of sett present (main, annexe, subsidiary or outlier). The surveys will also monitor how badgers are using the site to inform any necessary mitigation or compensation measures.

4.5.25 Furthermore, if the any future development design results in the loss of the setts, connectivity between setts, particularly the two main setts, and significant loss of habitat, badger bait marking surveys may be necessary to provide further information on the badger group(s) territory(ies) and how badgers are using the site to inform further mitigation or compensation measures.

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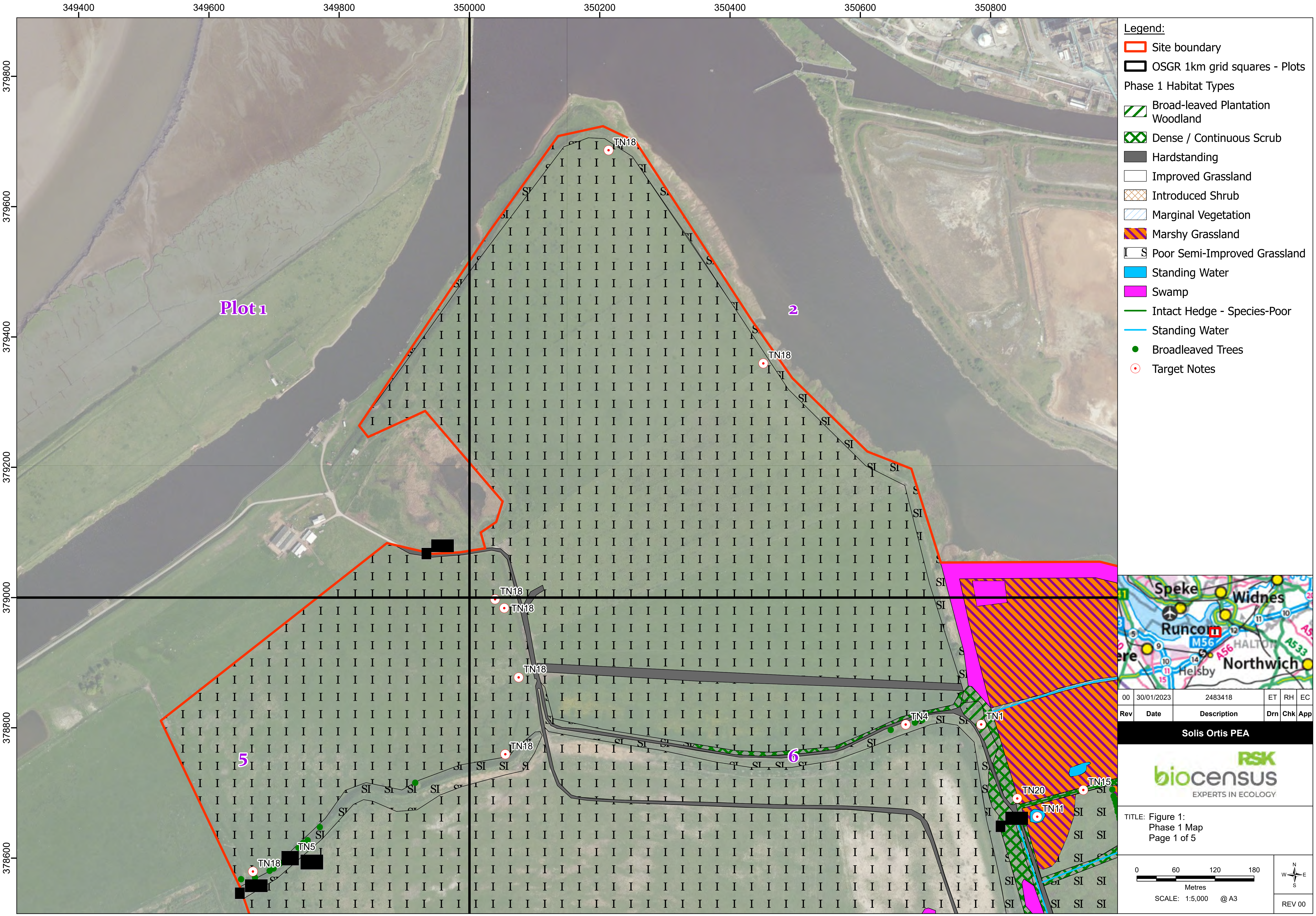
FIGURES

Figure 1 - Phase 1 Habitat Plan

Figure 2 – Site reference plan

Figure 3 - Pond and Ditch Plan

Figure 1 - Phase 1 Habitat Plan



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TN5
TN4
TN1
TN20
TN15
TN11
Legend:
Site boundary
OSGR 1km grid squares - Plots
Phase 1 Habitat Types
Broad-leaved Plantation Woodland
Dense / Continuous Scrub
Hardstanding
Improved Grassland
Introduced Shrub
Marginal Vegetation
Marshy Grassland
Poor Semi-Improved Grassland
Standing Water
Swamp
Intact Hedge - Species-Poor
Standing Water
Broadleaved Trees
Target Notes
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Widnes
Runcorn
Northwich
Helsby

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Solis Ortis PEA

RSK biocensus
EXPERTS IN ECOLOGY

TITLE: Figure 1:
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Page 1 of 5

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Plot 1

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TN18 TN18 TN18 TN18 TN5 TN18 TN3

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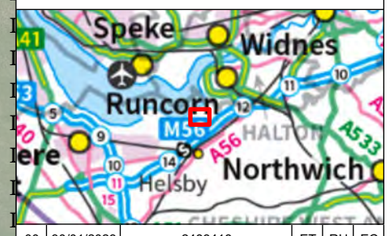
Legend:

- Site boundary
- OSGR 1km grid squares - Plots

Phase 1 Habitat Types

- Hardstanding
- Improved Grassland
- Marginal Vegetation
- Poor Semi-Improved Grassland
- Scattered Scrub
- Swamp
- Dry Ditch
- Standing Water
- Broadleaved Trees
- Target Notes



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Phase 1 Map
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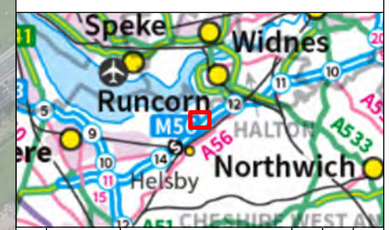
Legend:

- Site boundary
- OSGR 1km grid squares - Plots

Phase 1 Habitat Types

- Arable
- Broad-leaved Plantation Woodland
- Buildings
- Dense / Continuous Scrub
- Hardstanding
- Improved Grassland
- Marginal Vegetation
- Marshy Grassland
- Neutral Grassland - Semi-Improved
- Poor Semi-Improved Grassland
- Scattered Scrub
- Standing Water
- Swamp
- Dry Ditch
- Fence
- Intact Hedge - Species-Poor
- Standing Water
- Broadleaved Trees
- Target Notes



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Phase 1 Map
Page 3 of 5

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2 3 4 6 7 8 10

TN16 TN21 TN22 TN19 TN4 TN1 TN23 TN15 TN20 TN11 TN9 TN14 TN9 TN13 TN16 TN24 TN10 TN12 TN7 TN16

Legend:

- Site boundary
- OSGR 1km grid squares - Plots

Phase 1 Habitat Types

- Arable
- Bare Ground
- Broad-leaved Plantation Woodland
- Dense / Continuous Scrub
- Hardstanding
- Improved Grassland
- Introduced Shrub
- Marginal Vegetation
- Marshy Grassland
- Neutral Grassland - Semi-Improved
- Poor Semi-Improved Grassland
- Scattered Scrub
- Semi-improved Neutral Grassland
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- Tall Ruderal
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- Fence
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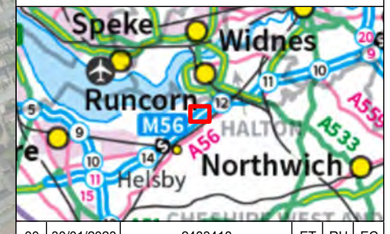
- Standing Water
- Broadleaved Trees
- Target Notes



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TITLE: Figure 1:
Phase 1 Map
Page 4 of 5

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TN6 TN2 TN16 TN21 TN22 TN19 TN23

3 4 7 8

Legend:

- Site boundary
- OSGR 1km grid squares - Plots

Phase 1 Habitat Types

- Arable
- Bare Ground
- Dense / Continuous Scrub
- Hardstanding
- Improved Grassland
- Marginal Vegetation
- Marshy Grassland
- Poor Semi-Improved Grassland
- Scattered Scrub
- Semi-improved Neutral Grassland
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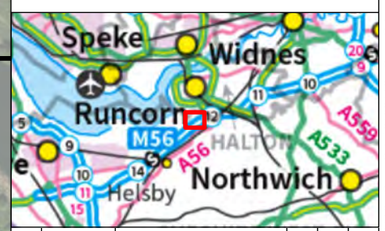
- Broadleaved Trees
- Target Notes



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Page 5 of 5

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PLOT 1

1 2 3 4 5 6 7 8 9 10

Legend:

- Site Boundary
- OSGR 1km grid squares - Plots

Phase 1 Habitat Types

- Arable
- Bare Ground
- Broad-leaved Plantation Woodland
- Buildings
- Dense / Continuous Scrub
- Hardstanding
- Improved Grassland
- Introduced Shrub
- Marginal Vegetation
- Marshy Grassland
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- Semi-improved Neutral Grassland
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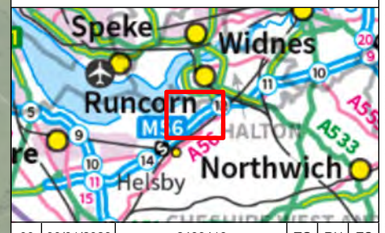
- Standing Water
- Broadleaved Trees
- Target Notes



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Frodsham Renewable Energy Development

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EXPERTS IN ECOLOGY

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Site Reference Plan

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Figure 3 - Pond and Ditch Plan

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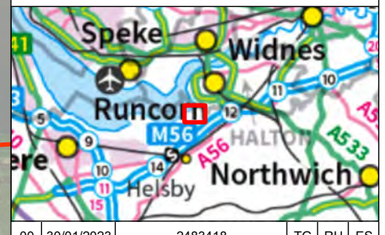
Legend:

- Site Boundary
- 250m Site Boundary Buffer
- Ponds for GCN Survey
- Ditches for GCN Survey



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Page 1 of 5

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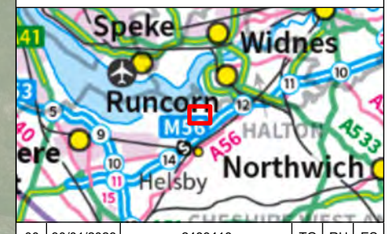
P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P12 P13 P14 P15 D27 D31 D32 D33

Legend:

- Site Boundary
- 250m Site Boundary Buffer
- Ponds for GCN Survey
- Ditches for GCN Survey



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P1 P3 P4 P5 P8 P9 P15 P10 P7 P14 P12 P11

D33 D32 D31 D27 D36 D2 D30 D11 D25 D19 D24 D23 D1 D26 D22 D34 D21 D29 D20

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Legend:

- Site Boundary
- 250m Site Boundary Buffer
- Ponds for GCN Survey
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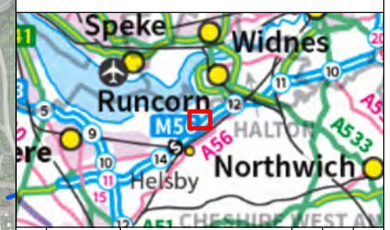

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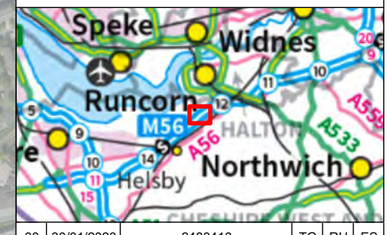
D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14 D15 D16 D17 D18 D19 D20 D21 D22 D23 D24 D25 D26 D27 D28 D29 D30 D31 D34 D35 D36

Legend:

- Site Boundary
- 250m Site Boundary Buffer
- Ponds for GCN Survey
- Ditches for GCN Survey



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Pond and Ditches Plan
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W1 W2 W3 W4 W5 W6 W8 W9

D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14 D15 D16 D17 D18 D19 D20 D22 D23 D24 D25 D26 D28 D30 D35

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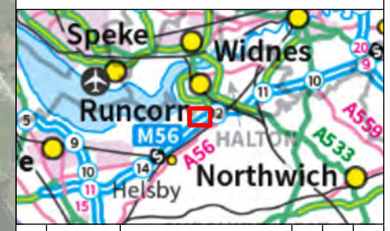
- 250m Site Boundary Buffer
- Ponds for GCN Survey
- Ditches for GCN Survey



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Frodsham Renewable Energy Development

RSK biocensus EXPERTS IN ECOLOGY

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APPENDIX A – TARGET NOTES

The locations of the following target notes are shown in *Figure 1*.

TN1 – Area of plantation woodland in the central section of the site (TN1), adjacent to a footpath. All trees are young – semi-mature and comprise Silver Birch (Betula pendula), Black Pine (Pinus nigra), Grey Willow (Salis cinerea), and Horse-chestnut (Aesculus hippocastanum). The ground flora comprise Ivy (Hedera helix), Herb-Robert (Geranium robertianum), Cleavers (Galium aparine), Cock's-foot (Dactylis glomerata) and Yorkshire-fog (Holcus lanatus). A small number of introduced shrubs were also noted within the area of woodland, including Flowering Currant (Ribes sanguineum) and Variegated Yellow Archangel (Lamiastrum galeobdolon subsp. argentatum)

TN2 – Scrub within the north-eastern corner of the site.. The patches of scrub are a mixture of young – semi-mature trees with a height of c. 2 – 7m and as such have been mapped as dense scrub. Tree species present include Goat Willow (Salix caprea), Grey Willow, Ash (Fraxinus excelsior), Elder (Sambucus nigra), Aspen (Populus tremula), Dogwood (Cornus sanguinea) and Silver Birch (Betula pendula), but Goat and Grey Willow are the most frequent species present. There are also small areas with Bramble (Rubus fruticosus), Hawthorn (Crataegus monogyna), Blackthorn (Prunus spinosa), Dog-rose (Rosa canina) and Field-rose (Rosa arvensis) are also present.

TN3 - Area of scattered scrub within the south-western section of the site contains scattered young – semi-mature trees, which are all below a height of 5m and as such have been mapped as scrub. Species present within the south-western section of site include Willow species (Salix sp.), Grey Willow and Elder.

TN4 – Area of broadleaved scattered trees

TN5 – Area of broadleaved scattered trees

TN6 – Area of semi-improved neutral grassland. However, a number of species present indicate the grassland is slightly calcareous, including Yellow-wort (Blackstonia perfoliata) and Fairy Flax (Linum catharticum). However, the majority of species present indicate neutral grassland, as the most frequent grass species present are Common Bent (Agrostis capillaris), Perennial Rye-grass (Lolium perenne), Red Fescue (Festuca rubra), False Oat-grass (Arrhenatherum elatius) and Rough Meadow-grass (Poa trivialis). Other species include Southern Marsh Orchid (Dactylorhiza praetermissa), Black Medick (Medicago lupulina), White Clover (Trifolium repens), Red Clover (Trifolium pratense), Common Vetch (Vicia sativa), Meadow Buttercup (Ranunculus acris), Common Bird's-foot-trefoil (Lotus corniculatus), Common Figwort (Scrophularia nodosa) and Self-heal (Prunella vulgaris).

TN7 – Area of damp semi-improved grassland. Species: Perennial Rye-grass, Hard Rush (Juncus inflexus), Red Fescue, Creeping Thistle, Common Vetch, Meadow Foxtail (Alopecurus pratensis), Yorkshire-fog, False Fox-sedge (Carex otrubae) , Common Sorrel (Rumex acetosa), Hairy Sedge (Carex hirta), Marsh Thistle (Cirsium palustre), Yellow Vetchling (Lathyrus aphaca), Thyme-leaved Speedwell (Veronica serpyllifolia), Rosebay Willowheb, Oval Sedge (Carex leporine), Tufted Hair-grass (Deschampsia

cespitosa), Sharp-flowered Rush (Juncus acutiflorus), Soft-rush (Juncus effusus), Common Sedge (Carex nigra), Crested Dog's-tail (Cynosurus cristatus), Carnation Sedge (Carex panicea), Marsh Bedstraw (Galium palustre), Lesser Stitchwort (Stellaria graminea), Greater Bird's-foot-trefoil (Lotus pedunculatus), Field Horsetail (Equisetum arvense) and Common Knapweed (Centaurea nigra).

TN8 – Windfarm.

TN9 – Fields managed for wildfowl purposes. The fields include areas of poor, semi-improved grassland with distinct lines of soft and compact rush present. The lines of rush are in shallow, man-made ditches to provide additional shelter for wildfowl species.

TN10 – Field where access was not permitted.

TN11 – Pond with New Zealand Pigmyweed (*Crassula helmsii)*

TN12 – Hedge 1, 1m high and 0.5m wide. Hawthorn is dominant but other species include Blackthorn, Hazel (*Corylus avellana*), Wild Cherry and Holly (*Ilex aquifolium*).

TN13 – Hedge 2, planted in last 5 years, evidenced by presence of tree guards. Hawthorn is the most frequent species, but other species include Blackthorn, Rose species (*Rosa* sp), Willow species and Holly.

TN14 – Hedge 3, in between two fields of marshy grassland in the central section of the site. The hedge is immediately adjacent to a wet ditch and is *c.* 1m wide and 4m high. Hawthorn is the dominant species but Rose, Blackthorn, Apple (*Malus sp.)* and Holly are also present. The hedge appears to have been planted or 'gapped up' recently as there are several trees with tree guards present.

TN15 – Hedge 4 - in between two fields of marshy grassland in the central section of the site. The hedge is *c.* 1m wide and 4 - 5m high. Hawthorn is the dominant species but Rose, Blackthorn, Apple species and Holly are also present.

TN16 – Dry ditch.

TN17 – Building within windfarm. It was not accessed during the initial PEA survey but is considered unlikely to be impacted as part of the proposed works and will be buffered from the works via the surrounding fence and hardstanding.

TN18 – Brick built structures.

TN19 – Area of bare ground with scattered ephemeral / short perennial plants.

TN20 – Location of cotoneaster plant.

TN21 – Pond with records of smooth newts.

TN22 – Ditch with records of smooth newts.

TN23 – Watercourse suitable for otters.

TN24 – Watercourse suitable for otters.

TN25 – Watercourse suitable for otters.

[redacted]

APPENDIX B – PROTECTED AND NOTEWORTHY SPECIES RECORDS

Species that are protected by law under Schedules 2 and 5 of The Conservation of Habitats and Species Regulations 2017, Schedules 2, 5 and 8 of The Wildlife and Countryside Act 1981 or The Protection of Badgers Act 1992 and have been recorded in the search area are listed in *Table 4* (excluding species protected only against collection for sale). These species records were obtained from Record – The Biodiversity Information System for Cheshire, Halton, Warrington and Wirral. The Latin and common names for species are given, along with the year of the most recent record and their level of designation.

Table 4: Protected species records within 1 km of the site boundary.Table 5 displays all noteworthy species that were returned within the search area. A glossary defining abbreviations used in the table is given in *Table 6, Appendix C*. If a species is not included in the tables below it does not necessarily mean the species is absent from the search area, but rather that data-holding organizations do not have records of it in these locations.

Table 4: Protected species records within 1 km of the site boundary.

Scientific name	Common name	Designation	Year
Amphibians			
Triturus cristatus	Great Crested Newt	EPS(Sch2), WCA5, S41	2003
Birds			
Accipiter gentilis	Goshawk	WCA1.1	2001
Alcedo atthis	Kingfisher	WCA1.1, Amber	2010
Anas acuta	Pintail	WCA1.2, Amber, GB RDB(CR)	2018
Anas querquedula	Garganey	WCA1.1, Amber, GB RDB(CR)	2004
Anser anser	Greylag Goose	WCA1.2, Amber	2018
Aythya marila	Scaup	WCA1.1, S41, Red, GB RDB(EN)	2004
Botaurus stellaris	Bittern	WCA1.1, S41, Amber, GB RDB(VU)	2002
Bucephala clangula	Goldeneye	WCA1.2, Amber, GB RDB(VU)	2017
Calidris pugnax	Ruff	WCA1.1, Red, GB RDB(CR)	2018
Calidris temminckii	Temminck's Stint	WCA1.1	2008
Cettia cetti	Cetti's Warbler	WCA1.1	2020
Charadrius dubius	Little Ringed Plover	WCA1.1	2001
Circus aeruginosus	Marsh Harrier	WCA1.1, Amber	2010
Circus cyaneus	Hen Harrier	WCA1.1, S41, Red, GB RDB(VU)	2018
Clangula hyemalis	Long-tailed Duck	WCA1.1, Red	2003
Cygnus columbianus	Bewick's Swan	WCA1.1, S41, Red, GB RDB(CR)	2018
Cygnus cygnus	Whooper Swan	WCA1.1, Amber, GB RDB(EN)	2018
Falco columbarius	Merlin	WCA1.1, Red, GB RDB(EN)	2013

Scientific name	Common name	Designation	Year
Falco peregrinus	Peregrine	WCA1.1	2004
Falco subbuteo	Hobby	WCA1.1	2017
Fringilla montifringilla	Brambling	WCA1.1	2002
Hydrocoloeus minutus	Little Gull	WCA1.1	2017
Larus melanocephalus	Mediterranean Gull	WCA1.1, Amber	2018
Limosa limosa	Black-tailed Godwit	WCA1.1, S41, Red, GB RDB(EN)	2018
Milvus milvus	Red Kite	WCA1.1	2011
Numenius phaeopus	Whimbrel	WCA1.1, Red, GB RDB(CR)	2004
Pandion haliaetus	Osprey	WCA1.1, Amber	2018
Podiceps nigricollis	Black-necked Grebe	WCA1.1, Amber, GB RDB(EN)	2019
Recurvirostra avosetta	Avocet	WCA1.1, Amber	2018
Tringa nebularia	Greenshank	WCA1.1, Amber	2017
Tringa ochropus	Green Sandpiper	WCA1.1, Amber, GB RDB(EN)	2018
Turdus iliacus	Redwing	WCA1.1, Amber, GB RDB(CR)	2003
Turdus pilaris	Fieldfare	WCA1.1, Red, GB RDB(CR)	2018
Tyto alba	Barn Owl	WCA1.1	2001
Mammals			
Arvicola amphibius	European Water Vole	WCA5, S41, GB RDB(EN)	2001
Lutra lutra	European Otter	EPS(Sch2), WCA5, S41	2009
Meles meles	Eurasian Badger	BA	2003
Myotis daubentonii	Daubenton's Bat	EPS(Sch2), WCA5	2007
Myotis mystacinus	Whiskered Bat	EPS(Sch2), WCA5	2012
Nyctalus noctula	Noctule Bat	EPS(Sch2), WCA5, S41	2012
Pipistrellus pipistrellus	Common Pipistrelle	EPS(Sch2), WCA5	2013
Pipistrellus pygmaeus	Soprano Pipistrelle	EPS(Sch2), WCA5, S41	2014
Reptile			
Anguis fragilis	Slow-worm	WCA5, S41	2001
Zootoca vivipara	Common Lizard	WCA5, S41	2008

Table 5: Noteworthy species records within 1 km of the site boundary.

Scientific name	Common name	Designation
Plants		
Bromus secalinus	Rye Brome	NS
Calystegia sepium subsp. roseata	Bindweed	NS
Catabrosa aquatica	Whorl-grass	GB RDB(VU), ENG BSBI RDB(VU)
Centaurium littorale	Seaside Centaury	NS
Eriophorum angustifolium	Common Cottongrass	GB RDB(VU), ENG BSBI RDB(VU)
Fritillaria meleagris	Fritillary	NS
Hottonia palustris	Water-violet	GB RDB(VU), ENG BSBI RDB(VU)

Scientific name	Common name	Designation
Hyacinthoides non-scripta	Bluebell	WCA8 – only inc in Appendix
Juncus filiformis	Thread Rush	NS
Lathyrus aphaca	Yellow Vetchling	GB RDB(VU), ENG BSBI RDB(VU), NS
Meconopsis cambrica	Welsh Poppy	NS
Pinus sylvestris	Scots Pine	NS
Ranunculus flammula	Lesser Spearwort	GB RDB(VU), ENG BSBI RDB(VU)
Trichomanes speciosum	Killarney Fern	EPS(Sch5), WCA8, NR
Amphibians		
Bufo bufo	Common Toad	WCA5
Lissotriton vulgaris	Smooth Newt	WCA5
Rana temporaria	Common Frog	WCA5
Birds		
Acanthis flammea	Common (Mealy) Redpoll	Amber, GB RDB(CR)
Accipiter nisus	Sparrowhawk	Amber
Acrocephalus schoenobaenus	Sedge Warbler	Amber
Actitis hypoleucos	Common Sandpiper	Amber, GB RDB(VU)
Alauda arvensis	Skylark	S41, Red
Anas clypeata	Shoveler	Amber
Anas crecca	Teal	Amber
Anas penelope	Wigeon	Amber
Anas platyrhynchos	Mallard	Amber
Anas strepera	Gadwall	Amber
Anser brachyrhynchus	Pink-footed Goose	Amber
Anthus pratensis	Meadow Pipit	Amber
Anthus spinoletta	Water Pipit	Amber, GB RDB(VU)
Apus apus	Swift	Red, GB RDB(EN)
Arenaria interpres	Turnstone	Amber, GB RDB(VU)
Asio flammeus	Short-eared Owl	Amber, GB RDB(EN)
Aythya ferina	Pochard	Red, GB RDB(EN)
Branta leucopsis	Barnacle Goose	Amber
Calidris alba	Sanderling	Amber
Calidris alpina	Dunlin	Red, GB RDB(EN)
Calidris canutus	Knot	Amber
Calidris ferruginea	Curlew Sandpiper	Amber
Charadrius hiaticula	Ringed Plover	Red, GB RDB(VU)
Chloris chloris	Greenfinch	Red, GB RDB(EN)
Chroicocephalus ridibundus	Black-headed Gull	Amber, GB RDB(VU)
Columba oenas	Stock Dove	Amber
Columba palumbus	Woodpigeon	Amber
Corvus frugilegus	Rook	Amber
Cuculus canorus	Cuckoo	S41, Red, GB RDB(VU)
Cygnus olor	Mute Swan	Amber

Scientific name	Common name	Designation
Delichon urbicum	House Martin	Red, GB RDB(VU)
Emberiza calandra	Corn Bunting	S41, Red
Emberiza citrinella	Yellowhammer	S41, Red
Emberiza schoeniclus	Reed Bunting	S41, Amber
Falco tinnunculus	Kestrel	Amber, GB RDB(VU)
Gallinago gallinago	Snipe	Amber
Gallinula chloropus	Moorhen	Amber, GB RDB(VU)
Haematopus ostralegus	Oystercatcher	Amber
Larus argentatus	Herring Gull	S41, Red, GB RDB(EN)
Larus canus	Common Gull	Amber
Larus fuscus	Lesser Black-backed Gull	Amber
Larus fuscus subsp. graellsii	British Lesser Black-Backed Gull	Amber
Larus hyperboreus	Glaucous Gull	Amber, GB RDB(VU)
Larus marinus	Great Black-backed Gull	Amber, GB RDB(EN)
Larus michahellis	Yellow-legged Gull	Amber, GB RDB(EN)
Limosa lapponica	Bar-tailed Godwit	Amber
Linaria cannabina	Linnet	S41, Red
Linaria flavirostris	Twite	S41, Red, GB RDB(VU)
Locustella naevia	Grasshopper Warbler	S41, Red
Mergellus albellus	Smew	Amber, GB RDB(CR)
Mergus serrator	Red-breasted Merganser	GB RDB(VU)
Motacilla cinerea	Grey Wagtail	Amber
Motacilla flava	Yellow Wagtail	S41, Red
Numenius arquata	Curlew	S41, Red, GB RDB(EN)
Oenanthe oenanthe	Wheatear	Amber
Passer domesticus	House Sparrow	S41, Red
Passer montanus	Tree Sparrow	S41, Red, GB RDB(VU)
Perdix perdix	Grey Partridge	S41, Red, GB RDB(VU)
Phylloscopus trochilus	Willow Warbler	Amber
Pluvialis squatarola	Grey Plover	Amber, GB RDB(VU)
Podiceps cristatus	Great Crested Grebe	GB RDB(VU)
Podiceps grisegena	Red-necked Grebe	Red, GB RDB(CR)
Prunella modularis	Dunnock	S41, Amber
Pyrrhula pyrrhula	Bullfinch	S41, Amber
Saxicola rubetra	Whinchat	Red
Scolopax rusticola	Woodcock	Red, GB RDB(VU)
Sterna hirundo	Common Tern	Amber
Strix aluco	Tawny Owl	Amber
Sturnus vulgaris	Starling	S41, Red, GB RDB(VU)
Sylvia communis	Whitethroat	Amber
Tadorna tadorna	Shelduck	Amber, GB RDB(EN)
Tringa erythropus	Spotted Redshank	Amber, GB RDB(EN)
Tringa totanus	Redshank	Amber, GB RDB(VU)
Troglodytes troglodytes	Wren	Amber

Scientific name	Common name	Designation
Turdus philomelos	Song Thrush	S41, Amber
Turdus torquatus	Ring Ouzel	S41, Red, GB RDB(VU)
Turdus viscivorus	Mistle Thrush	Red, GB RDB(VU)
Vanellus vanellus	Lapwing	S41, Red, GB RDB(EN)
Invertebrates		
Agelastica alni	Alder Leaf Beetle	NR
Agrochola litura	Brown-spot Pinion	S41
Agrochola lychnidis	Beaded Chestnut	S41
Allophyes oxyacanthae	Green-brindled Crescent	S41
Amphipyra tragopoginis	Mouse Moth	S41
Apamea remissa	Dusky Brocade	S41
Arctia caja	Garden Tiger	S41
Atethmia centrago	Centre-barred Sallow	S41
Beris clavipes	Scarce Orange Legionnaire	NS, Notable
Caradrina morpheus	Mottled Rustic	S41
Ceramica pisi	Broom Moth	S41
Chesias legatella	Streak	S41
Chiasmia clathrata	Latticed Heath	S41
Cirrhia gilvago	Dusky-lemon Sallow	S41
Cirrhia icteritia	Sallow	S41
Conisternum decipiens	Conisternum decipiens	Notable
Diarsia rubi	Small Square-spot	S41
Ecliptopera silaceata	Small Phoenix	S41
Ennomos erosaria	September Thorn	S41
Ennomos fuscantaria	Dusky Thorn	S41
Eulithis mellinata	Spinach	S41
Euxoa nigricans	Garden Dart	S41
Graphiphora augur	Double Dart	S41
Gyrinus paykulli	Gyrinus paykulli	NS
Helophorus (Helophorus) granularis	Helophorus (Helophorus) granularis	NS
Helotropha leucostigma	Crescent	S41
Hepialus humuli	Ghost Moth	S41
Hydaticus seminiger	Hydaticus seminiger	NS
Hydraecia micacea	Rosy Rustic	S41
Lasiommata megera	Wall	S41
Leucania comma	Shoulder-striped Wainscot	S41
Litoligia literosa	Rosy Minor	S41
Melanchra persicariae	Dot Moth	S41
Orthosia gracilis	Powdered Quaker	S41
Pelurga comitata	Dark Spinach	S41
Polydrusus (Chrysophis) formosus	Polydrusus (Chrysophis) formosus	Notable:A
Rhizedra lutosa	Large Wainscot	S41

Scientific name	Common name	Designation
Satyrium w-album	White-letter Hairstreak	WCA5, S41, GB RDB(EN) – only inc in Appendix
Scotopteryx chenopodiata	Shaded Broad-bar	S41
Spilosoma lubricipeda	White Ermine	S41
Spilosoma lutea	Buff Ermine	S41
Stratiomys singularior	Flecked General	Notable
Timandra comae	Blood-vein	S41
Tyria jacobaeae	Cinnabar	S41
Watsonalla binaria	Oak Hook-tip	S41
Xanthorhoe ferrugata	Dark-barred Twin-spot Carpet	S41
Mammals		
Erinaceus europaeus	West European Hedgehog	S41, GB RDB(VU)
Lepus europaeus	Brown Hare	S41
Meles meles	Eurasian Badger	BA
Mustela putorius	Polecat	S41

APPENDIX C - ABBREVIATIONS

Table 6 displays abbreviations of protected species legislation.

Table 6: Glossary of abbreviations used in this report.

Code	Full Title	Explanation
Amber	Amber list	Amber listed species have a population status in the UK of medium conservation concern.
BA	The Protection of Badgers Act 1992	Legislation making it an offence to kill, injure or take a badger, or to damage or interfere with a sett unless a licence is obtained from a statutory authority.
BAP	Biodiversity Action Plan	A plan that identifies threats to significantly important species and habitats, and sets out targets and actions to enhance or maintain biodiversity.
DA	The Deer Act 1991	All wild deer with the exception of muntjac (*Muntiacus reevesi*) and Chinese water deer (*Hydropotes inermis*) are protected by a closed season.
ENG BSBI RDB	A Vascular Plant Red List for England	A list published in 2014 by the Botanical Society of Britain and Ireland of the red list status of plants in England. Measured against standardised IUCN criteria.
ENG BSBI RDB(CR)	Critically Endangered	A BSBI Red List designation for species at an extremely high risk of extinction.
ENG BSBI RDB(EN)	Endangered	A BSBI Red List designation for species at a very high risk of extinction.
ENG BSBI RDB(VU)	Vulnerable	A BSBI Red List designation for species at high risk of extinction.
EPS (Sch 2)	European Protected Species (Schedule 2)	European protected species (listed on Schedules 2 of The Conservation of Habitats and Species Regulations 2017)
EPS (Sch 5)	European Protected Species (Schedule 5)	European protected species (listed on Schedules 5 of The Conservation of Habitats and Species Regulations 2017)
GB RDB	Red Data Book Species	Species identified in one of the UK Red Data 2001.
GB RDB(CR)	Critically Endangered	An IUCN Red List designation for species at an extremely high risk of extinction.
GB RDB(EN)	Endangered	An IUCN Red List designation for species at a very high risk of extinction.
GB RDB(VU)	Vulnerable	An IUCN Red List designation for species at high risk of extinction.

Code	Full Title	Explanation
HAP	Habitat Action Plan	A plan that identifies threats to a priority habitat and sets out targets and actions to enhance or maintain that habitat.
IUCN	International Union for Conservation of Nature and Natural Resources (also known as The World Conservation Union)	A worldwide partnership and conservation network to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable.
LBAP	Local Biodiversity Action Plan	A plan that identifies threats to locally important species and habitats, and sets out targets and actions in species action plans and habitat action plans to enhance or maintain biodiversity at the county or regional level.
LHAP	Local Habitat Action Plan	A plan that identifies threats to a locally important priority habitat and sets out targets and actions to enhance or maintain that habitat.
LSAP	Local Species Action Plan	A plan that identifies threats to locally important species, and sets out targets and actions to prevent losing that species from the local area.
Notable	Scarce and threatened invertebrates	Invertebrate species which are estimated to occur within the range of 16 to 100 10km squares but subdivision into Notable A and Notable B categories is not possible as there is insufficient information available).
Notable:A	Scarce and threatened invertebrates	Taxa which do not fall within Red Data Book categories but which are none-the-less uncommon in Great Britain and thought to occur in 30 or fewer 10km squares of the National Grid or, for less well-recorded groups, within seven or fewer vice-counties.
Notable: B	Scarce and threatened invertebrates	Taxa which do not fall within Red Data Book categories but which are none-the-less uncommon in Great Britain and thought to occur in between 31 and 100 10km squares of the National Grid or, for less-well recorded groups between eight and twenty vice-counties.
NN	Nationally Notable	Designation for invertebrate taxa that are thought to be notably important in the UK.
NR	Nationally Rare	Species in 15 or fewer hectads in Great Britain.
NS	National Scarce	Species in 16-100 hectads in Great Britain.
OSPAR	OSPAR	Species listed on The Convention for the Protection of the Marine Environment of the North-East Atlantic

Code	Full Title	Explanation
Red	Red List	Red listed species have a population status in the UK with high conservation concern.
SAP	Species Action Plan	A plan that identifies threats to significantly important species, and sets out targets and actions to prevent losing that species to extinction.
S41	Species of Principal Importance	Species of Principal Importance in England under The Natural Environment and Rural Communities (NERC) Act (2006)
UKBAP	UK Biodiversity Action Plan	A plan that identifies threats to locally important species and habitats, and sets out targets and actions in species action plans and habitat action plans to enhance or maintain biodiversity in the UK.
WCA	*The Wildlife and Countryside Act 1981* (as amended)	Containing 4 Parts and 17 Schedules, the Act covers protection of wildlife (birds, and some animals and plants), the countryside, National Parks, and the designation of protected areas, and public rights of way. All wild plants in Britain are protected from intentional uprooting by an unauthorized person, but land owners, land occupiers, persons authorized by either of these or persons authorized in writing by the Local Authority for the area are exempt. Protection for some species may be limited to certain Sections of the Act (*e.g.* S13(2).
WCA1	Schedule 1 of *The Wildlife and Countryside Act 1981* (as amended)	This Schedule lists birds protected by special penalties at all times, but virtually all wild birds have some protection in law. Acts which are prohibited for all wild birds (except derogated 'pest' species) include intentional killing, injuring or taking; taking, damaging or destroying nests in use or being built; taking or destroying eggs; possessing or having control of (with certain exceptions but including live for dead birds, parts or derivative); setting or permitting certain traps, weapons, decoys or poisons. Selling, offering or exposing for sale, possessing or transporting for sale any live wild bird, egg or part of an egg or advertising any of these for sale, or dead wild bird including parts or derivatives are also prohibited. Many birds must be formally registered and ringed if kept in captivity. Schedule I WCA birds are additionally protected from intentional or reckless disturbance while building a nest, or when such a bird is in, on or near a

Code	Full Title	Explanation
		nest containing eggs or young, or intentional or reckless disturbance of dependent young.
WCA5	Schedule 5 of *The Wildlife and Countryside Act 1981* (as amended)	Schedule 5 animals are protected from intentional killing, injuring or taking; possessing (including parts or derivatives); intentional or reckless damage, destruction or obstruction of any structure or place used for shelter or protection; selling, offering or exposing for sale, possessing or transporting for the purpose of sale (alive or dead, including parts or derivatives). Protection of some species is limited to certain Sections of the Act (*e.g.* S9(1), S9(4a), S9(4b), S9(5)).
WCA8	Schedule 8 of *The Wildlife and Countryside Act 1981* (as amended)	Plants and fungi protected from intentional picking, uprooting, destroying, trading (including parts or derivatives), *etc*.

APPENDIX D – NATURE CONSERVATION LEGISLATION AND POLICY

International Legislation

The following international conventions and directives apply to biodiversity protection in the UK. Post-'Brexit', even though European Union (EU) directives no longer directly apply to the UK, the provisions therein are enshrined in both domestic legislation and international agreements. Legislation has been enacted to ensure the regulations derived from these remain in force[1].

The Convention on Biological Diversity 1992 *et seq.*

This multilateral treaty (https://www.cbd.int/doc/legal/cbd-en.pdf), signed by 150 government leaders at the 1992 Rio Earth Summit, has three main goals, of which one is the conservation of biological diversity. Article 6 requires countries to develop national biodiversity strategies, plans or programmes. In response, the UK developed the UK Biodiversity Action Plan (BAP) 1994 (https://jncc.gov.uk/our-work/uk-bap/) as well as county-specific BAPs. Subsequent to this, parties of the convention agreed the supplementary Nagoya Protocol 2010 (available at https://www.cbd.int/abs/doc/protocol/nagoya-protocol-en.pdf), adopting the Strategic Plan for Biodiversity 2011-2020. The purpose of this Strategic Plan was to provide a framework for establishing national and regional biodiversity targets (https://www.cbd.int/doc/strategic-plan/2011-2020/Aichi-Targets-EN.pdf).

Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds (Birds Directive) 2009

https://www.legislation.gov.uk/eudr/2009/147

The Birds Directive 2009 relates to the conservation of all species of naturally occurring birds in their wild state in the territory of the EU Member States (MSs) to which the treaty applies. Under the Birds Directive, the most suitable areas of conservation of the Annex I species are to be designated as Special Protection Areas (SPAs), as part of the European Natura 2000 network. Post Brexit, SPAs are no longer considered part of Natura 2000 and are instead components of the UK's 'national site network', but their highly protected status is unchanged. Maintaining a coherent network of protected sites with overarching conservation objectives is still required in order to fulfil the commitment made by government to maintain environmental protections and continue to meet the UK's international legal obligations.

Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) 1992

https://www.legislation.gov.uk/eudr/1992/43

The Habitats Directive 1992 requires EU MSs to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of community interest, which are listed under Annex I, II, IV and/or V. Species listed under Annex IV are known as 'European

[1] Further information relating to England and Wales can be found here: https://www.gov.uk/government/publications/changes-to-the-habitats-regulations-2017/changes-to-the-habitats-regulations-2017. A similar exercise has been undertaken in Scotland and Northern Ireland.

Protected Species' (EPS), and have retained their protected status in UK domestic legislation post-Brexit.

Under the Habitats Directive, EU Member States are required to contribute to the Natura 2000 network through the designation of Special Areas of Conservation (SACs) for natural habitat types listed in Annex I and habitats of species listed in Annex II. Post Brexit, SACs are no longer considered part of the European Natura 2000 network and are instead components of the UK's 'national site network', but their highly protected status is unchanged.

The Convention on Wetlands of International Importance Especially as Waterfowl Habitat 1971: the Ramsar Convention

Accessible via https://jncc.gov.uk/our-work/ramsar-convention/

The Ramsar Convention is an intergovernmental treaty focused on the conservation and sustainable use of wetland, primarily as habitats for water birds. Under the convention, each ratified country is required to identify and designate sites (Ramsar sites) that meet the criteria for identifying a wetland of international importance, i.e. containing representative, rare or unique wetland types. In addition, the convention promotes international co-operation to promote the wise use of all wetlands and their resources.

Habitats Regulations Assessment (HRA): a note

There is a requirement under the EU nature directives, and enshrined in country-specific domestic legislation[2] (see below), to undertake a screening exercise to determine whether any sites that form part of the 'national site network' (formerly Natura 2000) are likely to be significantly affected by any proposal (project or plan). The assessment must consider the proposals alone and also in combination with other plans and projects, if they result from activities that are not directly connected with, or necessary to, the management of the designated sites. If significant effects are likely, an Appropriate Assessment (AA) will need to be carried out. The screening, any AA, and any subsequent assessment, are collectively known as a Habitats Regulations Assessment (HRA). The HRA needs to take into account each of the 'Qualifying Features' (habitats or species) that justified the site being designated. Ramsar sites are treated in the same way as SACs and SPAs in HRAs, as are sites which have not been fully adopted i.e. candidate SACs (cSACs) and potential SPAs (pSPAs).

The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) 1979

Accessible via: https://jncc.gov.uk/our-work/the-convention-on-the-conservation-of-migratory-species-of-wild-animals/#convention-summary

The Bonn Convention was adopted in 1979 and came into force in 1985. Contracting Parties work together to conserve migratory species and their habitats by providing strict protection for endangered migratory species (listed in Appendix I of the Convention), concluding multilateral agreements for the conservation and management of migratory species which require or would benefit from international cooperation (listed in Appendix II), and by

[2] In England and Wales: the Conservation of Habitats and Species Regulations 2017 (as amended).
In Scotland: the Conservation (Natural Habitats &c.) Regulations 1994 (as amended).
In Northern Ireland: the Conservation (Natural Habitats, &c) Regulations (Northern Ireland) 1995 (as amended). .
In the UK offshore area: the Conservation of Offshore Marine Habitats and Species Regulations 2017 (as amended).

undertaking cooperative research activities. The UK Government ratified the Bonn Convention in 1985. The current legally-binding Agreements under the Convention include EUROBATS[3].

The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) 1979
https://www.coe.int/en/web/bern-convention

The principal aims of the Bern Convention 1979 are to ensure the conservation and protection of wild plant and animal species and their natural habitats (listed in Appendices I and II of the Convention), to increase cooperation between contracting parties, and to regulate the exploitation of those species (including migratory species) listed in Appendix III. To this end, the Bern Convention imposes legal obligations on contracting parties, protecting over 500 wild plant species and more than 1,000 wild animal species. The UK Government ratified the Bern Convention in 1982.

National Legislation

The following pieces of domestic legislation apply to biodiversity protection in the UK.

The Wildlife and Countryside Act (WCA) 1981
https://www.legislation.gov.uk/ukpga/1981/69

The Wildlife and Countryside Act 1981 (as amended) is the primary piece of legislation relating to nature conservation in the UK, though it has been adapted in different ways in the devolved administrations. It was initially enacted to implement the Bern Convention, Bonn Convention and the Birds Directive (described above).

The act is supplemented by provisions in the Countryside and Rights of Way (CRoW) Act 2000 and the Natural Environment and Rural Communities (NERC) Act 2006, and extended in Scotland by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2011). Its equivalent in Northern Ireland is the Wildlife (Northern Ireland) Order 1985 (as amended and similarly extended). In addition to the Habitat Regulations (described below), the WCA provides protection for species listed in Schedules 1 (birds), 5 (other animals) and 8 (plants) of the Act. It provides for the notification and confirmation of Sites of Special Scientific Interest (SSSIs) in England and Wales[4]. It also sets out, in other schedules, important and invasive species which are legally protected or require management.

All species of bird are protected under the WCA. The legislation makes it an offence to intentionally:

a) kill, injure or take any wild bird;
b) take, damage, or destroy the nest of any wild bird while that nest is in use or being built; or
c) take or destroy an egg of any wild bird.

Those species of birds listed on Schedule 1 of the WCA are afforded additional protection, which deems it an offence to intentionally or recklessly:

[3] More information available at https://jncc.gov.uk/our-work/agreement-on-the-conservation-of-populations-of-european-bats-eurobats

[4] Duty replaced by the Nature Conservation (Scotland) Act 2004 (as amended) and the Nature Conservation and Amenity Lands (Northern Ireland) Order 1985 (as amended) in those countries.

a) disturb any wild bird included in Schedule 1 while it is building a nest or is in, on or near a nest containing eggs or young; or
b) disturb dependent young of such a bird.

Under Section 9 of the WCA, for animals listed on Schedule 5, it is an offence in England and Wales to intentionally or recklessly:

kill, injure or take any wild animal listed on Schedule 5;
possess or control any live or dead those wild animals or anything derived from it;
damage or destroy any structure or place which wild animals listed on Schedule 5 uses for shelter or protection;
disturb any such animal while it is occupying a structure or place of shelter or protection;
obstruct access to any structure or place used by any such animal for shelter or protection; and
sell, offer or expose for sale, or have in their possession or transports for the purpose of sale, any live or dead wild animal listed on Schedule 5 or any part of, or anything derived from such an animal.

In addition to EPS, species commonly found on development sites include water voles (*Arvicola amphibius*) and widespread species of reptiles: common lizard (*Zootoca vivipara*); slow-worm (*Anguis fragilis*); grass snake (*Natrix helvetica*); and adder (*Vipera berus*). These four reptile species receive partial protection, which prevents the intentional or deliberate killing and injuring of reptiles or offering them for sale.

Section 14(2)[5] states that it is an offence to plant or otherwise cause to grow any plant in the wild at a place outside its native range.

There is no provision within the Act for derogation licences to be issued for the purposes of development, although Section 10 provides a defence in cases that may be considered to be: *"the incidental result of a lawful operation and could not reasonably have been avoided"* if certain conditions are met.

Section 16(i) of the Act does make provision for derogation licences to be issued *"for the purposes of preserving public health or public … safety"*. For confirmation of this, it would be appropriate to consult the relevant statutory nature conservation body (SNCB)[6].

The Conservation of Habitats and Species Regulations (Habitat Regulations) 2017 https://www.legislation.gov.uk/uksi/2017/1012 England and Wales

The Habitats Regulations 2017 consolidated the various amendments made to the 1994 Habitat Regulations, which were developed to implement the Birds Directive and Habitats Directive (see above) at a national level, though this consolidation only applies in England and Wales. As noted above, in Scotland and in Northern Ireland, the original versions of the Regulations in each region have been retained and amended to include protections for EPS that were initially provided under the WCA (or its equivalent).

The Regulations (as amended) provide for the designation and protection of the national site network (formerly 'Natura 2000 sites'), the adaptation of planning and other controls for those sites, and the protection of EPS (listed on Schedules 2 and 5).

5 In Scotland, as amended by Section 14 of the Wildlife and Natural Environment (Scotland) Act 2011.

6 SNCBs are - in England: Natural England; in Wales: Natural Resources Wales; in Scotland: NatureScot; in Nortern Ireland: Department of Agriculture, Environment and Rural Affairs (DAERA).

The 2017 Regulations (England and Wales, Reg. 43) deems it an offence to:

a) deliberately capture, injure or kill a wild animal of a EPS,
b) deliberately disturb wild animals of any such species,
c) deliberately take or destroy the eggs of such an animal, or
d) damage or destroy a breeding site or resting place of such an animal.

For the purposes of paragraph (b), disturbance of animals includes in particular any disturbance which is likely to:

a) impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
b) to affect significantly the local distribution or abundance of the species to which they belong.

There are also restrictions on transport, possession and sale.

It is possible to obtain a derogation licence from the relevant SNCB[6] to permit activities which would otherwise contravene the regulations above, including for development purposes, when certain conditions are met. Failure to satisfy the Regulations and obtain a licence where required could result in prosecution and lead to fines and possible imprisonment.

Currently (2021), all EPS are also listed on Schedule 5 of the WCA (outlined above), as it applies in England and Wales. EPS often encountered on development sites include GCN (*Triturus cristatus*), all species of bats, dormice (*Muscardinus avellanarius*) and otters (*Lutra lutra*).

Countryside and Rights of Way Act 2000
https://www.legislation.gov.uk/ukpga/2000/37

The Countryside and Rights of Way (CRoW) Act 2000 provides for public access on foot to certain land types, amends the law for public rights of way, increases protection for SSSIs, and strengthens wildlife enforcement legislation. It applies only in England and Wales.

The Natural Environment and Rural Communities (NERC) Act 2006; The Environment (Wales) Act 2016
https://www.legislation.gov.uk/ukpga/2006/16

The Natural Environment and Rural Communities (NERC) Act 2006, Section 40 requires that any public body or statutory undertaker in England must have regard to the purpose of conservation of biological diversity in a manner that is consistent with the exercise of their normal functions. This may include enhancing, restoring or protecting a population or a habitat. The intention is to help ensure that biodiversity becomes an integral consideration in the development of policies, and that decisions of public bodies work with the grain of nature and not against it. In Wales, a similar duty has been moved to Section 6 of the Environment (Wales) Act 2016.

As part of this duty, statutory undertakers must have regard to the list of habitats and species which are of principal importance for the purpose of maintaining and enhancing biodiversity. For England, the duty to compile such a list is captured under Section 41 of the NERC Act; in

Wales, under Section 7 of the Environment (Wales) Act. The lists for England are accessible online via the National Archive[7]; for Wales via https://www.biodiversitywales.org.uk/.

The Hedgerows Regulations 1997
https://www.legislation.gov.uk/uksi/1997/1160/made

The Hedgerows Regulations 1997 provide protection for 'important' hedgerows for which replanting is not a substitute. The 'importance' of a hedgerow depends upon several archaeological, wildlife and landscape criteria (which are outlined in the Regulations). The regulations deem it an offence to remove an 'important hedgerow' without prior notification to the relevant local planning authority.

Protection of Badgers Act 1992
https://www.legislation.gov.uk/ukpga/1992/51

Badgers and their setts are protected under the Protection of Badgers Act 1992 (England, Wales and Scotland). The key part of this legislation in relation to the proposed development are in Section 3, which deems it an offence to:

a) damage a badger sett or any part of it;
b) destroy a badger sett;
c) obstruct access to, or any entrance of, a badger sett;
d) disturb a badger when it is occupying a badger sett,
e) intend to do any of those things or be reckless as to whether those actions would have any of the consequences listed above.

Derogation licences may be obtained from the relevant SNCB[6] under Section 10 of the Act for the purpose of development, to permit activities which would otherwise be unlawful.

Note: there are additional provisions relating to badgers under the WCA Section 11 (Prohibition of certain methods of killing or taking wild animals).

The Wild Mammals (Protection) Act 1996
https://www.legislation.gov.uk/ukpga/1996/3

All wild mammals are protected by The Wild Mammals (Protection) Act 1996 (as amended). This makes it an offence to mutilate, kick, beat, nail, or otherwise impale, stab, burn, stone, crush, drown, drag or asphyxiate any wild mammal.

Invasive Alien Species (Enforcement and Permitting) Order 2019
(https://www.legislation.gov.uk/uksi/2019/527/contents/made)

The Invasive Alien Species (Enforcement and Permitting) Order applies principally in England and Wales and the UK's offshore marine area, but also controls imports and exports from the UK (including Scotland and Northern Ireland). It lists species of concern which cannot be imported, kept, bred/grown, transported, sold, used, allowed to reproduce, or released into the environment. This Order replaces some elements relating to invasive species in the Wildlife and Countryside Act 1981 (as amended).

National, regional and local policy and guidance of relevance

Planning policy relating to ecology and nature conservation is set out below.

7 https://webarchive.nationalarchives.gov.uk/ukgwa/20140712055944/http:/www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/habsandspeciesimportance.aspx

National Planning Policy Framework 2021

Access via: https://www.gov.uk/government/publications/national-planning-policy-framework--2

The National Planning Policy Framework (NPPF) sets out the Government's planning policy in England at the national level. It does not contain specific policies for nationally significant infrastructure projects, which are determined in accordance with the decision-making framework in the Act and relevant National Policy Statements for major infrastructure, as well as any other matters that are relevant (which may include the NPPF). Section 15 (paragraphs 174-188) of the NPPF specifies the requirements for conserving and enhancing the natural environment through the planning and development process to minimise impacts on habitats and biodiversity.

Planning Practice Guidance

Accessed via: https://www.gov.uk/government/collections/planning-practice-guidance

The Planning Practice Guidance is a web-resource to support the NPPF, including guidance for Environmental Impact Assessments (https://www.gov.uk/guidance/environmental-impact-assessment) and the Natural Environment (https://www.gov.uk/guidance/natural-environment). The guidance for the Natural Environment explains key issues in implementing the NPPF to protect and enhance the natural environment, including local requirements. The guidance outlines what evidence needs to be taken into account in preparing planning applications to identify and map local ecological networks. It also outlines how biodiversity can be taken into account in preparing a planning application.

Government's 25-Year Environment Plan 2018

Accessed via: https://www.gov.uk/government/publications/25-year-environment-plan

The Government's 25-Year Environment Plan 2018 sets out how the UK Government intends to improve the natural health of the UK through improving land, air and water quality, as well as setting out how the effects of climate change will be tackled. The plan promotes the creation or restoration of wildlife-rich habitat outside the protected site network and seeks to recover threatened, iconic or economically important species of animals, plants and fungi, and where possible to prevent human induced extinction or loss of known threatened species in England. The plan sets out a number of goals and corresponding policies that look at managing land sustainably, improving and enhancing landscapes and biodiversity for both marine and terrestrial environments, improving resource efficiency and reducing waste and pollution, whilst also examining the UK's contribution to improving the global environment.

Cheshire West and Chester Local Plan (Part One) Strategic Policies 2015

Accessed via: https://consult.cheshirewestandchester.gov.uk/kse/event/24907/section/1419339111266#1419339111266

Cheshire West and Chester's Local Plan contains Policy ENV 4 Biodiversity and geodiversity which sets out measures to safeguard and enhance biodiversity through the identification and protection of sites and/or features of international, national and local importance. Sites will be protected from loss or damage taking into account the hierarchy of designations, the irreplaceability of habitats, sites and/or features and their contribution to the borough's ecological network, and the impact on priority habitats and protected/priority species.

Development should not result in a net loss of natural assets and should seek to provide net gains.

Annex 4

Frodsham Renewable Energy Development Water Vole Survey Report (RSK Biocensus, 2023)

Peel Cubico Renewables Limited

Frodsham Renewable Energy Development

Water Vole Habitat Assessment Report

2483418

JANUARY 2023

RSK biocensus
EXPERTS IN ECOLOGY

RSK GENERAL NOTES

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Author	Emily Clark	Technical & quality reviewer	Will Holden
Signature	[redacted]	Signature	[redacted]
Date:	30 January 2023	Date:	30 January 2023

Project manager	Will Holden
Signature	[redacted]
Date:	30 January 2023

Switchboard: +44 (0)330 223 1074 Company contact: Enquiries@biocensus.co.uk

EXECUTIVE SUMMARY

This report presents the findings of water vole (*Arvicola amphibius*) habitat assessment carried out at the Frodsham renewable energy development site, Frodsham to understand the potential impact on water voles as a result of any future development at the site.

The site is *c*.285 ha and contains predominantly marshy grassland (grazed by sheep and cattle), agricultural grassland fields and arable land with a grid of interconnected ditches forming the field boundaries. A large portion of the western section of the site is also utilized as a wind farm. The development area is located to the north-west of the M56 motorway and 200m north-west of the town of Frodsham. The site is bordered by the Manchester Ship Canal and River Weaver to the north and east and the M56 motorway and Frodsham to the south.

Areas of potential suitable habitat were identified during the ecological walkover, undertaken between 22 and 24 March 2022, including 36 ditches and 9 waterbodies. The suitability of the ditches and waterbodies for water voles was subsequently assessed between 5 and 6 April 2022.

13 records of water voles, located within or immediately adjacent the proposed site boundary were returned from the records centre. The records were from between 2001 – 2013 and included records for burrow, field record, latrine, run and feeding remains, indicating that water voles are present on the site.

The habitat suitability assessment identified 22 ditches and 5 waterbodies with suitability to support water voles. One ditch has been assessed as optimal suitability while 16 (12 ditches and 4 waterbodies) have been assessed as good suitability and 10 (nine ditches and one waterbody) have been assessed as suitable but poor. The remaining three waterbodies and 13 ditches have been assessed as having negligible suitability to support water vole.

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1.0 INTRODUCTION

1.1 Purpose of this report

1.1.1 This report presents the results of water vole (*Arvicola amphibius*) habitat assessment survey carried out at the Frodsham Renewable Energy Development site, Frodsham, Cheshire; to understand the suitability of the habitat on the site for water voles.

1.1.2 The survey was required to understand the constraints posed by water voles and how they may be affected, by any future development.

1.2 Landscape context

1.2.1 The site is *c*.285 ha and contains predominantly marshy grassland (grazed by sheep and cattle), agricultural grassland fields and arable land with a grid of interconnected ditches forming the field boundaries. A large portion of the western section of the site is also utilized as a wind farm. The development area is located to the north-west of the M56 motorway and 200m north-west of the town of Frodsham. The site is bordered by the Manchester Ship Canal and River Weaver to the north and east, and the M56 motorway and Frodsham to the south.

2.0 METHODS

2.1 Background data search

2.1.1 A record request was submitted to Record – The Biodiversity Information System for Cheshire, Halton, Warrington and Wirral in March 2022 as part of the preliminary ecological appraisal. The search included records for water voles and American mink (*Neovison vison)* within 1km of the site boundary.

2.2 Habitat assessment

2.2.1 Areas of potential suitable habitat were identified during the ecological walkover, undertaken by Emily Clark and Shona Redman between 22 and 24 March 2022, including 36 ditches and 9 waterbodies. Emily is a senior ecological consultant with over six years' experience in ecological consultancy. She is an associate member of CIEEM and has botanical skills rated at Field Identification Skills Certificate (FISC) level 4.

2.2.2 The value of the ditches and waterbodies for water voles was subsequently assessed for their suitability to support water vole between 5 - 6 April 2022 by Emily Clark and Adam Penney using the criteria detailed within *Table 1* below.

2.2.3 The 36 ditches and 9 ponds were identified on the site during the ecological walkover, undertaken between 22 – 24 March 2022. On Figure 2, the ponds have been labeled waterbodies (W1 - W9) while the ditches are labelled ditches (D1 – D36), see Figure 1 for pond and ditch locations.

Table 1: Criteria for assessing the value of habitat for water voles (Dean 2021)

Habitat category	Dry areas for burrows or nests			Herbaceous vegetation	Water
	Bank profile	Bank substrate	Variation in water level		
Optimal (all criteria need to be met)	Steep (approaching 1:1) on at least one side of a watercourse. Steep or shallow on static waterbodies or fen-type habitat.	Earth or peat	No noticeable variation during the summer months; banks are not overtopped regularly.	Continuous swathe of tall and luxurious riparian vegetation providing 90 – 100% cover on the banks (tall tussocky grassland) and marginal / in channel vegetation is present (emergent species)	Permanent water
Good (all criteria	Steep (approaching 1:1) on at least	Earth or peak banks, or stony /	No noticeable variation during the	Continuous swathe of bankside or in-channel (emergent) vegetation	Permanent water. Or routinely wet for

need to be met)	one side of a watercourse. Steep or shallow on static waterbodies or fen-type habitat.	reinforced bank with gaps allowing access to the earth behind	summer months; banks are not overtopped regularly.	providing at least 60% ground cover. May be dominant by grasses and weeds rather than luxurious riparian vegetation. The vegetation should generally be tall, except in urban or suburban areas, where shorter bankside vegetation may also qualify.	at least 2-3 months during the summer, and where other 'good' habitat is present in immediately adjacent areas with permanent water.
Suitable but poor	Any habitat that falls short of the criteria to qualify as 'good' but does not meet the criteria of 'negligible' value could reasonably be considered to be 'suitable but poor'				
Negligible (will generally need to meet the criteria for herbaceous vegetation and at least one other)	Shallow profile on both banks	Rocky or gravel, unsuitable for burrowing	Considerable variation in water level – the bank toe can move by more than 1m horizontally over the breeding season	No or limited bankside and marginal vegetation (due to shading or other 'permanent factors – note that management can change and is often a 'temporary' factor).	N/A
	Vertical bank face with no burrowing opportunities behind it	Reinforced banks with no gaps	n/a		

a. Overtopping once every 5–10 years is likely to be too frequent in most cases; overtopping less frequently than this may also be problematic for water voles.

2.3 Constraints and limitations

2.3.1 Some ditches and stretches of bank were inaccessible from land and/or the ditch channel due to various constraints including dense vegetation, and steep banks. Furthermore, a large section of one ditch (D30, see Figure 1) was not surveyed due to land access constraints. However, sufficient information was gathered to assess the ditches suitability to support water vole, with a precautionary approach taken where necessary. Therefore, this is not considered to be a significant limitation to the survey.

3.0 RESULTS

3.1 Desk study

3.1.1 A record search for within 1km of the proposed site boundary was undertaken in March 2022, which included a search for water vole records. 32 records for water vole were returned, including 15 which were located within or immediately adjacent to the proposed site boundary. The records were from between 2001 – 2015 and included records for burrow, field record, latrine, run and feeding remains, see Figure 1 for further details.

3.2 Habitat assessment

3.2.1 Habitat assessments were undertaken in April 2022 for Ditches 1 – 36 and waterbodies 1 – 9. The ditches and waterbodies vary in their condition including both wet and dry ditches and a range of vegetation densities and types. The habitat suitability assessment identified 22 ditches and 5 waterbodies with suitability to support water voles. One ditch has been assessed as optimal suitability while 16 (12 ditches and 4 waterbodies) have been assessed as good suitability and 10 (nine ditches and one waterbody) have been assessed as suitable but poor. The remaining three waterbodies and 13 ditches have been assessed as having negligible suitability to support water vole. A summary of the assessment for each ditch and waterbody is provided in *Table 2* below, with detailed results and photographs provided in Appendix B and the location of each ditch and waterbody provided on Figure 2.

Table 2: Water vole habitat assessment

Id	Habitat Assessment	Suitability
Ditch 1	Both banks are shallow and sloping, earth substrate. *c.*1m wide, depth is *c.* 20cm. One bank is densely shaded by a line of trees while the other bank dominated by dense Bramble scrub. Some small patches of emergent vegetation dominated by Common Reed and small areas of bare ground below trees. The ditch may dry but likely to be wet for most of year due to number of Common Reed present.	Suitable but poor
Ditch 2	One bank is shallow while the southern bank is steep. Continuous bankside vegetation, some sections are densely shaded by scrub and overhanging trees, but open sections have rough grassland, ruderal and scrub vegetation. Permanent ditch and unlikely to be significant variation in water levels. Filamentous algae present and large sections of the southern bank poaches by livestock.	Good
Ditch 3	Both banks are steep, earth substrate. Variation in water level is *c.*5cm. The ditch is heavily shaded due to continuous bankside vegetation, dense scrub and overhanging trees make it very shaded. There was limited water present and is considered likely to dry in summer.	Negligible
Ditch 4	Both banks shallow. Water depth varies from 5cm – 30cm and is considered likely to dry in the summer. Large sections of bank bare, other sections vegetated with scrub and Common Nettle (*Urtica dioica*). Small 1m sections of Common Reed vegetation were present. The majority of the ditch is heavily shaded with limited vegetation on banks. No mammal holes observed.	Negligible

Ditch 5	Both banks are steep, earth substrate. Water depth *c.* 10 – 20cm. One bank has large sections which are bare and heavily shaded from adjacent dense scrub. Other bank has dense scrub and ruderal vegetation present. Limited emergent vegetation present and no in channel vegetation present. Permanent, dries sometimes. Small burrows noted on one bank, resurvey to confirm if water vole or not.	Good
Ditch 6	Both banks are steep, earth substrate. Depth *c.* 5cm Some sections of the banks are bare, while other sections have overhanging grasses, scrub and ruderal species. No in channel vegetation and emergent vegetation limited to occasional Common Reed (*Phragmites australis*). Some sections likely to dry in summer. *c.* 3 shallow burrows observed on western bank at SJ51817898. Some evidence of pollution in water. Record of WV from 2009.	Good
Ditch 7	Both banks are steep, earth substrate. Water is permanent, significant variation in water level is considered unlikely. Continuous swathe of bankside vegetation, dominated by dense scrub and tall ruderal species. Limited riparian vegetation present. Small mammal paths in vegetation, leading to ditch and potential burrows noted. No in channel vegetation present. Water blue / grey in colour.	Good
Ditch 8	Shallow, sloping banks. Earth substrate. Water is permanent, significant variation in water level considered unlikely. Continuous swathe of bankside vegetation present, dominated by dense scrub, grasses and ruderal vegetation. Emergent vegetation limited and no in channel vegetation present. Some sections have bare earth where ditch is densely shaded and water levels fluctuate along the ditch. A small number of potential mammal burrows were observed along the ditch.	Good
Ditch 9	Steep banks and earth substrate. Water is permanent, significant variation in water level considered unlikely. Continuous swathe of bankside vegetation present, dominated by dense scrub, grasses and ruderal vegetation. Emergent vegetation limited and no in channel vegetation present. Water possibly polluted, blue-green colour. Record of WV from 2009.	Suitable but poor
Ditch 10	Shallow banks, earth substrate. Water is permanent, significant variation in water level considered unlikely. Continuous swathe of bankside vegetation present, by rough grassland. Emergent and in channel vegetation limited to Reed Canary-grass (*Phalaris arundinacea*). Numerous mammal burrows identified along banks of ditch, but no droppings or feeding remains found.	Optimal
Ditch 11	Steep banks, earth substrate. Water is permanent, significant variation in water level considered unlikely. Continuous swathe of bankside vegetation present, dominated by dense scrub, grasses and ruderal vegetation. Emergent vegetation limited and no in channel vegetation present. Water possibly polluted, blue-green colour. A large proportion of the ditch is heavily shaded. Small number of small mammal paths observed leading into ditch.	Suitable but poor
Ditch 12	Steep banks, *c.* 1m high. Earth substrate. Water is permanent, significant variation in water level considered unlikely. Continuous swathe of vegetation present but dominated by Common Reeds with scattered areas with rough grasses, scrub and tall ruderal.	Good

Ditch 13	Steep banks. Earth substrate. Water is permanent, significant variation in water level considered unlikely. Continuous swathe of vegetation present but dominated by Common Reeds with scattered areas with rough grasses, scrub and tall ruderal vegetation.	Good
Ditch 14	Steep banks, earth substrate. Ditch is dammed so variation in water levels is possible. Continuous vegetation along banks and in channel vegetation dominated by Common Reed. Likely to hold water for at least 2- 3 months in summer.	Good
Ditch 15	Steep banks, bare earth substrate. Depth *c.* 5 – 10cm, likely to dry out in summer. One bank bare. In channel vegetation limited to Common Reed. Other bank covered with ruderal and scrub vegetation. Very heavily shaded	Negligible
Ditch 16	Steep banks. Bare earth substrate. Depth *c.* 5 – 20cm, likely to dry out in summer. One bank bare. In channel vegetation limited to Common Reed. Other bank covered with ruderal and scrub vegetation. Very heavily shaded.	Negligible
Ditch 17	Steep bank on both sides, earth substrate. Continuous vegetation on both banks, only emergent vegetation present is Common Reed and Reed Canary-grass. Other vegetation including grasses and ruderal species likely to be tall in summer. Water level varies from dry – 20cm but emergent and grassy vegetation present throughout Suitable but poor as likely to dry in summer and not well connected to areas of permanent water.	Suitable but poor
Ditch 18	Shallow banks, bare earth substrate. Depth *c.* 5cm Marginal vegetation limited to Common Reed, other vegetation limited to grasses and ruderal. Water levels likely to fluctuate and dry in summer. Ditch shaded by adjacent scrub, Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*) and Willow (*Salix* spp.).	Negligible
Ditch 19	Banks are variable from steep to shallow, earth substrate. Depth 10 – 30cm. Continuous swathe of swamp vegetation, dominated by Common Reed. Some sections of rough grasses and tall ruderal vegetation. Scattered Bramble. Likely to hold some water for proportion of the year, but may be shallow. Small sections covered with dense scrub and densely shaded. Record of WV from 2009 and record of American mink from 2001.	Good
Ditch 20	Steep bank on both sides, earth substrate. Continuous vegetation on both banks, only emergent vegetation present is Common Reed and Reed Canary-grass. Other vegetation includes grasses and ruderal species which are likely to be tall in summer. Water level varies from dry – 20cm but emergent and grassy vegetation present throughout Suitable but poor as likely to dry in summer and not well connected to areas of permanent water.	Suitable but poor
Ditch 21	Shallow banks, bare earth substrate. Depth *c.* 5cm. Continuous bankside vegetation, dense scrub and overhanging trees. Very densely shaded and difficult to access. Water levels likely to fluctuate and dry in summer.	Negligible

Ditch 22	Steep banks on both sides, earth substrate. Depth *c.* 20cm. Continuous vegetation on both banks, only emergent vegetation present is Common Reed and Reed Canary-grass. Other vegetation includes grasses and ruderal species which are likely to be tall in summer. Variable water depth from 5cm – 20cm. Majority of the ditch is considered likely to dry out in summer, small sections where water deeper and Water-starwort (*Callitriche sp.*) present. Some sections of ditch densely shaded by adjacent scrub (Hawthorn and Blackthorn).	Suitable but poor
Ditch 23	Steep banks, earth substrate. Not noticeable but sections may dry in summer. Continuous vegetation on both banks, only emergent vegetation present is Common Reed and Reed Canary-grass. Majority of bank covered with dense scrub. Other vegetation includes grasses and ruderal species which are likely to be tall in summer. Variable water depth *c.* 20 – 30cm, sections may dry in summer. A large section is shaded by adjacent hawthorn scrub.	Suitable but poor
Ditch 24	Shallow banks, earth substrate. Not noticeable but sections may dry in summer and may overtop in winter. Bankside vegetation limited to Common Nettle and Hogweed (*Heracleum sphondylium*). Variable water depth but dammed so likely to contain water for most of year. Ditch has 100% shade	Negligible
Ditch 25	Shallow banks, earth substrate. Shallow, *c.* 10 – 30cm. Continuous vegetation with Common Reed, Reed Canary-grass dominant. Some sections densely shaded by dense bramble scrub. Water levels likely to fluctuate throughout year.	Suitable but poor
Ditch 26	Shallow banks on both sides, earth substrate. Very shallow *c.*. 5cm in depth, likely to dry out in summer. Continuous scrub vegetation on both banks. Other vegetation includes grasses, Common Nettle and Willowherb (*Epilobium* sp). Densely shaded with no 'open water' sections. *c.* 0.5m wide of water.	Negligible
Ditch 27	Both banks steep, earth substrate. Water is permanent, possible large variations in water level. Continuous swathe of bankside vegetation present but limited emergent vegetation (only Common Reed and Reed Canary-grass) but tall ruderal species present including Common Nettle, Lesser Celandine (*Ficaria verna*), Cow Parsley (*Anthriscus sylvestris*). Ditch has culverts from surrounding fields and noticeable water line indicating changing water levels throughout the year. Several records of WV.	Good
Ditch 28	Both banks are steep, earth substrate. Water is permanent, significant variation in water level considered unlikely. Continuous swathe of bankside vegetation present, mix of rough grassland, scrub and swamp vegetation present. Species include Common Reed, Lesser Celandine, Meadowsweet (*Filipendula ulmaria*) and Cow Parsley. Only in channel vegetation present is Common Reed. Some sections of ditch choked with Common Reed. Emergent vegetation diversity very limited and dominated by Common Reed.	Good

Ditch 29	Both banks are shallow, earth substrate. Considered likely to dry out regularly in summer. Depth *c.* 20cm. One bank densely shaded by line of trees while the other bank is dominated by dense Bramble scrub. Some small patches of emergent vegetation dominated reed and small areas of bare ground below trees. Banks densely shaded. Permanent wet but surrounding habitat poor, adjacent footpath and poor semi-improved field. *c.* 1m wide but very shallow water and heavily shaded on both sides of the bank. Small sections open up for *c.* 1 – 2m.	Suitable but poor
Ditch 30	Large portion cannot be surveyed as located within land don't have access too. Ditch connected to W1 and D28 via culverts. Section visible continuous swamp vegetation dominated by Common Reed. Three records for WV returned. Taking into account the records, section that is visible and assessment of W1 and D28 considered likely to be 'good' for water vole.	Good
Ditch 31	Majority has shallow banks but small section has steep banks, continuous swamp (Common Reed) or scrub vegetation throughout. Large sections dry and densely poached by sheep and cattle.	Negligible
Ditch 32	Shallow banks on both sides, continuous swamp (Common Reed) or scrub vegetation throughout. Large sections dry and densely poached by sheep and cattle.	Negligible
Ditch 33	Steep banks, large sections with limited, grazed vegetation. Some sections with swamp (Common Reed) or scrub vegetation. Large sections dry and poached by sheep and cattle.	Negligible
Ditch 34	Shallow banks on both sides, continuous scrub vegetation throughout. Large sections dry and densely shaded.	Negligible
Ditch 35	Shallow banks on both sides, continuous scrub vegetation throughout. Large sections dry and densely shaded.	Negligible
Ditch 36	Shallow banks on both sides, the ditch has a depth of c.5cm so does not provide suitable burrowing habitat. The only aquatic or emergent vegetation present is Common Reed. The ditch has been poached by livestock and likely to dry in summer	Negligible
Waterbody 1	Steep on both sides, earth substrate. Possibly a sluice present on eastern end to manage water levels. Continuous vegetation on bankside, limited within channel. Vegetation varies from emergent (dominated by Common Reed and Bulrush (*Typha latifolia*)), to rough grassland / ruderal and dense scrub. Permanent water No in channel vegetation present. Records of WV from 2007 and 2009.	Good
Waterbody 2	Banks have shallow profile, earth substrate. Water is permanent, significant variation in water level considered unlikely. Pond with marginal species present including Soft-rush (*Juncus effusus*), Common Reed, Common Bullrush (*Typha latifolia*), Reed Canary-grass , Amphibious Bistort (*Persicaria amphibia*) and Sweet Grass (*Glyceria sp.*) present. Evidence of mammal feeding remains of reed sweet grass observed within pond. No '45 degree' angle observed though. Herbaceous vegetation not considered to be diverse to be considered 'optimal' habitat and no banks for burrowing.	Good
Waterbody 3	Shallow bank on southern side of pond, earth substrate. Variation in water likely, considered likely to dry in summer. Marginal vegetation limited to Soft-rush scattered throughout the pond. Pond used by large number of waterfowl.	Negligible

Waterbody 4	Shallow banks, earth substrate. Significant variation in water level considered unlikely. Considered likely to dry in summer. Marginal vegetation limited to Soft-rush and Reed Canary-grass. Small number of other aquatic species present including Water-starwort, Gypsywort (*Lycopus europaeus*) and Water-plantain (*Alisma plantago-aquatica*)). Pond used by number of waterfowl.	Good
Waterbody 5	Shallow banks, earth substrate. Water is permanent, significant variation in water level considered unlikely. Marginal vegetation limited to Soft-rush, Reed Canary-grass and Amphibious Bistort.	Good
Waterbody 6	Shallow / no banks, earth substrate. Likely to dry in summer. Marginal vegetation limited to sweet grass species and Soft-rush and other grasses. Ephemeral scrape rather than pond.	Negligible
Waterbody 7	Shallow / no bank, earth substrate. Water is permanent, significant variation in water level considered unlikely. Vegetation present within pond and at edge, but diversity limited; Soft-rush, Brooklime (*Veronica beccabunga*), Water-starwort, New Zealand Pigmyweed (Crassula helmsii), Bulrush, Amphibious Bistort and Sweet-grass (*Glyceria* sp) species. Not luxurious riparian but suitable emergent vegetation. New Zealand Pigmyweed present within pond.	Good
Waterbody 8	No bank profile, earth substrate. *c.* 5 – 10cm in depth, likely to dry out in summer Grasses and rushes present along edge and within pond, low diversity in species.	Negligible
Waterbody 9	No bank profile, earth substrate, with a depth of c. 5cm and is utilised by a number of waterfowl. The waterbody is a large ephemeral scrape utilised by a number of waterfowl. No aquatic or emergent vegetation was recorded within the waterbody.	Negligible

4.0 EVALUATION AND CONCLUSIONS

4.1 General

4.1.1 The habitat suitability assessment identified 22 of the 36 ditches and 5 of the 9 waterbodies have suitability to support water voles. One ditch (D10) has been assessed as optimal suitability while 12 ditches (D2, D5, D6, D7, D8, D12, D13, D14, D19, D27, D28, D30) and four waterbodies (W1, W2, W5, W7) have been assessed as good suitability. Nine ditches (D1, D9, D10, D11, D17, D20, D22, D23, D25, D29) and one waterbody (W4) have been assessed as suitable but poor and a further 11 ditches (D3, D4, D15, D16, D18, D21, D24, D26, D31, D33, D34, D35, D36) and four waterbodies (W3, W6, W8, W9) have been assessed as having negligible suitability to support water vole.

4.1.2 It should also be noted that New Zealand Pigmyweed (*Crassula helmsii*) was recorded within W7. This species is non-native invasive species listed on Schedule 9 of the Wildlife and Countryside Act 1981 (as amended).

REFERENCES

Chartered Institute of Ecology and Environmental Management (2013), Technical Guidance Series, Competencies for Species Survey: Water Vole. CIEEM, Winchester, Hampshire.

Dean, M. (2021) *Water Vole Field Signs and Habitat Assessment: A Practical Guide to Water Vole Surveys*. Pelagic publishing

Dean, M., Strachan, R., Gow, D. and Andrews, R. (2016) *The Water Vole Mitigation Handbook (The Mammal Society Mitigation Guidance Series).* Eds Fiona Matthews and Paul Chanin. The Mammal Society, London

FIGURES

Figure 1 – Water vole records

Figure 2 – 2022 Water Vole Survey Results

Figure 1 – Water vole records

347000 347500 348000 348500 349000 349500 350000 350500 351000 351500 352000 352500 353000 353500 354000 354500 355000

382000 381500 381000 380500 380000 379500 379000 378500 378000 377500 377000 376500 376000 375500

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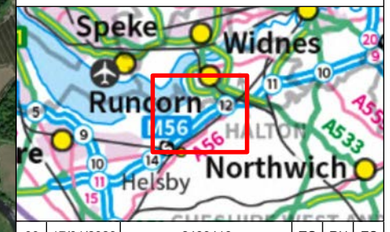
- 1km Site Buffer
- 2km Site Buffer

Desk Study Records

- American Mink [4]
- European Water Vole [50]



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Frodsham Renewable Energy Development

RSK biocensus
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Water Vole Records

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Figure 2 – 2022 Water Vole Survey Results

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Water Vole Survey Assessment

Good

Negligible

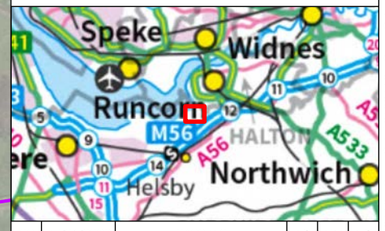
Suitable But Poor

Good

Negligible

Optimal

Suitable But Poor



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379200 379000 378800 378600 378400 378200 378000

D33 D32 D31 D27

Legend:

Site Boundary

Water Vole Survey Assessment

Good

Negligible

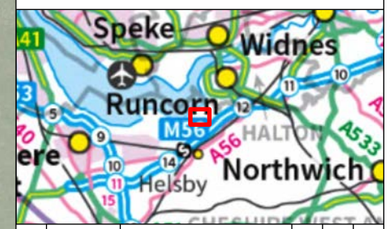
Suitable But Poor

Good

Negligible

Optimal

Suitable But Poor



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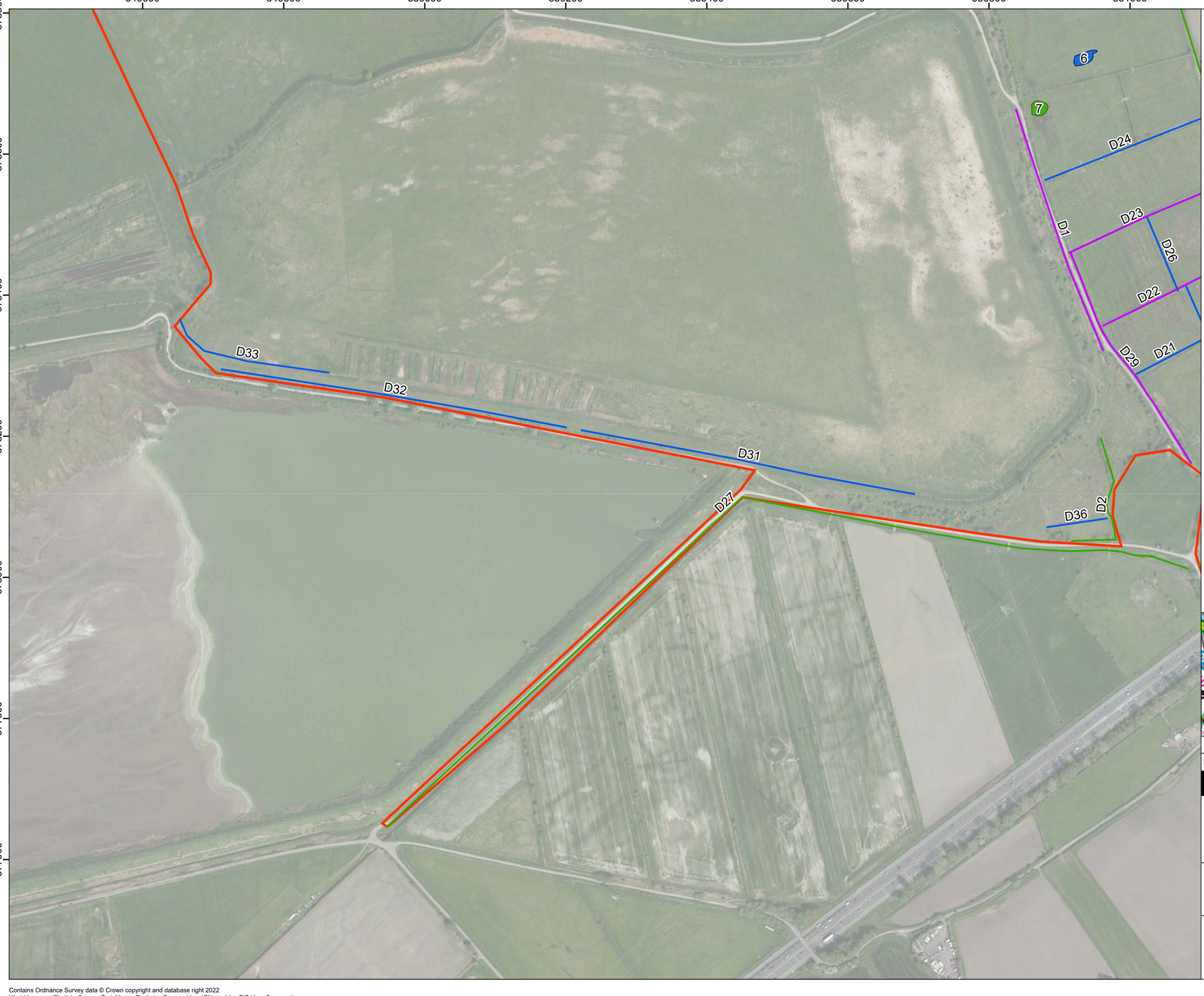

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Water Vole Survey Assessment

- Good
- Negligible
- Suitable But Poor
- Good
- Negligible
- Optimal
- Suitable But Poor

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Frodsham Renewable Energy Development

RSK biocensus
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1 2 3 4 5 6 7 8

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Water Vole Survey Assessment

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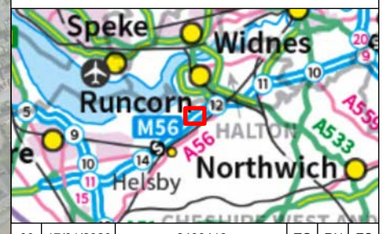
- Negligible
- Suitable But Poor
- Good
- Negligible
- Optimal
- Suitable But Poor



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Frodsham Renewable Energy Development

RSK biocensus EXPERTS IN ECOLOGY

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Water Vole Survey Assessment

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- Negligible
- Suitable But Poor
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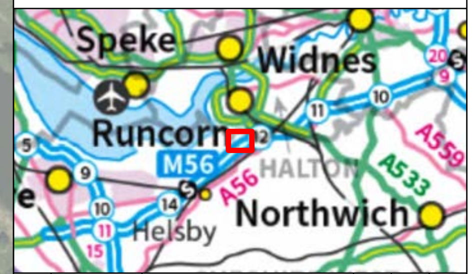

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Frodsham Renewable Energy Development

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APPENDIX A – WATER VOLE SURVEY RESULTS

Table 3: Water Vole Survey Results

ID	Dry areas above water level			Herbaceous vegetation	Water	Additional notes	Overall suitability	Photograph
	Bank profile	Bank	Variation in water level					
D1	Both banks are shallow	Earth	Considered likely to dry out regularly in summer. Depth *c.* 20cm.	One bank densely shaded by line of trees while the other bank dominated by dense Bramble scrub. Some small patches of emergent vegetation dominated reed and small areas of bare ground below trees.	May dry but likely to be wet for most of year due to number of Common Reed present.	*c.*. 1m wide but very shallow water and heavily shaded on both sides of the bank. Small sections open up for *ac.*. 1 – 2m.	Suitable but poor	
D2	One bank shallow while southern bank steep.	Earth	Unlikely to be significant variation in water levels.	Continuous bankside vegetation, some sections densely shaded by scrub and overhanging trees, but open sections have rough grassland, ruderal and scrub vegetation.	Permanent	Filamentous algae present and large sections of the southern bank poaches by livestock.	Good	

D3	Both banks steep	Earth	*c.*. 5cm	Continuous bankside vegetation, dense scrub and overhanging trees, very shaded.	Likely to dry in summer.	Heavily shaded and limited water present.	Negligible	
D4	Both banks shallow	Earth	Water depth varies from 5cm – 30cm	Large sections of bank bare, other sections vegetated with scrub and nettle. Small 1m sections of reed vegetation present.	Likely to dry in summer.	Majority of ditch is heavily shaded and limited vegetation on banks. No mammal holes observed.	Negligible.	
D5	Both banks steep	Earth	Water depth *c.*. 10 – 20cm	One bank has large sections which are bare and heavily shaded from adjacent dense scrub. Other bank has dense scrub and ruderal vegetation present. Limited emergent vegetation present and no in channel vegetation present.	Permanent, dries sometimes.	Small burrows noted on one bank, resurvey to confirm if water vole or not.	Good	

								
D6	Both banks steep	Earth	Depth *c.* 5cm	Some sections of the banks are bare, while other sections have overhanging grasses, scrub and ruderal species. No in channel vegetation and emergent vegetation limited to occasional Common Reed.	Some sections likely to dry in summer.	*c.* 3 shallow burrows observed on western bank at SJ51817898. Some evidence of pollution in water. Record of WV from 2009.	Good	 

D7	Both banks steep,	Earth	Significant variation in water level considered unlikely.	Continuous swathe of bankside vegetation, dominated by dense scrub and tall ruderal species. Limited riparian vegetation present.	Permanent	Small mammal paths in vegetation, leading to ditch and potential burrows noted. Very steep and high banks. No in channel vegetation present. Water levels may fluctuate slightly in summer. Water blue / grey in colour.	Good	
D8	Shallow banks	Earth	Significant variation in water level considered unlikely.	Continuous swathe of bankside vegetation present, dominated by dense scrub, grasses and ruderal vegetation. Emergent vegetation limited and no in channel vegetation present.	Permanent.	Some sections have bare earth where ditch is densely shaded and water levels fluctuate along the ditch. Small number of potential mammal burrows observed along ditch.	Good	

D9	Steep banks	Earth	Significant variation in water level considered unlikely.	Continuous swathe of bankside vegetation present, dominated by dense scrub, grasses and ruderal vegetation. Emergent vegetation limited and no in channel vegetation present.	Some sections likely to dry in summer.	Water possibly polluted, blue-green colour. Record of WV from 2009.	Suitable but poor	
D10	Shallow banks	Earth	Significant variation in water level considered unlikely.	Continuous swathe of bankside vegetation present, by rough grassland. Emergent and in channel vegetation limited to Reed Canary-grass.	Permanent.	Numerous mammal burrows identified along banks of ditch, but no droppings or feeding remains found.	Optimal	

								
D11	Steep banks	Earth	Significant variation in water level considered unlikely.	Continuous swathe of bankside vegetation present, dominated by dense scrub, grasses and ruderal vegetation. Emergent vegetation limited and no in channel vegetation present.	Permanent.	Water possibly polluted, blue-green colour, large proportion of the ditch is heavily shaded. Small number of small mammal paths observed leading into ditch.	Suitable but poor	

D12	Steep banks	Earth	Significant variation in water level considered unlikely.	Continuous swathe of vegetation present but dominated by Common Reeds with scattered areas with rough grasses, scrub and tall ruderal.	Permanent	n/a	Good	
D13	Steep sided banks.	Earth	Significant variation in water level considered unlikely.	Continuous swathe of vegetation present but dominated by Common Reeds with scattered areas with rough grasses, scrub and tall ruderal.	Permanent	n/a	Good	

D14	Steep banks	Earth	Ditch is dammed so variation in water levels is possible.	Continuous vegetation along banks and in channel vegetation dominated by Common Reed.	Likely to hold water for at least 2-3 months in summer.		Good	
D15	Steep banks.	Bare earth	Depth c. 5 – 10cm, likely to dry out in summer.	One bank bare. In channel vegetation limited to Common Reed. Other bank covered with ruderal and scrub vegetation.	Likely to dry out in summer.	Very heavily shaded.	Negligible	

D16	Steep banks.	Bare earth	Depth *c.* 10 – 20cm, likely to dry out in summer.	One bank bare. In channel vegetation limited to Common Reed. Other bank covered with ruderal and scrub vegetation.	Likely to dry out in summer.	Very heavily shaded.	Negligible	
D17	Steepbanks	Earth	Not noticeable but sections will dry in summer.	Continuous vegetation on both banks, only emergent vegetation present is Common Reed and Reed Canary-grass. Other vegetation including grasses and ruderal species are likely to be tall in summer.	Water level varies from dry – 20cm but emergent and grassy vegetation present throughout	Suitable but poor as likely to dry in summer and not well connected to areas of permanent water.	Suitable but poor	n/a similar to D20.
D18	Shallow banks	Bare earth	Depth *c.* 5cm	Marginal vegetation limited to Common Reed, other vegetation limited to grasses and ruderal species.	Water levels likely to fluctuate and dry in summer.	Ditch shaded by adjacent scrub, Hawthorn, Blackthorn and willow.	Negligible.	

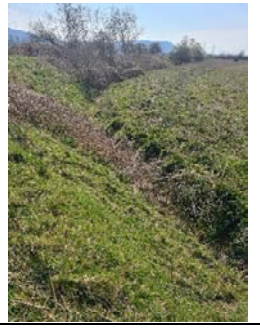
D19	Banks are variable from steep to shallow	Earth	Depth 10 – 30cm.	Continuous swathe of swamp vegetation, dominated by Common Reed. Some sections of rough grasses and tall ruderal vegetation. Scattered Bramble.	Likely to hold some water for proportion of the year, but may be shallow.	Small sections covered with dense scrub and densely shaded. Record of WV from 2009 and record of American mink from 2001.	Good	
D20	Steep bank on both side	Earth	Not noticeable but sections will dry in summer.	Continuous vegetation on both banks, only emergent vegetation present is Common Reed and Reed Canary-grass. Other vegetation including grasses and ruderal species are likely to be tall in summer.	Water level varies from dry – 20cm but emergent and grassy vegetation present throughout	Suitable but poor as likely to dry in summer and not well connected to areas of permanent water.	Suitable but poor	
D21	Shallow banks	Bare earth	Depth *c.* 5cm	Continuous bankside vegetation, dense scrub and overhanging trees, very shaded.	Water levels likely to fluctuate and dry in summer.	Very densely shaded and difficult to access.	Negligible	N/A

D22	Steep banks on both sides	Earth	Considered likely to dry out regularly in summer. Depth *c.* 20cm.	Continuous vegetation on both banks, only emergent vegetation present is Common Reed and Reed Canary-grass. Other vegetation including grasses and ruderal species are likely to be tall in summer.	Variable water depth from 5cm – 20cm.	Majority of ditch likely to dry out in summer, small sections where water deeper and Water-starwort present. Some sections of ditch densely shaded by adjacent scrub (Hawthorn and Blackthorn)	Suitable but poor (due to low water level and dense shading)	
D23	Steep banks	Earth	Not noticeable but sections may dry in summer.	Continuous vegetation on both banks, only emergent vegetation present is Common Reed and Reed Canary-grass. Majority of bank covered with dense scrub. Other vegetation includes grasses and ruderal species	Variable water depth *c.* 20 – 30cm.	Large section shaded by adjacent Hawthorn scrub.	Suitable but poor due to low water level and majority densely shaded.	

D24	Shallow banks	Earth	Not noticeable but sections may dry in summer and may overtop in winter.	Bankside vegetation limited to tall ruderal vegetation, Common Nettle and Hogweed.	Variable water depth but dammed so likely to contain water for most of year.	Ditch has 100% shade	Negligible.	
D25	Shallow, sloping banks	Earth	Shallow, *c.* 10 – 30cm.	Continuous vegetation with Common Reed, Reed Canary-grass dominant. Some sections densely shaded by dense Bramble scrub.	Water levels likely to fluctuate throughout year.	n/a	Suitable but poor	

D26	Shallow banks on both sides	Earth	Very shallow *c.* 5cm in depth.	Continuous scrub vegetation on both banks. Other vegetation including grasses and ruderal species.	Likely to dry in summer, depth *c.* 5cm.	Densely shaded with no 'open water' sections. *c.* 0.5m wide of water.	Negligible	
D27	Both banks steep	Earth	Possible large variations in water level	Continuous swathe of bankside vegetation present but limited emergent vegetation (only Common Reed and Reed Canary-grass) but tall ruderal species present including Common Nettle, Lesser Celandine and Cow Parsley	Permanent	Ditch has culverts from surrounding fields and noticeable water line indicating changing water levels throughout the year. Several records of WV.	Good	

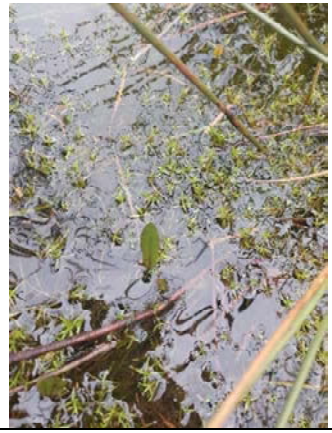
D28	Banks are steep	Earth	Significant variation in water level considered unlikely.	Continuous swathe of bankside vegetation present, mix of rough grassland, scrub and swamp vegetation present. Species include Common Reed, Lesser Celandine, Meadowsweet and Cow Parsley.	Permanent	Only in channel vegetation present is Common Reed. Some sections of ditch choked with Common Reed. Emergent vegetation diversity very limited and dominated by Common Reed.	Good	
D29	Both banks are shallow	Earth	Considered likely to dry out regularly in summer. Depth *c.* 20cm.	One bank densely shaded by line of trees while the other bank dominated by dense Bramble scrub. Some small patches of emergent vegetation dominated reed and small areas of bare ground below trees. Banks densely shaded.	Permanent wet but surrounding habitat poor, adjacent footpath and poor semi-improved field.	*c.* 1m wide but very shallow water and heavily shaded on both sides of the bank. Small sections open up for *c.* 1 – 2m.	Suitable but poor	
D30	Large portion cannot be surveyed as located within land which can not be accessed. Ditch connected to W1 and D28 via culverts. Section visible continuous swamp vegetation dominated by Common Reed. Three records for WV returned. Taking into account the records, section that is visible and assessment of W1 and D28 considered likely to be 'good' for water vole.						Good	N/A

D31	Majority has shallow banks but small section steep banks.	Earth	Dry or very shallow (2cm)	Continuous swamp (Common Reed) or scrub vegetation throughout.	Dry	Large sections dry and densely poached by sheep and cattle.	Negligible	
D32	Shallow banks	Earth	Dry or very shallow (2cm)	Continuous swamp (Common Reed) or scrub vegetation throughout.	Dry	Large sections dry and densely poached by sheep and cattle.	Negligible	Similar to D31
D33	Steep banks	Earth	Very shallow c. 5cm in depth.	Large sections with limited, grazed vegetation. Some sections with swamp (Common Reed) or scrub vegetation.	Dry	Large sections dry and poached by sheep and cattle.	Negligible	
D34	Shallow banks	Earth	Very shallow c. 5cm in depth.	Continuous scrub vegetation throughout.	Dry	Large sections dry and densely shaded.	Negligible	N/A
D35	Shallow banks	Earth	Very shallow c. 5cm in depth.	Continuous swamp vegetation throughout	Dry	n/a	Negligible	N/A
D36	Shallow banks	Earth	Very shallow c. 5cm in depth.	Continuous swamp vegetation throughout	Dry	n/a	Negligible	N/A

W1	Steep banks	Earth	Possible as sluice present on eastern end to manage water levels.	Continuous vegetation on bankside, limited within channel. Vegetation varies from emergent (dominated by Common Reed and Bulrush), to rough grassland / ruderal vegetation and dense scrub.	Permanent water	No in channel vegetation present. Records of WV from 2007 and 2009.	Good	
W2	Banks shallow	Earth	Significant variation in water level considered unlikely.	Pond with marginal species present including Soft-rush, Common Reed, Bulrush, Reed Canary-grass, Amphibious Bistort and Sweet-grass present.	Permanent	Evidence of mammal feeding remains of Reed Sweet-grass (*Glyceria maxima*) observed within pond. No '45 degree' angle observed though. Herbaceous vegetation not considered to be diverse to be considered 'optimal' habitat and no banks for burrowing.	Good	

W3	Small shallow banks on southern side of pond	Earth	Variation in water likely, reasonably likely to dry in summer.	Marginal vegetation limited to Soft-rush scattered throughout the pond.	Considered likely to dry in summer.	Pond used by large number of waterfowl.	Negligible	
W4	Shallow banks	Earth	Significant variation in water level considered unlikely	Marginal vegetation limited to Soft-rush and Reed Canary-grass. Small number of other aquatic species present including Water-starwort, Gypsywort and Water-plantain.	Considered likely to dry in summer.	Pond used by number of water fowl.	Suitable but poor	

W5	Shallow banks	Earth	Significant variation in water level considered unlikely.	Marginal vegetation limited to Soft-rush, Reed Canary-grass and Amphibious Bistort.	Permanent		Good	
W6	Very shallow / no banks	Earth	Likely to dry in summer.	Marginal vegetation limited to sweet grass species and Soft-rush and other grasses.	Likely to dry in summer.	Ephemeral scrape rather than pond.	Negligible.	N/A
W7	Very shallow / no bank	Earth	Significant variation in water level considered unlikely.	Vegetation present within pond and at edge, but diversity limited; Soft-rush, Brooklime, Water-starwort, New Zealand Pigmyweed, Bulrush, Amphibious Bistort and Sweet-grass species. Not luxurious riparian but suitable emergent vegetation.	Dries in summer	New Zealand Pigmyweed present within pond.	Good	

								
W8	No bank profile	Earth	Likely to dry in summer *c.* 5 – 10cm in depth.	Grasses and rushes present along edge and within pond, low diversity in species.	Likely to dry in summer.	No bank and likely to dry out in summer.	Negligible	

APPENDIX B – WATER VOLE LEGISLATION

Water vole is fully protected under Section 9 of Schedule 5 of the Wildlife and Countryside Act 1981 (as amended). Protection was extended by the Countryside and Rights of Way Act 2000.

Under this legislation, it is an offence to:

- intentionally kill, injure or take (capture) a water vole;
- possess or control alive or dead water vole, or any part of a water vole;
- intentionally or recklessly damage, destroy or obstruct access to any structure or place which water voles use for shelter or protection, or to intentionally or recklessly disturb water voles while they are using such a place; or
- sell, offer for sale or advertise for live or dead water voles.

The water vole is included as a priority species under Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

RSK Biocensus is owned by RSK Environment Ltd
Registered office
Spring Lodge, 172, Chester Road, Helsby, Frodsham, England, WA6 0AR, UK
Registered in England No. 04364279
www.rsk.co.uk

Annex 5

Frodsham Renewable Energy Development Great Crested Newt Survey Report (RSK Biocensus, 2023)

Peel Cubico Renewables Limited

Frodsham Renewable Energy Development

Great Crested Newt Survey Report

2483418

MARCH 2023

RSK biocensus
EXPERTS IN ECOLOGY

RSK GENERAL NOTES

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Author and project manager	Emily Clark	**Technical and quality reviewer**	Will Holden
Signature	[redacted]	Signature	[redacted]
Date:	14 March 2023	Date:	14 March 2023

Switchboard: +44 (0)330 223 1074 Company contact: Enquiries@biocensus.co.uk

EXECUTIVE SUMMARY

This report presents the findings of great crested newt (GCN) (*Triturus cristatus*) surveys carried out for Peel Cubico Renewables Limited on behalf of any future project specific Special Purpose Vehicle (SPV) company at the Frodsham renewable energy development site. The survey area is *c.*285 ha and contains predominantly marshy grassland (grazed by sheep and cattle), semi-improved neutral grassland, agricultural grassland fields and arable land with a grid of interconnected ditches forming the field boundaries. A large portion of the western section of the site is also utilised as a wind farm. The development area is to the north-west of the M56 motorway and 200m north-west of the town of Frodsham. The site is bordered by the Manchester Ship Canal and River Weaver to the north and east and the M56 motorway and Frodsham to the south.

The 36 ditches and nine ponds were identified within the survey boundary (hereafter called the site) during the ecological walkover, undertaken between 22 – 24 March 2022. An additional 15 ponds, which do not have any significant barriers to the site, were identified within 500m of the site. Habitat suitability Index (HSI) surveys were subsequently undertaken for all ponds and ditches between 5 and 6 April 2022. Water samples were collected from 20 waterbodies between 20 – 22 April and analysed for the presence of GCN environmental DNA (eDNA). All ponds which hold water on the site and within 500m of the site boundary were sampled for GCN DNA. Then a further seven ditches were surveyed, these ditches were sampled based on their HSI score and whether they were accessible from a health and safety point of view

20 waterbodies were tested for GCN eDNA. 16 waterbodies initially tested negative for GCN but four results were indeterminate (D7, W4, W7, P1) due to the presence of sediment and algae within the samples. As such, an additional survey was undertaken of these four waterbodies on 9 May 2022. One waterbody (W7) was found to be dry during the second survey and was therefore unsuitable for breeding GCN, one waterbody (W4) was inaccessible for health and safety reasons due to the introduction of cows with calves during the second visit, one waterbody (P1) still returned as indeterminate due to the presence of sediment and algae, but one waterbody (D7) tested negative for GCN eDNA. Therefore, in total, 17 waterbodies tested negative for GCN eDNA.

No records of GCN were returned for the site during the desk study and the closet record is located 450m north of the site and is from 2003. However, the River Weaver will act as a barrier between this record and the site. The majority of the eDNA results returned negative results. No positive results were recorded. Furthermore, reptile surveys were undertaken on the site between March and June 2022 and no GCNs were recorded using the refugia traps. Therefore, it is considered that GCNs are reasonably unlikely to be present on the site.

Common toads were identified on the site during the initial walkover survey and two toadlets were recorded during the reptile surveys, indicating that the site is used by common amphibians for foraging and commuting. No evidence of toads breeding within the on-site waterbodies was recorded but they were identified breeding within one waterbody (Pond 1), located 165m north-west of the site.

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1.0 INTRODUCTION

1.1 Purpose of this report

1.1.1 This report presents the results of great crested newt (GCN) (*Triturus* cristatus) surveys carried out for Peel Cubico Renewables Limited on behalf of any future project specific Special Purpose Vehicle (SPV) company at the Frodsham renewable energy development site, Frodsham, Cheshire. The surveys were carried out in April and May 2022 by RSK Biocensus. The survey area included the land within the red-line boundary (called 'the site' from this point forward – as shown in *Figure 1*).

1.2 Landscape context

1.2.1 The site is *c*.285 ha and contains predominantly marshy grassland (grazed by sheep and cattle), agricultural grassland fields and arable land with a grid of interconnected ditches forming the field boundaries. A large portion of the western section of the site is also utilized as a wind farm. The development area is to the north-west of the M56 motorway and 200m north-west of the town of Frodsham. The site is bordered by the Manchester Ship Canal and River Weaver to the north and east, and the M56 motorway and Frodsham to the south.

2.0 METHODS

2.1 Overview

2.1.1 The survey was undertaken in line with guidance from the Chartered Institute of Ecology and Environmental Management (CIEEM, 2013); it therefore included:

- a desk study (here called a background data search (BDS)), which included requesting data from the local records centre, review of aerial imagery and ordnance survey maps to identify ponds within 500m of the site boundary; and
- a field survey that assessed the value of suitable habitat on site to support GCNs.
- a field survey that assessed the presence of breeding GCNs within suitable habitat on site.

2.1.2 Following the identification of ditches and ponds during the preliminary ecological appraisal in March 2022, the initial habitat suitability index assessment was carried out between 5 and 6 April 2022 by Emily Clark, senior ecologist and Adam Penney, consultant ecologist. The subsequent eDNA sampling of 20 waterbodies was undertaken by Emily Clark and Shona Redman, consultant ecologist between 20 and 22 April.

2.1.3 Four of the eDNA samples returned as inconclusive due to excessive sediment within the samples, as such a second eDNA survey was undertaken by Emily Clark and Molly Meadows, assistant ecologist on 9 May 2022.

2.1.4 However, one waterbody (W7) was found to be dry during the second survey and therefore unsuitable for breeding GCN, one waterbody (W4) was inaccessible for health and safety reasons due to the introduction of cows with calves during the second visit. Therefore, only two ponds were surveyed during the survey on 9 May 2022.

2.1.5 Emily is a suitably qualified and experienced senior ecologist, associate member of CIEEM, and is licensed by Natural England to disturb, take and handle great crested newts under licence number 2017-32271-CLS-CLS (CL08).

2.2 Background data search

2.2.1 A record request was submitted to Record – The Biodiversity Information System for Cheshire, Halton, Warrington and Wirral in March 2022 as part of the preliminary ecological appraisal.

2.2.2 The search included a search for statutory designated sites within 2km of the site boundary, non-statutory designated sites within 2km of the site boundary. The search was extended to 10 km for Ramsar sites, special areas of conservation (SACs) and special protection areas (SPAs). A search was also made for records for GCNs and other common amphibians within 1km of the site boundary.

2.3 Habitat Suitability Index (HSI)

2.3.1 The 36 ditches and nine ponds were identified on the site during the ecological walkover, undertaken between 22 – 24 March 2022 and an additional 15 ponds, which do not have any significant barriers to movement to the site (e.g. M56 motorway), were identified within 500m of the site. On Figure 2, the on-site ponds have been labeled waterbodies (W) while the off-site ponds / ditches have been labeled (P). Ditches on the site are labelled ditches (D).

2.3.2 Water features were assessed to determine whether they were suitable for GCNs using the habitat suitability index (HSI) methodology developed by Oldham *et al.* (2000). This comprises a numerical index, where 0 indicates unsuitable habitat and 1 represents optimal habitat. The HSI for the GCNs uses ten factors (suitability indices (SI) 1 to 10), which are thought to affect GCNs as follows:

- geographic location (SI 1);
- surface area (SI 2);
- hydrology (drying) (SI 3);
- water quality (SI 4);
- shade (SI 5);
- presence of water fowl (SI 6);
- presence of fish (SI 7);
- number of adjacent water features (SI 8);
- terrestrial habitat (SI 9); and
- macrophyte cover (SI 10).

2.3.3 Each factor is scored using field and desk-based survey. These ten scores are then converted to SI scores using a scale from 0.01 to 1 from graphs given in Oldham et al. (2000) and a HSI result is calculated using the following formula:

2.3.4 $HSI = (SI1 \times SI2 \times SI3 \times SI4 \times SI5 \times SI6 \times SI7 \times SI8 \times SI9 \times SI10)^{1/10}$

2.3.5 Further research by Brady (unpublished) has developed a system for using HSI scores to define pond suitability for GCNs according to the following categories:

- HSI <0.5 = poor
- HSI 0.5 – 0.59 = below average
- HSI 0.6 – 0.69 = average
- HSI 0.7 – 0.79 = good
- HSI > 0.8 = excellent

2.4 Environmental DNA (eDNA)

2.4.1 Environmental DNA (eDNA) testing provides a GCN presence / absence result from water samples taken from a pond, following specific protocols detailed in Biggs *et al.*, 2014. These protocols have been approved by Natural England as a method to

determine GCN presence or absence in a waterbody, within the newt breeding season, from 15 April to 30 June. Using the sterile kit provided from a laboratory, 20 water samples are taken from intervals around each pond and then mixed together. From there, a 15ml sample is transferred into each of the 6 sample tubes, which contain a preserving fluid.

2.4.2 Table 1 details the dates and weather conditions for the eDNA surveys.

Table 1 – Date and weather conditions recorded for the eDNA surveys

Date	Temp (°C)	Start / End Wind (Beaufort)	Rainfall	Start / End Cloud Cover (Octas)
20.04.2022	14	2	None	3
21.04.2022	15	1	None	0
22.04.2022	15	2	None	2
09.05.2022	15	1	None	1

2.5 Constraints and limitations

2.5.1 The HSI assessment is designed for ponds, not ditches. Therefore, the score for ditches is not considered to be as accurate as that for ponds, but it still gives an indication for which ditches are most suitable on site.

2.5.2 One waterbody (D30) is within third party land and access was not permitted. However, one section of the ditch was surveyed, and it is interconnected to W1 and D27 which both achieved HSI scores of 0.65 and 0.67, indicating they are of 'average suitability' to support breeding GCNs. Therefore, it can be reasonably assumed that D30 will offer similar suitability. Therefore, this is not a significant constraint to the survey.

2.5.3 All waterbodies were subject to a detailed HSI assessment and then all ponds which hold water on the site and within 500m of the site boundary were sampled for GCN DNA. The weather conditions and time of year for the eDNA survey were considered to be suitable and the eDNA surveys are therefore considered to be valid. Then a further seven ditches were surveyed, these ditches were sampled based on their HSI score and whether they were accessible from a health and safety point of view. Many of the ditches have steep banks and are surrounded by dense bramble scrub and as such are difficult to access and gain enough samples and coverage of the ditch. Therefore, not all waterbodies were subject to an eDNA survey, however all the ditches are interconnected and additional information regarding amphibians was gathered during the reptile surveys also undertaken at the site. Therefore, it is considered sufficient information has been gathered with regard to amphibians to

considered sufficient information has been gathered with regard to amphibians to make a robust assessment to the presence of or impacts on GCNs and other common amphibians.

3.0 RESULTS

3.1 Background Data Search

Statutory and non-statutory designated sites

3.1.1 There are no statutory sites designated for GCNs within 10km or non-statutory sites designated for GCNs within 2km of the proposed site boundary.

Records

3.1.2 71 amphibian records were returned from within 1km of the site boundary;

- 20 records for common frog (*Rana temporaria*), with the closest record from 2008 and located 25m
- 17 records for common toad (*Bufo bufo*), with the closest record from 2008 and for 8 individuals, located 25m
- 12 records for GCNs, with the closest record from 2017 for a negative eDNA result located 450m south-east of the proposed site boundary. The closest record of a GCN is from 2003 and is located 450m north of the site, although the River Weaver will act as a barrier to movement between the record and the site.
- 22 records for smooth newt (*Lissotriton vulgaris*), with five records from 2002 and located within the proposed site boundary. Two records are located within W2 and three records are located near D2 on the site (see Page 3 on Figure 2).

3.2 Terrestrial habitat assessment

3.2.1 The land within the proposed development site contains predominantly marshy grassland (grazed by sheep and cattle), rough grassland, agricultural grassland fields and arable land with a grid of interconnected ditches forming the field boundaries. The areas of scrub, rough grassland, marshy grassland, emergent and swamp and rough grassland will provide foraging and commuting opportunities for GCNs while the areas of scrub and scattered trees will also provide refuge opportunities. A large portion of the western section of the site is also utilised as a wind farm and is intensively grazed by sheep and cattle, providing limited opportunities for GCNs within this section of the site. The development area is located to the north-west of the M56 motorway and 200m north-west of the town of Frodsham. The site is bordered by the River Weaver and Manchester Ship Canal to the north and east, M56 motorway and Frodsham to the south and as such the site is relatively isolated.

3.3 Aquatic habitat survey

3.3.1 On Figure 2, the on-site ponds have been labeled waterbodies (W) while the off-site ponds / ditches have been labeled (P). Ditches on site are labelled ditches (D).

On-site

D1 – Grid reference: (SJ) 5091 7843

3.3.2 This ditch is within the center of the site and immediately adjacent to the footpath, see Page 3 on Figure 2. The banks are shallow, and the ditch is densely shaded by a line of trees or dense bramble scrub. The ditch is shallow and has a depth of *c.* 20cm and is likely to dry in the summer. There is no aquatic vegetation present and emergent vegetation is limited to a small area of Common Reed (*Phragmites australis*).

D2 – (SJ) 5096 7813

3.3.3 This ditch is within an area of marshy grassland to the south of the site, see Page 3 on Figure 2. One bank is shallow while one is steep. and the ditch has a depth of *c.* 30cm. Large portion of the bank is shaded by scrub and overhanging trees, but there are small open sections with rough grassland and ruderal vegetation. The only aquatic or emergent vegetation present is filamentous algae and Common Reed. Furthermore, the ditch has been poached by livestock and may dry occasionally.

D3 – Grid reference: (SJ) 5211 7896

3.3.4 This ditch is within the eastern section of the site (see Page 4 on Figure 2) and is immediately adjacent to a line-of trees, dominated by Hawthorn (*Crataegus monogyna*), and dense Bramble (*Rubus fruticosus agg.*) scrub. The ditch, line of trees and scrub is surrounded by two arable fields. The water is extremely shallow, and the ditch has a depth of *c.* 5cm and is considered likely to dry out annually. Due to the surrounding scrub and trees, it is extremely shaded and there is no aquatic or emergent vegetation present.

D4 – Grid reference: (SJ) 5193 7887

3.3.5 This ditch is within the eastern section of the site and is located immediately adjacent to a line of trees and dense scrub, see Page 4 on Figure 2. The ditch, line of trees and scrub is surrounded by arable and pasture fields. The water is extremely shallow, and the ditch has a depth of *c.* 5 - 30cm and is considered dry frequently. Due to the surrounding scrub and trees, the majority of the ditch is extremely shaded, however small 1 – 2m sections open up slightly and as such Common Reed is present, but no other emergent or aquatic vegetation was recorded.

D5 – Grid reference: (SJ) 5192 7901

3.3.6 This ditch is within the eastern section of the site and is a boundary between two arable fields, see Page 4 on Figure 2. The ditch has a width of *c.* 1m and a depth of *c.*10 - 20cm, it is considered likely to dry in summer months. The water also appears to be polluted with an oil film present. The banks are steep and contain scrub and tall ruderal, as such the ditch is relatively shaded.

D6 – Grid reference: (SJ) 5186 7908

3.3.7 This ditch within the eastern section of the site and is a boundary between four fields, two arable and two grazed pasture, see Page 4 on Figure 2. The ditch has a width of *c.* 0.5m and the majority of the ditch is extremely shaded by adjacent trees and scrub, as such there is limited aquatic or emergent vegetation present. However small sections of the ditch are wider (*c.* 2m) and are less shaded. Within the open areas Common Reed present, but no other aquatic or emergent vegetation as recorded. The water is extremely shallow, *c.* 2 – 5cm, and is likely to dry frequently.

D7 – Grid reference: (SJ) 5182 7915

3.3.8 This small ditch is within the eastern section of the site, in between two pasture fields which are grazed by cattle, see Page 4 on Figure 2. The ditch is *c.* 2m wide and there is a wire fence around the ditch to prevent cattle entering. The banks are extremely steep and densely vegetated with scrub and ruderal vegetation. The ditch is relatively open, but the water is blue/grey in colour, indicating potential pollution, and has a depth of *c.* 10cm. No aquatic vegetation was recorded, and emergent vegetation is limited to Common Reed. Mallard (*Anas platyrhynchos*) nest tubes were also noted within the ditch.

D8 – Grid reference: (SJ) 5174 7915

3.3.9 This ditch is within the eastern section of the site and is a boundary between pasture fields and scrub / grassland habitat to the north-east, see Page 4 on Figure 2. The ditch is *c.* 2m wide and there is a wire fence around the ditch to prevent cattle entering from the southern side of the ditch. The banks are sloping and some sections are bare while other sections are densely vegetated with scrub and ruderal vegetation. As such, a large portion of the ditch is densely shaded but small sections are relatively open. The ditch is relatively open and has a depth of *c.*10cm. No aquatic vegetation was recorded, and emergent vegetation is limited to Common Reed.

D9 – Grid reference: (SJ) 5149 7904

3.3.10 This ditch is within the northern central section of the site, see Page 4 on Figure 2. The ditch is connected to D12 and D11 by culverts. It is *c.*2m wide and has a depth of *c.* 50cm. The ditch has steep sloping banks which are vegetated with grasses, scrub and ruderal vegetation. There are no aquatic species present and emergent vegetation is limited to Common Reed. The water is blue/grey indicating it is potentially polluted.

D10 – Grid reference: (SJ) 5131 7898

3.3.11 This ditch is within the northern central section of the site in between two areas of marshy grassland and is connected to D11, see Page 4 on Figure 2. The banks are shallow, and the ditch has a depth of *c.* 80cm. No aquatic vegetation was recorded but Floating Sweet-grass (*Glyceria fluitans* and Common Reed are present. The ditch is dammed at the northern end, indicating the water levels may fluctuate occasionally, but is considered unlikely to dry.

D11 – Grid reference: (SJ) 5149 7904

3.3.12 This ditch is within the northern central section of the site see Page 3 on Figure 2. The ditch is connected to D10, D9, D12 and D13. It is *c.* 2m wide and has a depth of *c.* 50cm. The ditch has steep sloping banks which are vegetated with scrub and ruderal vegetation. There are no aquatic species present but dense stands of Common Reed are present. The water is stagnant and has a depth of *c.* 10cm.

D12 – Grid reference: (SJ) 5153 7890

3.3.13 This ditch is within the northern central section of the site, see Page 3 on Figure 2. The ditch is connected with D9, D28 and D14. It is *c.*5m wide and has a depth of 10 – 30cm. The ditch has sloping banks which are densely vegetated with Bramble scrub. There are no aquatic species present, but some small stands of Common Reed are present. The water is stagnant and of poor quality.

D13 – Grid reference: (SJ) 5132 7887

3.3.14 This ditch is within the northern central section of the site, see Page 3 on Figure 2. The ditch is connected with D11 and D14. It is *c.* 5m wide and has a depth of 10 – 30cm. The ditch has steep sloping banks which are densely vegetated with Common Reed and Bramble scrub. There are no other aquatic or emergent species present. The ditch is considered likely to dry in summer.

D14 – Grid reference: (SJ) 5143 7883

3.3.15 This ditch is within the northern central section of the site, see Page 3 on Figure 2. The ditch is connected with D11 and D14. It is *c.* 5m wide and has a depth of 10 – 30cm. The ditch has steep sloping banks which are densely vegetated with common Reed. There are no other aquatic or emergent species present.

D15 – Grid reference: (SJ) 5146 7848

3.3.16 This ditch is within the southern central section of the site, see Page 3 on Figure 2. The ditch is connected with D16, D17 and D30. It is *c.*5m wide and has a depth of 5 - 10cm. The ditch has relatively steep sloping banks which are densely vegetated with Common Reed and the ditch is densely filled with Common Reed and as such is heavily shaded. There are no other aquatic or emergent species present. The ditch is considered likely to dry annually.

D16 – Grid reference: (SJ) 5160 7856

3.3.17 This ditch is within the southern central section of the site between two arable fields, see Page 3 on Figure 2. The ditch is connected with D15 and D28. It is *c.* 1m wide and has a depth of 5-20cm. The ditch has steep sloping banks, one of which is vegetated with Hawthorn and Bramble scrub and as such the ditch is densely shaded. The only emergent species recorded within the ditch is stands of Common Reed, no other emergent or aquatic species were recorded. The ditch is considered likely to dry annually.

D17 – Grid reference: (SJ) 5160 7856

3.3.18 This ditch is within the southern central section of the site between an arable field and footpath, see Page 3 on Figure 2. The ditch is connected with D20 and D28. It is *c.* 1m wide and has a depth of 20cm. The only emergent vegetation present is Common Reed and Reed Canary-grass (*Phalaris arundinacea*).

D18 – Grid reference: (SJ) 5127 7864

3.3.19 This ditch is within central section of the site between two arable fields, see Page 3 on Figure 2. The ditch is connected with D20 and D28. It is *c.* 0.5m wide and is extremely shallow and likely to dry in the summer. The ditch is heavily shaded due to the adjacent Hawthorn, Blackthorn (*Prunus spinosa*) and Willow (*Salix sp.*) scrub. Common Reed is present within the ditch, but no other emergent or aquatic vegetation is present.

D19 – Grid reference: (SJ) 5118 7854

3.3.20 This ditch is within central section of the site between two arable fields see Page 3 on Figure 2. The ditch is connected with D25 and D20. It is *c.* 2m wide and is choked with Common Reed. However, the depth varies from *c.* 0.5m to 10cm throughout the ditch. The banks are variable from very steep to relatively shallow. Other than Common Reed, no emergent or aquatic vegetation was recorded within the ditch.

D20 – Grid reference: (SJ) 5160 7856

3.3.21 This ditch is within the southern central section of the site between an arable field and footpath, see Page 3 on Figure 2. The ditch is connected with D17. It is *c.* 1m wide and has a depth of 20cm. The only emergent vegetation present is Common Reed and Reed Canary-grass.

D21 – Grid reference: (SJ) 5113 7835

3.3.22 This ditch is within the western central section of the site between two marshy grassland fields used for wildfowling, see Page 3 on Figure 2. The ditch is connected with D19 and D29. The ditch is *c.* 0.5m wide and has a depth of 5cm. There is continuous scrub on both banks and overhanging Hawthorn trees, resulting in the ditch being densely shaded. The banks are extremely shallow and emergent / aquatic vegetation is limited to Common Reed which is scattered throughout the ditch. The ditch is considered likely to dry in the summer.

D22 – Grid reference: (SJ) 5110 7843

3.3.23 This ditch is within the western central section of the site between two marshy grassland fields used for wildfowling, see Page 3 on Figure 2. The ditch is connected with D19 and D29. The ditch is *c.* 0.5m wide and has a depth of 5 - 20cm. There is continuous scrub on both banks and overhanging Hawthorn trees, resulting in the ditch being densely shaded. The banks are steep and emergent / aquatic vegetation

is limited to Common Reed and Reed Canary-grass which dominates the ditch. The ditch is considered likely to dry in the summer.

D23 – Grid reference: (SJ) 5103 7853

3.3.24 This ditch is within the western central section of the site between two marshy grassland fields used for wildfowling, see Page 3 on Figure 2. The ditch is connected with D19 and D29. The ditch is *c.* 0.5m wide and has a depth of 20cm – 30cm. There is continuous scrub on both banks and overhanging Hawthorn trees, resulting in the ditch being densely shaded. The banks are slightly sloping and emergent / aquatic vegetation is limited to scattered Common Reed and Reed Canary-grass. Some sections of the ditch are considered likely to dry in the summer.

D24 – Grid reference: (SJ) 5100 7861

3.3.25 This ditch is within the western central section of the site between two marshy grassland fields used for wildfowling, see Page 3 on Figure 2. The ditch is connected to D19. The ditch is *c.* 0.5m wide and has a depth of 20cm – 30cm. There is continuous scrub on both banks and overhanging Hawthorn trees, resulting in the ditch being densely shaded. The banks are shallow and emergent / aquatic vegetation is limited to scattered Common Reed. Some sections of the ditch are considered likely to dry in the summer, but it is dammed so may contain more water than other similar ditches in the area.

D25 – Grid reference: (SJ) 5100 7861

3.3.26 This ditch is within the central section of the site between a marshy grassland that is grazed by cattle and arable fields, see Page 3 on Figure 2. The ditch is connected to D13, D14 and D19. The ditch is *c.* 2m wide and has a depth of 10cm – 30cm. The banks are shallow and sloping and continuous vegetation is present on the banks and within the ditch, dominated by Common Reed and Reed Canary-grass. Some sections of the ditch are relatively open and not shaded while others are densely shaded by dense Bramble scrub. No other aquatic or emergent species were recorded within the ditch.

D26 – Grid reference: (SJ) 5104 7846

3.3.27 This ditch is within the western section of the site between two marshy grassland fields used for wildfowling, see Page 3 on Figure 2. The ditch is connected to D23 and D23. The ditch is *c.* 0.5m wide and has a depth of 5cm. The banks are shallow and densely vegetated with dense scrub, and as such the ditch is densely shaded with no open water sections. The ditch is very shallow and likely to dry out annually and no aquatic or emergent vegetation was recorded within the ditch.

D27 – Grid reference: (SJ) 5081 7806

3.3.28 This ditch is within the western section of the site adjacent to a road and arable fields, see Page 3 on Figure 2. The ditch is connected to D30. The ditch is *c.* 5m wide and appears to be deep. The banks are extremely steep and high (minimum of 1m) and

are vegetated with ruderal and grass species. Emergent vegetation is limited to Common Reed and Reed Canary-grass and no aquatic vegetation was recorded.

D28 – Grid reference: (SJ) 5166 7870

3.3.29 This ditch is within the western section of the site adjacent to a road and arable fields, see Page 3 on Figure 2. The ditch is connected to D30. The ditch is *c.* 5m wide and appears to be deep. The banks are extremely steep and high (minimum of 1m) and are vegetated with ruderal and grass species. Emergent vegetation is limited to Common Reed and Reed Canary-grass and no aquatic vegetation was recorded.

D29 – Grid reference: (SJ) 5103 7824

3.3.30 This ditch is within the western section of the site adjacent to a footpath and marshy grassland, see Page 3 on Figure 2. The ditch is connected to D21, D22 and D23. The ditch is *c.* 0.5m wide and depth of c. 20cm. The banks are extremely shallow and are densely shaded by line of trees and dense Bramble scrub. Some small patches of emergent vegetation dominated by Common Reed and small areas of bare ground below trees are present, but no other emergent or aquatic vegetation is present. The ditch is also filled with leaf litter from the overhanging trees and the water is stagnant.

D30 – Grid reference: (SJ) 5150 7828

3.3.31 A large portion could not be surveyed as it is within land where access was not permitted. The ditch is connected to W1 and D28 via culverts. Section visible continuous swamp vegetation dominated by Common Reed.

D31, D32 and D33 – Grid reference: (SJ) 5050 7815

3.3.32 These three ditches are all very similar and are within the western section of the site within an improved field that is intensively grazed by sheep and cattle, see Page 2 on Figure 2. The ditches are *c.* 1m wide and the majority of the ditches were dry at the time of the survey. Several small sections had water with a depth of *c.* 2cm. The ditches are choked with Common Reed and limited other vegetation is present.

D35 – Grid reference: (SJ) 5109 7837

3.3.33 This ditch is within the western section of the site between two marshy grassland fields used for wildfowling, see Page 3 on Figure 2 . The ditch is connected to D21 and D22. The ditch is *c.* 0.5m wide and has a depth of 5cm. The banks are shallow and densely vegetated with dense scrub, and as such the ditch is densely shaded with limited open water sections. The ditch is very shallow and likely to dry out annually and no aquatic or emergent vegetation was recorded within the ditch.

D36 – Grid reference: (SJ) 5109 7837

3.3.34 This ditch is within an area of marshy grassland to the south of the site and is connected to D2, see Page 3 on Figure 2. The banks are shallow, and the ditch has a depth of *c.*5cm. The only aquatic or emergent vegetation present is Common Reed,

which dominates the ditch. Furthermore, the ditch has been poached by livestock and may dry occasionally.

W1 – Grid reference: (SJ) 5213 7884

3.3.35 This waterbody is within the south-eastern corner of the site, surrounded by a footpath and arable or pasture fields, see Page 4 on Figure 2. The banks of the waterbody are extremely steep and covered with dense scrub and ruderal vegetation. There are no submerged species present and emergent vegetation is limited to Common Reed and Bulrush (*Typha latifolia*). The waterbody has a sluice present at the eastern end, suggesting water levels may fluctuate occasionally.

W2 – Grid reference: (SJ) 5155 7892

3.3.36 This waterbody is within the north-eastern section of the site, surrounded by tall ruderal and scrub vegetation. The pond has a depth of *c.* 10 – 30cm and there are a number of marginal species present including Soft-rush (*Juncus effusus*), Common Reed, Bulrush and Reed Canary-grass but suitably egg laying plants are limited to Amphibious Bistort (*Persicaria amphibia*) and Sweet-grass (*Glyceria sp.*). There is no shading within the pond and limited evidence of waterfowl or fish.

W3 – Grid reference: (SJ) 5133 7911

3.3.37 This waterbody is within the north-eastern corner of the site, surrounded by marshy grassland, see Page 4 on Figure 2. The waterbody is an ephemeral scrape, utilized by a number of waterfowl, including mallard, coot (*Fulica atra*) and lapwing (*Vanellus vanellus*). A large proportion of the banks are bare and there is no aquatic or marginal species present. The waterbody has a depth of *approximately* 5 – 10cm but a large portion of the waterbody is expected to dry in the summer months.

W4 – Grid reference: (SJ) 5123 7899

3.3.38 This waterbody is within the north-eastern corner of the site, surrounded by marshy grassland which is occasionally grazed by cattle, see Page 3 on Figure 2. The waterbody is rectangular in shape with a small island in the middle which is utilized by nesting swans (*Cygnus sp.*). The pond has a depth of *c.* 20 – 30cm and the banks are vegetated with marginal vegetation, dominated by Soft-rush and Reed Canary-grass. A small number of other aquatic species are present including Water Starwort (*Callitriche sp.*), Gypsywort (*Lycopus europaeus*) and Water-plantain (*Alisma plantago-aquatica*). There is no shading within the pond, no fish and impacts from waterfowl are anticipated to be minor.

W5 – Grid reference: (SJ) 5127 7888

3.3.39 This waterbody is within the north-eastern corner of the site, surrounded by marshy grassland which is grazed by cattle, see Page 3 on Figure 2. The waterbody has a depth of *c.*10 – 30cm. The banks are extremely shallow and emergent vegetation is limited to Soft-rush, Reed Canary-grass and Amphibious Bistort. There is no shading within the pond, no fish and impacts from waterfowl are anticipated to be minor.

W6 – Grid reference: (SJ) 5093 7873

3.3.40 This waterbody is within the central section of the site, surrounded by marshy grassland, see Page 3 on Figure 2. The waterbody is a shallow ephemeral scrape which is likely to dry in the summer months. The waterbody has a depth of *c.* 5cm. Emergent vegetation is limited to Soft-rush and Sweet-grass species.

W7 – Grid reference: (SJ) 5087 7866

3.3.41 This waterbody is within the north-eastern corner of the site, surrounded by marshy grassland, see Page 3 on Figure 2. The waterbody is an ephemeral scrape and was dry during the survey on 9 May 2022. The pond is considered to be wet for a proportion of the year as species present include Soft-rush, Brooklime (*Veronica beccabunga*), Water Starwort, New Zealand Pigmyweed (*Crassula helmsii*), Bulrush, Amphibious Bistort and Sweet-grass species.

W8 – Grid reference: (SJ) 5153 7872

3.3.42 This waterbody is within the central, south-eastern section of the site, within an arable field, see Page 3 on Figure 2. The waterbody is a shallow ephemeral scrape which is likely to dry in the summer months. The waterbody has a depth of *c.* 5 - 10cm and no aquatic or emergent species were recorded.

W9 – Grid reference: (SJ) 5191 7927

3.3.43 This waterbody is within the north-eastern corner of the site, surrounded by marshy grassland which is occasionally grazed by cattle see Page 4 on Figure 2. The waterbody is a large ephemeral scrape, with a depth of *c.* 5cm and is utilised by a number of waterfowl. No aquatic or emergent vegetation was recorded within the waterbody.

Off-site

P1 – Grid reference: (SJ) 4930 7876

3.3.44 This waterbody is *c.* 165m north-west of the survey boundary. The pond is a large pond with fishing platforms present around the edge, indicating fish are present. Furthermore, the pond is used by a number of Canada geese (*Branta canadensis*), mallards and swans. The waterbody has a depth of *c.* 30cm and has shallow sloping banks which are poached by cattle. Aquatic and emergent vegetation is limited to Water Mint (*Mentha aquatica*), Ivy-leaved Crowfoot (*Ranunculus hederaceus*), New Zealand Pigmyweed and Floating Sweet-grass. Most of the banks are bare due to the impact of cattle poaching and waterfowl. Tadpoles were noted within the eastern section of the pond.

P2 – Grid reference: (SJ) 4911 7866

3.3.45 This waterbody is *c.* 320m west of the sit boundary. This waterbody is similar to P1 but the water was a blue green colour, as an algae control solution had recently been

added to the water. This management had resulted in loss of aquatic and emergent plants within the waterbody as-well as killing the algae present.

P3 – Grid reference: (SJ) 4939 7866

3.3.46 This waterbody is *c.* 155m west of the site boundary and is a large ephemeral scrape with no aquatic or marginal vegetation present. The pond edges are severely poached by cattle and the pond has a depth of *c.* 10cm.

P4 – Grid reference: (SJ) 4947 7865

3.3.47 This waterbody is *c.* 90m west of the site boundary and is a large ephemeral scrape with no aquatic or marginal vegetation present. The pond edges are severely poached by cattle and the pond has a depth of *c.* 10cm.

P5 – Grid reference: (SJ) 4943 7861

3.3.48 This waterbody is *c.* 150m west of the site boundary and is a large ephemeral scrape with no aquatic or marginal vegetation present. The pond edges are severely poached by cattle and the pond has a depth of *c.* 10cm.

P6 – Grid reference: (SJ) 4923 7846

3.3.49 This waterbody is *c.* 380m west of the site boundary and is a large ephemeral scrape with no aquatic or marginal vegetation present. The pond edges are severely poached by cattle and the pond has a depth of *c.* 10cm.

P7 – Grid reference: (SJ) 4942 7841

3.3.50 This waterbody is *c.* 160m west of the site boundary and is a large ephemeral scrape with no aquatic or marginal vegetation present. The pond edges are severely poached by cattle and the pond has a depth of *c.* 10cm.

P8 (ditch) – Grid reference: (SJ) 4960 7854

3.3.51 This waterbody is *c.* 50m west of the site boundary. It is a shallow ditch which hold between 5 – 30cm of water. The aquatic and emergent vegetation is limited to Reed Canary-grass. No waterfowl or fish were noted within the ditch and sections of the ditch are likely to dry in the summer months.

P9 – Grid reference: (SJ) 4956 7850

3.3.52 This waterbody is *c.* 70m west of the site boundary and is a large ephemeral scrape with no aquatic or marginal vegetation present. The pond edges are severely poached by cattle and the pond has a depth of *c.* 10cm.

P10 – Grid reference: (SJ) 4955 7844

3.3.53 This waterbody is *c.* 70m west of the site boundary and is a large ephemeral scrape with no aquatic or marginal vegetation present. The pond edges are severely poached by cattle and the pond has a depth of *c.* 2-5cm.

P11 – Grid reference: (SJ) 4956 7746

3.3.54 This waterbody is *c.* 415m south-west of the site boundary and was dry at the time of the survey. No emergent or aquatic vegetation were recorded in the vicinity of the pond and as such is considered to have been dry for some time.

P12 – Grid reference: (SJ) 5021 7809

3.3.55 This waterbody is *c.* 20m south of the site boundary. It is a very large lake with extremely steep banks which are vegetated with Bramble and Willow scrub. As such, access to the pond to take eDNA sample was not possible for health and safety reasons. However, no aquatic or emergent vegetation was recorded and the waterbody is likely to hold fish, reducing its suitability for GCN.

P13 – Grid reference: (SJ) 4999 7916

3.3.56 This waterbody is *c.* 10m south-west of the site boundary. The pond is within an area of swamp vegetation and emergent or aquatic vegetation is limited to Common Reed, Bulrush, Reed Canary-grass and Water Mint. The pond has a depth of *c.* 20 – 50 cm but is 100% shaded due to the Common Reed.

P14 – Grid reference: (SJ) 4963 7838

3.3.57 This waterbody is *c.* 25m north-west of the site boundary. It is a shallow ditch which holds between 5 – 30cm of water. The aquatic and emergent vegetation is limited to Reed Canary-grass. No waterfowl or fish were noted within the ditch and sections of the ditch are likely to dry in the summer months.

P15 – Grid reference: (SJ) 4951 7848

3.3.58 This waterbody is *c.* 145m west of the site boundary and is a large ephemeral scrape with no aquatic or marginal vegetation present. The pond edges are severely poached by cattle and the pond has a depth of *c.* 5cm.

3.4 HSI results

3.4.1 A total of 45 waterbodies (36 ditches and 9 ponds) on the site and 15 off-site waterbodies within 500m of the proposed site boundary were subject to a HSI assessment for their suitability to support GCNs.

- Four waterbodies (D5, D31, D32 and P11), were found to be dry and as such are unsuitable to support GCN

- 19 waterbodies (W3, W9, D1, D3, D6, D15, D16, D21, D24, D26, D33, D34, D36, P1, P2, P6, P7, P12, P15), achieved a HSI score of < 0.50, which indicates they are of 'poor suitability' to support breeding GCNs.
- 16 waterbodies (W6, W8, D4, D9, D17, D18, D22, D23, D35, P3, P4, P5, P8, P9, P10, P14) achieved a HSI score of 0.50 - 0.59 which indicates they are of 'below average suitability' to support breeding GCNs.
- 14 waterbodies (W1, D7, D8, D10, D11, D12, D13, D14, D19, D20, D25, D27, D28, D29) achieved a HSI score of 0.60 - 0.69 which indicates they are of 'average suitability' to support breeding GCNs.
- 5 waterbodies (W2, W4, W5, D2, P13) achieved a HSI score of 0.70 - 0.79 which indicates they are of 'good suitability' to support breeding GCNs.
- 1 waterbody (W7) achieved a HSI score of 0.82 which indicates it is of 'excellent suitability' to support breeding GCNs. The waterbody was subsequently found to be dry on 9 May 2022. The initial score considered the pond was likely to dry out 'sometimes', when this is changed to 'annually' the score decreases to 0.70 which indicates it is of 'good suitability' to support breeding GCNs.
- 1 waterbody (D30) is within third party land and access was not permitted. However, one section of the ditch was surveyed, and it is interconnected to W1 and D27 which both achieved HSI scores of 0.65 and 0.67, indicating they are of 'average suitability' to support breeding GCNs. Therefore, it can be reasonably assumed that D30 will offer similar suitability.

3.4.2 Further details and HSI scores are provided within Appendix B – HSI Results.

3.5 eDNA results

3.5.1 All ponds which hold water on the site and within 500m of the site boundary were sampled for GCN DNA. Then a further seven ditches were surveyed, these ditches were sampled based on their HSI score and whether they were accessible from a health and safety point of view. Many of the ditches have steep banks and are surrounded by dense bramble scrub and as such are difficult to access and gain sufficient number of samples and coverage of the ditch. Furthermore, many of the ditches are interconnected across the site.

Table 2 - eDNA results

Pond number	eDNA result 20th – 22nd April	2nd eDNA result
D2	Negative	N/A
D7	Indeterminate	Negative
D11	Negative	N/A
D12	Negative	N/A
D19	Negative	N/A
D23	Negative	N/A
D25	Negative	N/A
W1	Negative	N/A

Pond number	eDNA result 20th – 22nd April	2nd eDNA result
W2	Negative	N/A
W3	Negative	N/A
W4	Indeterminate	No access
W5	Negative	N/A
W7	Indeterminate	Dry
P1	Indeterminate	Indeterminate
P2	Negative	N/A
P3	Negative	N/A
P4	Negative	N/A
P8	Negative	N/A
P9	Negative	N/A
P13	Negative	N/A

4.0 EVALUATION

4.1 Habitat suitability

4.1.1 The areas of scrub, marshy grassland, emergent and swamp vegetation and rough grassland will provide foraging and commuting opportunities for GCNs while the areas of scrub and scattered trees will also provide refuge opportunities. However, a large portion of the western section of the site is also utilized as a wind farm and is intensively grazed by sheep and cattle, providing limited opportunities for GCNs within this section of the site. The site is bordered by the Manchester Ship Canal and River Weaver to the north and west and the M56 motorway and Frodsham to the south and as such the site is relatively isolated.

4.2 HSI and eDNA results

4.2.1 A total of 45 waterbodies (36 ditches and 9 ponds) on the site and 15 off-site waterbodies within 500m of the proposed site boundary were assessed for their suitability to support GCNs. 35 of the ditches and ponds were assessed as either poor or below average suitability to support breeding GCNs while five were assessed as having good suitability to support breeding GCN. One pond (W7) was assessed as excellent suitability to support breeding GCN but was subsequently found to be dry in May 2022 and as such is unsuitable to support breeding GCN. The remaining waterbodies were found to be dry.

4.2.2 All ponds which hold water on the site and within 500m of the site boundary were sampled for GCN DNA. Then a further seven ditches were surveyed, these ditches were sampled based on their HSI score and whether they were accessible from a health and safety point of view.

4.2.3 A total of 20 waterbodies were sampled for GCN DNA using eDNA protocol.

- 16 waterbodies initially returned negative for GCN DNA, indicating that GCNs are absent from these waterbodies.
- D7 was first sampled in April 2022 and returned an indeterminate result. However, when the pond was resurveyed on 9 May 2022, it returned negative for GCN DNA, indicating that GCN are absent from D7.
- W7 was first sampled in April 2022 and returned an indeterminate result. However, when the pond was resurveyed on 9 May 2022, it was found to be dry and as such unsuitable for breeding GCN.
- W4 as first sampled in April 2022 and returned an indeterminate result. However, when the pond was due to be resurveyed on 9 May 2022, it could not be accessed due to the presence of cows and calves within the field.
- P1 was sampled in April and May 2022 but both samples returned an indeterminate result.

4.3 Potential Impacts

4.3.1 The majority of the eDNA tests returned negative results, and no positive results, indicating that GCNs are not using the waterbodies surveyed to breed. Furthermore, reptile surveys were undertaken on the site between March and June 2022 and no GCNs were recorded using the refugia traps, further indicating that they are not present on site. However, common toads were identified on site during the initial walkover survey and two toadlets were recorded under one trap during the reptile surveys, indicating that the site is used by low numbers of common amphibians for foraging and commuting. No evidence of toads breeding within the on-site waterbodies was recorded but they were identified breeding within P1, located 165m north-west of the site.

4.3.2 Therefore, without mitigation, the proposed development may directly impact common amphibians and result in the loss of suitable foraging, commuting and refuge habitat for common amphibians.

4.4 Validity of Data

4.4.1 Unless the site changes significantly, the surveys carried out for this report should remain valid for at least 18 months, and potentially up to 3 years (CIEEM 2019).

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FIGURES

Figure 1 Site Location Plan

Figure 2 - Waterbodies Location and Results Map

- Figure 1 Site Location Plan

Legend:

Site Boundary

Rev	Date	Description	Drn	Chk	App
00	17/01/2023	2483418	TG	RH	ES

Frodsham Renewable Energy Development

RSK biocensus
EXPERTS IN ECOLOGY

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Site Location Plan

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- Figure 2 - Waterbodies Location and Results Map

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379800 379600 379400 379200 379000 378800 378600

P13 P1 P3 P4 P5 P8 P9 D11 W6 W7 D1 D24

Legend:

- Site Boundary

HSI Assessment - Ponds

- Excellent
- Good
- Average
- Below Average
- Poor
- Unsuitable

HSI Assessment - Ditches

- Good
- Average
- Below Average
- Poor
- Unsuitable

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379200 379000 378800 378600 378400 378200 378000

P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P12 P13 P14 P15 D21 D31 D32 D33

Legend:

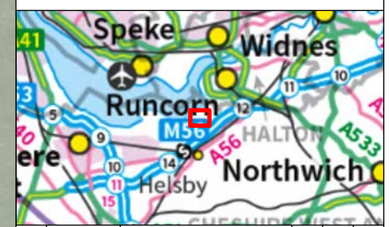
- Site Boundary

HSI Assessment - Ponds

- Excellent
- Good
- Average
- Below Average
- Poor
- Unsuitable

HSI Assessment - Ditches

- Good
- Average
- Below Average
- Poor
- Unsuitable



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Legend:

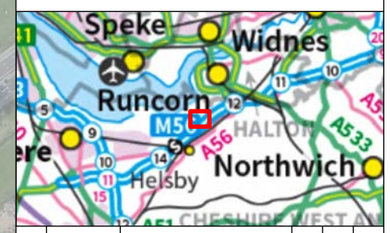
- Site Boundary

HSI Assessment - Ponds

- Excellent
- Good
- Average
- Below Average
- Poor
- Unsuitable

HSI Assessment - Ditches

- Good
- Average
- Below Average
- Poor
- Unsuitable



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379200 379000 378800 378600 378400 378200 378000

W1 W2 W3 W4 W5 W6 W7 W8

D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14 D15 D16 D17 D18 D19 D20 D21 D22 D23 D24 D25 D26 D27 D28 D29 D30 D31 D34 D35 D36

Legend:

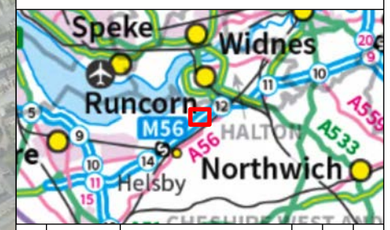
- Site Boundary

HSI Assessment - Ponds

- Excellent
- Good
- Average
- Below Average
- Poor
- Unsuitable

HSI Assessment - Ditches

- Good
- Average
- Below Average
- Poor
- Unsuitable



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379800 379600 379400 379200 379000 378800 378600

W9 W3 W4 W5 W2 W8 W1

D8 D7 D9 D6 D5 D4 D3 D10 D35 D11 D12 D13 D14 D25 D19 D24 D23 D18 D17 D15 D16 D28 D30

Legend:

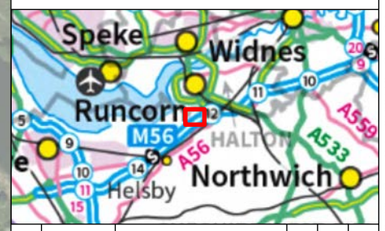
- Site Boundary

HSI Assessment - Ponds

- Excellent
- Good
- Average
- Below Average
- Poor
- Unsuitable

HSI Assessment - Ditches

- Good
- Average
- Below Average
- Poor
- Unsuitable



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APPENDIX A – NATURE CONSERVATION LEGISLATION AND POLICY

International Legislation

The following international conventions and directives apply to biodiversity protection in the UK. Post-'Brexit', even though European Union (EU) directives no longer directly apply to the UK, the provisions therein are enshrined in both domestic legislation and international agreements. Legislation has been enacted to ensure the regulations derived from these remain in force[1].

Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (Habitats Directive) 1992
https://www.legislation.gov.uk/eudr/1992/43

The Habitats Directive 1992 requires EU MSs to maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of community interest, which are listed under Annex I, II, IV and/or V. Species listed under Annex IV are known as 'European Protected Species' (EPS), and have retained their protected status in UK domestic legislation post-Brexit.

National Legislation

The following pieces of domestic legislation apply to amphibian protection in the UK.

The Wildlife and Countryside Act (WCA) 1981
https://www.legislation.gov.uk/ukpga/1981/69

The Wildlife and Countryside Act 1981 (as amended) is the primary piece of legislation relating to nature conservation in the UK, though it has been adapted in different ways in the devolved administrations. It was initially enacted to implement the Bern Convention, Bonn Convention and the Birds Directive (described above).

The act is supplemented by provisions in the Countryside and Rights of Way (CRoW) Act 2000 and the Natural Environment and Rural Communities (NERC) Act 2006, and extended in Scotland by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2011). WCA provides protection for amphibian species listed in 5 (other animals).

- Under Section 9 of the WCA, for animals listed on Schedule 5, it is an offence in England and Wales to intentionally or recklessly:

[1] Further information relating to England and Wales can be found here: https://www.gov.uk/government/publications/changes-to-the-habitats-regulations-2017/changes-to-the-habitats-regulations-2017. A similar exercise has been undertaken in Scotland and Northern Ireland.

- kill, injure or take any wild animal listed on Schedule 5*;
- possess or control any live or dead those wild animals or anything derived from it*;
- damage or destroy any structure or place which wild animals listed on Schedule 5 uses for shelter or protection*;
- disturb any such animal while it is occupying a structure or place of shelter or protection;
- obstruct access to any structure or place used by any such animal for shelter or protection; and
- sell, offer or expose for sale, or have in their possession or transports for the purpose of sale, any live or dead wild animal listed on Schedule 5 or any part of, or anything derived from such an animal.
- As noted above, there are minor differences between the offences in England and Wales outlined above, and those in Scotland / Northern Ireland. The three clauses marked with asterisks do not apply to EPS in England and Wales, as these offences are included in the 'Habitats Regulations' (see below). In addition, the Wildlife and Countryside Act 1981 is no longer relevant to EPS in Scotland or Northern Ireland, which instead are afforded full protection by the 'Habitats Regulations' (see below).
- There is no provision within the Act for derogation licences to be issued for the purposes of development, although Section 10 provides a defence in cases that may be considered to be: *"the incidental result of a lawful operation and could not reasonably have been avoided"* if certain conditions are met.
- Section 16(i) of the Act does make provision for derogation licences to be issued *"for the purposes of preserving public health or public … safety"*. For confirmation of this, it would be appropriate to consult the relevant statutory nature conservation body (SNCB)[2].

The Conservation of Habitats and Species Regulations (Habitat Regulations) 2017
https://www.legislation.gov.uk/uksi/2017/1012 England and Wales

The 2017 Regulations (England and Wales, Reg. 43) deems it an offence to:

a) deliberately capture, injure or kill a wild animal of a EPS,
b) deliberately disturb wild animals of any such species,
c) deliberately take or destroy the eggs of such an animal, or
d) damage or destroy a breeding site or resting place of such an animal.

- For the purposes of paragraph (b), disturbance of animals includes in particular any disturbance which is likely to:

[2] SNCBs are - in England: Natural England; in Wales: Natural Resources Wales; in Scotland: NatureScot; in Nortern Ireland: Department of Agriculture, Environment and Rural Affairs (DAERA).

a) impair their ability to survive, to breed or reproduce, or to rear or nurture their young, or in the case of animals of a hibernating or migratory species, to hibernate or migrate; or
b) to affect significantly the local distribution or abundance of the species to which they belong.

Currently (2021), all EPS are also listed on Schedule 5 of the WCA (outlined above), as it applies in England and Wales, though only some clauses of the WCA apply (Section 9 4(b), (c) and 5). EPS often encountered on development sites including GCN (*Triturus cristatus*).

The Natural Environment and Rural Communities (NERC) Act 2006; The Environment (Wales) Act 2016
https://www.legislation.gov.uk/ukpga/2006/16

- The Natural Environment and Rural Communities (NERC) Act 2006, Section 40 requires that any public body or statutory undertaker in England must have regard to the purpose of conservation of biological diversity in a manner that is consistent with the exercise of their normal functions. This may include enhancing, restoring or protecting a population or a habitat. The intention is to help ensure that biodiversity becomes an integral consideration in the development of policies, and that decisions of public bodies work with the grain of nature and not against it. In Wales, a similar duty has been moved to Section 6 of the Environment (Wales) Act 2016.
- As part of this duty, statutory undertakers must have regard to the list of habitats and species which are of principal importance for the purpose of maintaining and enhancing biodiversity. For England, the duty to compile such a list is captured under Section 41 of the NERC Act; in Wales, under Section 7 of the Environment (Wales) Act. The lists for England are accessible online via the National Archive[3]; for Wales via https://www.biodiversitywales.org.uk/.

[3] https://webarchive.nationalarchives.gov.uk/ukgwa/20140712055944/http:/www.naturalengland.org.uk/ourwork/conservation/biodiversity/protectandmanage/habsandspeciesimportance.aspx

APPENDIX B – HSI RESULTS

Table 3: HSI Results

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D1	A	365	frequently	poor	90	minor	absent	16	poor	0	0.48	Poor	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D2	A	420	sometimes	poor	50	minor	absent	16	good	0	0.70	Good	
D3	A	428	frequently	poor	100	absent	absent	16	poor	0	0.47	Poor	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D4	A	715	frequently	poor	100	absent	absent	16	moderate	0	0.52	Below average	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D5	A	300	frequently	poor	70	absent	absent	16	poor	0	0.53	Below average	 

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D6	A	800	frequently	poor	100	absent	absent	16	poor	0	0.48	Poor	
D7	A	290	sometimes	poor	80	minor	absent	16	moderate	0	0.62	Average	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D8	A	1530	sometimes	poor	80	minor	absent	16	good	0	0.67	Average	
D9	A	600	frequently	poor	50	minor	absent	16	moderate	0	0.58	Below average	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D10	A	150	sometimes	moderate	10	minor	absent	16	moderate	0	0.65	Average	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D11	A	550	sometimes	poor	90	minor	absent	16	moderate	0	0.63	Average	
D12	A	300	sometimes	poor	70	minor	absent	16	moderate	0	0.64	Average	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D13	A	360	sometimes	poor	90	minor	absent	16	moderate	0	0.61	Average	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D14	A	400	sometimes	moderate	90	minor	absent	16	moderate	0	0.66	Average	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D15	A	580	frequently	poor	100	minor	absent	16	moderate	0	0.50	Poor	

ID	Geographic location	Pond area (m²)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D16	A	560	frequently	poor	100	minor	absent	16	moderate	0	0.50	Poor	
D17	A	600	frequently	poor	95	minor	absent	16	moderate	0	0.52	Below average	n/a similar to D20.

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D18	A	530	frequently	poor	95	minor	absent	16	moderate	0	0.52	Below average	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D19	A	1800	sometimes	poor	90	minor	absent	16	moderate	0	0.61	Average	

ID	Geographic location	Pond area (m²)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D20	A	345	rarely	poor	60	minor	absent	16	poor	0	0.66	Average	
D21	A	220	frequently	poor	100	absent	absent	16	moderate	0	0.48	Poor	N/A

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D22	A	260	frequently	poor	90	absent	absent	16	moderate	0	0.52	Below average	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D23	A	550	frequently	poor	80	minor	absent	16	moderate	0	0.55	Below average	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D24	A	520	frequently	poor	100	minor	absent	16	moderate	0	0.50	Poor	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D25	A	740	sometimes	poor	90	minor	absent	16	good	0	0.65	Average	

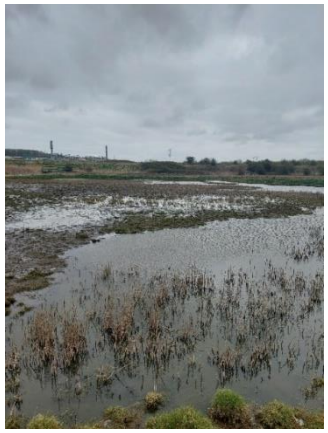
ID	Geographic location	Pond area (m²)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D26	A	115	frequently	poor	100	absent	absent	16	moderate	0	0.45	Poor	
D27	A	1200	never	poor	0	minor	possible	16	poor	0	0.65	Average	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D28	A	2000	never	poor	50	minor	possible	16	moderate	0	0.68	Average	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D29	A	800	Sometimes	poor	90	minor	absent	16	moderate	0	0.61	Average	
D30	No access												n/a

ID	Geographic location	Pond area (m²)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D31	Dry - unsuitable												
D32	Dry - unsuitable												Similar to D31
D33	A	240	frequently	poor	90	absent	absent	45	poor		0.48	Poor	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
D34	A	32.5	frequently	poor	100	minor	absent	45	moderate	0	0.38	Poor	N/A
D35	A	62.5	frequently	moderate	10	minor	absent	45	moderate	0	0.51	Below average	N/A
D36	A	20	frequently	poor	0	absent	absent	45	good	0	0.46	Poor	N/A
W1	A	3600	rarely	poor	5	minor	possible	45	moderate	5	0.67	Average	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
W2	A	1200	sometimes	moderate	10	minor	absent	45	good	0	0.76	Good	
W3	A	7000	sometimes	poor	0	major	absent	45	moderate	0	0.28	Poor	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
W4	A	1500	rarely	moderate	0	minor	absent	45	moderate	10	0.80	Good	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
W5	A	340	rarely	moderate	0	minor	absent	45	moderate	0	0.76	Good	
W6	A	425	frequently	poor	0	minor	absent	45	moderate	0	0.57	Below average	N/A

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
W7	A	400	sometimes	moderate	0	minor	absent	45	good	50	0.82	Excellent	 

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
W8	A	200	frequently	poor	0	absent	absent	45	poor	0	0.52	Below average	
W9	A	20	frequently	poor	0	absent	absent	45	moderate	0	0.42	Poor	n/a
P1	A	9477	never	poor	0	minor	possible	45	poor	10	0.44	Poor	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
P2	A	15077	never	good	5	minor	minor	45	poor	10	0.53	Poor	
P3	A	2379	frequently	poor	0	minor	absent	45	poor	0	0.54	Below average	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
P4	A	1230	frequently	poor	0	minor	absent	45	poor	0	0.54	Below average	
P5	A	715	frequently	poor	0	minor	absent	45	poor	0	0.45	Below average	n/a
P6	A	6000	frequently	poor	0	minor	absent	45	poor	0	0.49	Poor	n/a

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
P7	A	4500	frequently	poor	0	minor	absent	45	poor	0	0.54	Poor	
P8 - ditch	A	640	frequently	poor	0	minor	absent	45	poor	0	0.54	Below average	

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
P9	A	600	frequently	poor	0	minor	absent	45	poor	0	0.53	Below average	
P10	A	2000	frequently	poor	0	minor	absent	45	poor	0	0.45	Below average	
P11	Dry – unsuitable.												n/a

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
P12	A	125442	Never	Poor	10	Minor	Minor	45	Moderate	0	0.41	Poor	
P13	A	1900	never	moderate	25	minor	minor	45	moderate	0	0.67	Average	N/A
P14 - Ditch	A	470	sometimes	poor	0	minor	absent	45	poor	0	0.58	Average	N/A

ID	Geographic location	Pond area (m^2)	Pond permanence	Water quality	Shade (%)	Waterfowl	Fish	Pond density	Terrestrial habitat	Macrophyte cover (%)	HSI score	Pond suitability	Photograph
P15	A	81	frequently	poor	0	minor	absent	45	poor	0	0.5	Poor	

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Annex 6

Frodsham Renewable Energy Development Reptile Letter Report (RSK Biocensus, 2023)

Joe Chambers
Peel Cubico Renewables Limited
Venus Building
1 Old Park Lane
Trafford City
Manchester
M41 7HA

Spring Lodge
172 Chester Road
Helsby
Cheshire
WA6 0AR

Telephone: +44 (0)330 223 1074
www.rskbiocensus.com

By email: [redacted]@peellandp.co.uk

Our reference: 2483418 Frodsham Renewable Energy Development Reptile Surveys REV01

30 January 2023

Dear Joe,

Reptile surveys

This report presents the findings of reptile surveys carried out for Peel Cubico Renewables Limited on behalf of any future project specific Special Purpose Vehicle (SPV) company at the Frodsham renewable energy development site in Frodsham, Cheshire (OS grid reference: SJ 510 786). The survey area included the land within the red-line boundary (called 'the site' from this point forward – as shown on *Figure 1*).

The ecological value of this site and its suitability for reptiles was assessed in a preliminary ecological appraisal undertaken in March 2022 by RSK Biocensus. The site was considered to provide suitable terrestrial habitat for reptiles as it contains areas of marshy grassland (grazed by sheep and cattle), rough grassland and arable land with a grid of interconnected ditches forming the field boundaries. These habitats provide foraging and commuting opportunities for reptiles, in particular grass snake (*Natrix helvetica)*, while the areas of scrub and scattered trees will also provide refuge opportunities. A large portion of the western section of the site is utilised as a wind farm and is intensively grazed by sheep and cattle, providing limited opportunities for reptiles within this section of the site.

As these habitats are likely to be affected by the proposals, visits were recommended to determine whether reptiles are present on the site and whether the proposals would be likely to have a significant impact on them, if present.

Methods

The standard method for establishing reptile presence is to survey using artificial refuges (roofing felt tiles and squares of corrugated metal, known as 'tins' *c*.0.5 m^2), which were placed in suitable reptile habitat. The felt tiles and metal tins absorb the heat of the sun and attract reptiles, which use them for shelter and basking to aid temperature regulation. This allows surveyors to find reptiles that would otherwise be widely dispersed and well-hidden.

Due to the size of the proposed site boundary, the site was split into 13 different areas and a total of 600 artificial refuges were deployed on 31 March 2022, see Figure 2 for refuge locations. Seven

reptile visits were then carried out between April and June 2022 and the refuges were checked for reptiles during suitable weather when reptiles are active. Ideal weather conditions are bright sunshine between the hours of 08:30 and 11:00 or 16:00 to 18:30, with air temperatures between 9 and 15 ºC, or if there is hazy or intermittent sunshine and little wind then between 9 and 18 ºC, and not during rain. When completing each site walk and checking refuges, a general watch was kept for reptiles away from refuges and other signs of reptiles, e.g. grass snake eggs, excrement, or sloughed skins (often beneath refuges).

Limitations

The site is accessed by members of the public and as such *c.* 20 the artificial refuges were disturbed or removed during the survey. The reptile survey guidelines[1] recommend ten artificial refugia per hectare of habitat, this would equal 480 artificial refuges for the areas of suitable habitat present on site. Therefore, as 600 artificial refuges were deployed and over 96% of the mats remained in position, this is not considered to be a significant constraint to the survey.

Results

No reptiles were recorded during any of the survey visits, but juvenile toads (*Bufo bufo)* were recorded occasionally. The maximum number of toads was recorded during a single site visit was three (under three separate mats). This was recorded during visit 6. A table of all the surveys carried out can be found in *Appendix 2*.

Conclusion

No reptiles were recorded on the site during the survey visits. Therefore, reptiles are considered reasonably likely to be absent from the site or present in very low numbers. However, a small number of common amphibians (toads) were recorded on the site.

These survey findings are valid for two years. If more than two years lapse before construction begins and the site conditions have changed significantly since these surveys, additional surveys may be required prior to the commencement of works.

Yours sincerely,

[redacted]

Emily Clark BSc (Hons) PGdip ACIEEM
senior ecological consultant

Technical and quality review by

[redacted]

Will Holden BSc (Hons) MSc CEcol MCIEEM

principal consultant

[1] Froglife. (1999). *Reptile survey: An introduction to planning, conducting and interpreting surveys for snake and lizard conservation*. Froglife Advice Sheet 10. Froglife: Halesworth.

Appendix 1: Legislation

Common Reptiles

Common lizard (*Zootoca vivipara*), grass snake (*Natrix helvetica*), slow-worm (Anguis fragilis), and adder (*Vipera berus*) are listed under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), in respect of Section 9(5) and part of Section 9(1). This protection was extended by the CRoW Act.

Under the above legislation it is an offence to:

- Intentionally or deliberately kill or injure any individual of such a species.

Appendix 2: Full survey results

Survey Visit	Areas	Date	Time	Temp. (Air)	Wind (Beaufort)	Cloud (Octas)	Rain (0-5)	Suitable Conditions (Yes / No / Fair)	Results
1	1 - 13	14.04.22	07:40 – 13:40	12	3	0	0	Yes	N/A
2	2, 4, 5, 6, 7, 8, 12, 13	21.04.22 /	09:00 – 14:00	9	3	8	0	Yes	N/A
	1, 3, 9,10, 11	22.04.22	08:00 – 10:	9	3	8	0	Yes	N/A
3	1 -13	28.04.22	09:00 – 15:30	10	2	6	0	Yes	Area 8 – 2x juvenile toads under one refuge.
4	1 – 3, 5 - 13	05.05.22	08:30 -13:00	8	2	8	0	Yes	Area 1 – 1x juvenile toad under one refuge. Area 13 – 1x juvenile toad under one refuge.
	4	12.05.22	12:45 – 14:30	12	2	5	0	Yes	1x juvenile toad under one refuge.
5	5, 6, 8, 9, 10	12.05.22	09:15 – 13:30	12	2	5	0	Yes	N/A
	1 – 4, 7, 11 - 13	20.05.22	10:45 – 12:45	12	2	8	2	Fair	Area 1 – 1x juvenile toad under one refuge.
6	1 – 4, 7, 11 - 13	26.05.22	07:00 – 12:00	13	3	0	0	Yes	Area 3 – 2x juvenile toad under two refuge.
	5, 6, 8, 9, 10	27.05.22	07:30 – 12:30	13	3	0	0	Yes	Area 9 -1x juvenile toad under one refuge.
7	4, 5, 6, 8, 9, 10	10.06:22	08:00 – 16:00	15	4	7	0	Yes	N/A
	1, 2, 3, 7, 11, 12, 13	22.06.22	09:00 – 15:00	14	2	0	0	Yes	Area 7 – 1x juvenile toad under one refuge.

Figures

Figure 1: Site location

Figure 2: Reptile survey locations

Legend:

Site Boundary

Rev	Date	Description	Drn	Chk	App
00	17/01/2023	2483418	TG	RH	ES

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TITLE: Figure 1:

Site Location Plan

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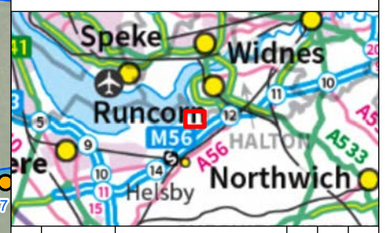
Document Path: C:\OneDrive\RSK Group\RSK Biocensus - 06 GIS - 2483418 - Solis Ortis\2483418 - Solis Ortis - Figure 1 - Site Location Plan.aprx

Legend:

- Site Boundary
- Reptile Survey Area
- Reptile Trap Location



Rev	Date	Description	Drn	Chk	App
00	17/01/2023	2483418	TG	RH	ES

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TITLE: Figure 2:
Reptile Survey Locations
Page 1 of 4

0 60 120 180
Metres
SCALE: 1:5,000 @ A3

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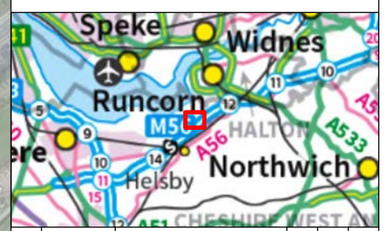
Document Path: C:\OneDrive\RSK Group\RSK Biocensus - 06 GIS - 2483418 - Solis Ortis\2483418 - Solis Ortis -Figure 2 - Reptile Survey Locations.aprx

Legend:

- Site Boundary
- Reptile Survey Area
- Reptile Trap Location



Rev	Date	Description	Drn	Chk	App
00	17/01/2023	2483418	TG	RH	ES

Frodsham Renewable Energy Development

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TITLE: Figure 2:
Reptile Survey Locations
Page 2 of 4

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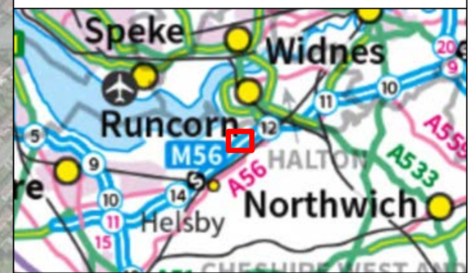
Legend:

- Site Boundary
- Reptile Survey Area
- Reptile Trap Location



Rev	Date	Description	Drn	Chk	App
00	17/01/2023	2483418	TG	RH	ES

Frodsham Renewable Energy Development

RSK biocensus
EXPERTS IN ECOLOGY

TITLE: Figure 2:
Reptile Survey Locations
Page 3 of 4

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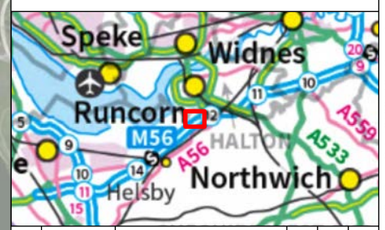
Legend:
- Site Boundary
- Reptile Survey Area
- Reptile Trap Location



Rev	Date	Description	Drn	Chk	App
00	17/01/2023	2483418	TG	RH	ES

Frodsham Renewable Energy Development

RSK biocensus EXPERTS IN ECOLOGY

TITLE: Figure 2:
Reptile Survey Locations
Page 4 of 4

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Annex 7

Invertebrate Assessment Report

An invertebrate assessment of Frodsham Marsh

The tooth-thighed hoverfly *Tropidia scita*

Peter Brash Ecology

Tel 07956 215012

58 Rosslyn Street
Liverpool
L17 7DP

peterbrashecology.co.uk
[redacted]@peterbrashecology.co.uk

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Management and mitigation 9
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Summary

9 days fieldwork over the course of summer 2023 generated 1231 records of 386 invertebrate species. 8 of these have a current UK conservation status[1], at 2.07% of the total this is a low proportion of scarce or rare species.

Curimopsis setigera is a pill beetle associated with mosses and is Nationally Rare[2] and Near Threatened[3], this is the first Cheshire record and represents a considerable extension of the range of this southern species. The thistle associated weevil *Rhinocyllus conicus* is Nationally Scarce category A[4] but is sure to be downgraded at next review. Alder leaf beetle *Agelastica alni* at last review was classed as Nationally Rare and Data Deficient[5] but is now common and widespread.

The weevils *Oxystoma cerdo* and *Sitona waterhousei* both have status of Nationally Scarce category B but may be downgraded in any future review. Bull's-horn stem moth *Ochsenheimeria urella* is Nationally Scarce category B, while cinnabar *Tyria jacobaeae* and blood-vein *Timandra comae* moths are Section 41[6] species.

Two additional species, the figwort associated weevil *Cionus tuberculosus* and poplar-associated lance fly *Lonchaea palposa* are believed to be new species to Cheshire.

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[1] Some of the designations are likely to be downgraded in future reviews.

[2] **Nationally Rare (NR)** A native species recorded from between 1- 15 hectads (10km x 10km square) of the Ordnance Survey national grid in Great Britain since 1990 and: • There is reasonable confidence that exhaustive recording would not find them in more than 15 hectads. • Where it is believed to occur as a breeding species within each of these hectads (i.e. discount those that are known to contain only casual immigrants).

[3] **NEAR THREATENED (NT)** A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

[4] **Nationally Scarce** or Nationally Notable species are those recorded within 16 to 100 hectads (10 km squares) in GB and hence are of significant nature conservation importance. The designation is sometimes split into Nationally Scarce A (16-30 hectads) and Nationally Scarce B (17 to 100 hectads).

[5] **DATA DEFICIENT (DD)** A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.

[6] Priority habitats and species are those identified as being of principal importance for the conservation of biodiversity in England. They are listed in Section 41 of the Natural Environment & Rural Communities Act 2006. The lists are derived from those UK BAP Priority habitats and species which occur in England.

Pantheon[7] analysis failed to find any assemblages that were favourable, although the 'low-grade' assemblages of rich flower resource and scrub edge came close with 14 of 15 qualifying species and 9 of 11 respectively.

The area surveyed is probably of local or county significance for the invertebrate fauna.

Introduction

This report covers the invertebrate interest of a proposed renewable energy site at Frodsham Marsh in Cheshire. An area of approximately 275 hectares, the entire site was surveyed in May. Selected areas of potentially higher interest were covered a further three times over the course of the summer.

The site varies, some low-lying land is intensive arable, other areas have part-improved and semi-natural grassland with wetter areas of rush pasture and small reedbeds. Ditches with low water levels cross the lower parts of the site. Hedges are hawthorn dominated and often tall, up to 6 metres in height.

Some areas have been modified by having the banks raised and used as settlement tanks for sludge from the Manchester Ship Canal. These areas have generally been reseeded with agricultural grasses and grazed with sheep and as such are generally poor for invertebrates. There is some interest around temporary pools in low lying areas and also in and around a series of pools at the southern edge of the No.5 tank at SJ500782 (the mitigation area). Poplars on the northern edge of No 5 tank have value for invertebrates. Another area of interest is the settlement tank known as the ICI tank. This is ungrazed and has some areas of mildly calcareous influenced grassland but is rapidly undergoing succession to woodland with willows dominating many areas.

[7] An online analytical tool for invertebrate samples developed by Natural England and Centre for Ecology and Hydrology.

A mix of scrub and grassland including bird's-foot trefoil on the former ICI tank.

Methods and timings

An initial visit was made in May, covering all of the areas under consideration. Further visits were made to areas of higher invertebrate potential. All visits were conducted in favourable weather conditions.

23/5/2023 Overcast, sunny spells later, light breeze, maximum temperature 16 Celsius.

24/5/2023 3/8 cloud, fresh breeze maximum temperature 15 Celsius.

26/5/2023 4/8 cloud, still, maximum temperature 20 Celsius.

21/6/2023 4/8 cloud, light breeze, occasional heavy showers, maximum temperature 20 Celsius.

28/6/2023 Overcast, light breeze, maximum temperature 20 Celsius.

27/7/2023 Mostly cloudy, fresh breeze, maximum temperature18 Celsius.

28/7/2023 4/8 cloud, fresh breeze, maximum temperature 21 Celsius.

4/9/2023 1/8 cloud, light breeze maximum temperature 27 Celsius.

5/9/2023 0/8 cloud, light breeze, maximum temperature 27 Celsius.

Sweep netting: random sampling of grassland and shrubs using a butterfly net, sweep-netting over bare ground, targeted sweeping of insects from flowers, shrubs, seepages, pool edges.

Suction sampling of plants in grassland, moss and bare ground using a small 'dustbuster' electric vacuum cleaner.

Visual searching, particularly of flowering plants, edges of water bodies, turning over stones etc.

Beating tray: A large white canvas sheet that is held under trees and shrubs, collecting insects that are beaten from foliage or dead branches.

Most species are identified in the field. Some specimens are euthanized using ethyl acetate and are stored in 7ml glass snap top vials for identification later (prior to report writing).

All species were recorded on iRecord and were analysed using Pantheon, an analytical tool for invertebrate samples developed by Natural England and Centre for Ecology and Hydrology.

Results

A total of 386 species were recorded over the duration of the fieldwork, 8 species have a current UK conservation designation (see table 1). One species (the poplar associated lance fly *Lonchaea palposa*) has been recently downgraded from Nationally Scarce on account of occupying twelve UK vice counties[8], the species is new to Cheshire. The breakdown included 130 beetle species, 110 true flies, 47 true bugs, 34 hymenopterans (bees, wasps, sawflies and ants), 20 moths, 17 butterflies, and 32 other species split between seven groups.

Table 1 Species with conservation designation

Common & scientific name	Conservation status	Location	Ecological notes
A pill beetle *Curimopsis setigera*	Nationally Rare Near Threatened	ICI tank SJ516795	A small, bristly pill beetle associated with short turf in calcareous areas, mainly coastal. May be associated with mosses. Most records from south coasts of England and Wales but with outliers in The Brecks and Yorkshire.

[8] Sub-divisions of Great Britain based on ancient county boundaries with some subdivided to make more uniform sized areas. The vice county system is useful for biological recording as the boundaries do not change with local government reorganisation.

Common & scientific name	Conservation status	Location	Ecological notes
A weevil *Oxystoma cerdo*	Nationally Notable category B (very likely to be downgraded when next reviewed)	ICI tank SJ514793	A blackish weevil associated with vetches, particularly tufted vetch *Vicia cracca*. Formerly thought to be a northern species, now fairly widespread across England, Wales and into southern Scotland.
A weevil *Rhinocyllus conicus*	Nationally Notable category A (very likely to be downgraded when next reviewed)	On spear thistle SJ518785 SJ49657879 SJ50467928 On welted thistle SJ500782	Feeds on various thistles including musk thistle but increasingly on spear thistle. Formerly restricted to southern England but range has increased rapidly in the last couple of decades and now no longer deserves Nationally Scarce status. Adults recorded from April to October.
A weevil *Sitona waterhousei*	Nationally Notable category B (likely to be downgraded when next reviewed)	ICI tank SJ514793	Associated with bird's-foot-trefoil on coastal cliffs, coastal shingle, calcareous grasslands and quarries near the coast. Widely distributed but very local in occurrence. Adults have been recorded from February to September.
Alder leaf beetle *Agelastica alni*	Nationally Rare Data Deficient (Very likely to be downgraded in any future review)	Widespread on alder SJ5095 7864 SJ5118 7827 SJ5121 7831 SJ520782	Formerly considered extinct in Great Britain, this species was rediscovered in 2004 and has since spread rapidly. Will often defoliate alders and will also feed on a range of broad-leaved trees including hazel and willow.
Bull's-horn stem-moth *Ochsenheimeria urella*	Nationally Scarce category B (likely to be downgraded when next reviewed)	SJ51837859	Fairly widespread throughout the British Isles. Larvae feed on coarse grasses such as *Bromus* and *Agropyron*. Adults on the wing in July and August.

Common & scientific name	Conservation status	Location	Ecological notes
Cinnabar *Tyria jacobaeae*	Section 41 Priority species	SJ51747922 SJ51577902 SJ510784	Still very widespread but declining in England, Wales and the southern half of Scotland. Larvae feed on ragworts and groundsels *Senecio* especially common ragwort *S. jacobaea*. Adults fly from May to July.
Blood-vein *Timandra comae*	Section 41 Priority species	SJ51557908	Widespread and common (although declining) in most of England and Wales, scarce in Scotland. Larve feed on various members of the dock family including knotgrass and sorrels. Adults on the wing in two broods, May to July and August to September.

The species list was entered into Pantheon, a software application which assesses the importance of invertebrate assemblages. None of the assemblages were found to be favourable although two assemblages came close with 'Rich Flower Resource' (based on bee species) having 14 of the 15 qualifying species and Scrub Edge having 9 of 11 qualifying species. Both assemblages are considered 'low-grade' as favourable condition is often easily achieved. It is somewhat surprising for neither to be favourable but this probably reflects the fact that nectar sources and bare ground are relatively poorly represented across the site.

The Scrub-heath and Moorland also came fairly close to favourable condition. This is rather surprising as this assemblage is often linked to heaths and upland areas, although trees and scrub on acid soils are also features.

Apart from the scarce species outlined in the table there are other assemblages that are probably quite important. The wetland hoverflies at Frodsham include robust populations of specialist species such as the Tooth-Thighed Hoverfly *Tropidia scita*, populations of Marsh Tiger Hoverfly *Helophilus hybridus* and Orange-legged Boxer *Platycheirus fulviventris* are important in the county or regional context. Local records suggest that soldierflies are an important group in the wider area at Frodsham and correct management might maintain or enhance these populations.

Overall the field work and assessment suggests an area of local significance although with some important species at the county level.

Table 2 Pantheon assemblage scores

Broad biotope	Habitat	SAT	Reported condition
Open habitats		Rich flower resource	Unfavourable (14 species, 15 required)
Open habitats		Scrub edge	Unfavourable (9 species, 11 required)
Open habitats		Scrub-heath & moorland	Unfavourable (7 species, 9 required)
Tree-associated	Decaying wood	Bark & sapwood decay	Unfavourable (6 species, 19 required)
Open habitats	Short sward & bare ground	Bare sand & chalk	Unfavourable (5 species, 19 required)
Open habitats	Short sward & bare ground	Open short sward	Unfavourable (4 species, 13 required)
Wetland	Acid & sedge peats	Reed-fen & pools	Unfavourable (2 species, 11 required)
		Epiphyte fauna	Unfavourable (1 species, 3 required)
Tree-associated	Decaying wood	Fungal fruiting bodies	Unfavourable (1 species, 7 required)
Tree-associated	Decaying wood	Heartwood decay	Unfavourable (1 species, 6 required)

Management and mitigation

- Bare ground and early successional vegetation such as mosses, Black Medick and Bird's-foot Trefoil should be maintained and increased on the old ICI tank. Some mature willows should be retained around the edges as these can be important basking areas for species such as soldierflies.
- Areas of bare ground, both vertical and horizontal, should be retained or created in dry places that receive full sun for most of the day. These will provide nesting opportunities for burrowing bees and wasps as well as other heat loving invertebrates.
- Increasing the water levels in ditches would help them support a better wetland vegetation and in turn a richer invertebrate fauna including aquatic species and terrestrial species with aquatic or semi aquatic larvae.
- Areas of herb-rich marshy grassland should be retained, increased or if not possible on site, then recreated elsewhere locally.
- Cattle grazing is important in maintaining this habitat.
- The poplar trees on the northern side of No 5 tank should be retained as they support important invertebrates in the local context, including species associated with dead wood and decay habitats.
- Hedgerows should be allowed to grow to at least two metres tall, dense and managed on rotation so that there is always a large proportion that are able to produce flowers and fruit.

- Establish herb-rich neutral grassland on former arable land from seed sources of UK (preferably local) provenance. Species such as bird's-foot trefoil, yarrow, common knapweed and ox-eye daisy should make up part of the species list.

References

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Hyman, P.S. & Parsons, M.S., 1992: *A Review of the scarce and threatened Coleoptera of Great Britain*. Part 1. JNCC. Peterborough.

Lane, S.A. 2021. A review of the status of the beetles of Great Britain – The Byrrhidae (Pill Beetles), Clambidae (Fringe-winged Beetles), Dascillidae (Soft-bodied Plant Beetles), Eucinetidae (Plate-thigh Beetles), Monotomidae (Root-eating Beetles), Phalacridae (Shining Flower Beetles) and Ptilodactylidae. Species Status 17. JNCC, Peterborough, ISSN 1473-0154.

Electronic resources

Pantheon analytical software

Webb, J., Heaver, D., Lott, D., Dean, H.J., van Breda, J., Curson, J., Harvey, M.C., Gurney, M., Roy, D.B., van Breda, A., Drake, M., Alexander, K.N.A. and Foster, G. (2018). Pantheon - database version 3.7.6

Annex 8

Confidential Badger Report

(Provided as a separate document)