



ARCUS

ECOLOGICAL IMPACT ASSESSMENT

SOAY SOLAR PARK AND GREENER GRID PARK

STATKRAFT UK LTD

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EXECUTIVE SUMMARY

This report has been produced for Statkraft UK LTD in support of a planning application for Soay Solar Farm and Greener Grid Park (the Development) on land at Thornton, near York, East Riding of Yorkshire (the Site).

A Preliminary Ecological Appraisal (PEA) was undertaken and identified the Site had the potential to support a range of important ecological features that may be sensitive to development and recommended further surveys of these features to provide the necessary information to inform an Ecological Impact Assessment (EclA).

Surveys were completed for breeding birds, wintering birds, Nightjar, Great Crested Newt (GCN) and Water Vole. The results of the PEA and additional surveys, and mitigation measures to address any identified effects, are included within this report. The results of the breeding bird, wintering birds and Nightjar surveys are included within a separate Ornithology Impact Assessment.

In the absence of mitigation, there is the potential for adverse ecological effects given the findings of the protected species surveys. Species-specific and general mitigation have been recommended and incorporated into the design of the Development to minimise adverse ecological effects.

Habitat creation and enhancement will provide significant benefits to a range of ecological features and increase the biodiversity value of the Site. This is detailed further in the Biodiversity Enhancement and Mitigation Plan (BEMP) which has been drafted in consultation with the Bumblebee Conservation Trust (BBCT). There will be an overall positive impact on habitats, with wildflower planting providing food sources for pollinators, along with two new Habitat Enhancement Areas (HEAs) as a result of the Development. The HEAs will provide connectivity for commuting bats, badgers, reptiles and other mammals to Allerthorpe Common, a Site of Special Scientific Interest (SSSI) that is immediately adjacent to the north of the Site.

The creation of a native species grassland (primarily between and beneath the solar panels) and wildflower grassland (areas outside the fenced areas) will also create a large quantum of new habitat that would not be possible in the absence of the Development. This will result in a marked increase in biodiversity value as a result of the Development.

1 INTRODUCTION AND BACKGROUND

1.1 Overview

Arcus Consultancy Services Limited (Arcus) has been instructed by Statkraft UK LTD to undertake an Ecological Impact Assessment (EclA) of land at Thornton, near York, East Riding of Yorkshire (the Site), approximately centred on National Grid Reference SE 76204 46514.

The EclA is submitted as part of a planning application for the proposed Soay Solar Farm and Greener Grid Park (the Development), which includes associated soft and hard landscaping. The EclA presents the ecological baseline conditions and potential ecological impacts from the Development, taking into account relevant planning policy and legislation.

Further surveys are described in order to provide additional information for assessing potential impacts and to inform, where applicable, recommendations and mitigation to avoid or reduce impacts, as well as measures for ecological enhancements. All surveys followed necessary Covid-19 working restrictions.

The layout and technical details of the Development are provided in the associated Planning, Design and Access Statement (PDAS) and accompanying figures. The Site Layout is shown in Figure 2 of the planning application.

1.2 Structure of Report

The report is supported by the following appendices:

- Appendix A – Planning Policy and Legislation;
- Appendix B – Figures and Target Notes:
 - Figure 1: Phase 1 Habitat Survey Map;
 - Figure 2: Great Crested Newt Pond Locations within 250 meters (m) of the Site;
 - Figure 3: Bat Roost Assessment – Tree Locations;
 - Figure 4: Water Vole Survey Results;
- Appendix C – Designated Sites;
- Appendix D - Plant Species List;
- Appendix E – Photographs;
- Appendix F – Great Crested Newt (GCN) Detailed Survey Results;
- Appendix G – Bat Roost Assessment – Trees; and
- Appendix H – Water Vole Detailed Survey Results.

1.3 Planning Policy and Legislation

The following planning policy and legislation were consulted during preparation of this report, with a further summary and citations of each provided in Appendix A:

- The Wildlife and Countryside Act 1981 (as amended)¹;
- The Conservation of Habitats and Species Regulations (CSHR) 2017²;
- Natural Environment and Rural Communities (NERC) Act 2006³;
- The Protection of Badgers Act (1992)⁴;

¹ UK Government (1981) Wildlife and Countryside Act 1981 [Online] Available at: <https://www.legislation.gov.uk/ukpga/1981/69> (Accessed 09/07/2021)

² UK Government (2017) The Conservation of Habitats and Species Regulations 2017 [Online] Available at: <https://www.legislation.gov.uk/uksi/2017/1012/contents/made> (Accessed 09/07/2021)

³ UK Government (2006) Natural Environment and Rural Communities Act 2006 [Online] Available at: <https://www.legislation.gov.uk/ukpga/2006/16/contents> (Accessed 09/07/2021)

⁴ UK Government (1992) Protection of Badgers Act 1992 [Online] Available at: <https://www.legislation.gov.uk/ukpga/1992/51/contents> (Accessed 09/07/2021)

- The Hedgerow Regulations (1997)⁵ and
- The National Planning Policy Framework (NPPF) 2021⁶.

2 METHOD

2.1 Desk Study

A search of European statutory designated sites such as Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar sites⁷ within 5 km of the Site was undertaken. **Natural England's Multi Agency Geographic Information for the Countryside (MAGIC)**⁸ was also searched to identify records of connecting priority habitats and European Protected Species (EPS) up to 2 km.

Natural England's MAGIC website was consulted to obtain information about local or national statutory designated sites such as National Nature Reserves (NNR), Local Nature Reserves (LNR) and Sites of Special Scientific Interest (SSSI) within 2 kilometres (km) of the Site.

The North & East Yorkshire Ecological Data Centre (NEYEDC) East was consulted for local records of features of ecological interest within 2 km of the Site, including non-statutory designated Local Wildlife Sites (LWS) and notable and protected species.

A review of available historic aerial satellite imagery⁹ was undertaken for the Site to gain an understanding of previous land use.

2.2 Extended Phase 1 Habitat Survey

An Extended Phase 1 Habitat Survey was conducted on 15th December 2019 and 1st July 2021 by a suitably experienced Ecologist.

The survey covered the entirety of the Site (shown on Figure 1, Appendix B). The aim of the survey was to classify and map habitats according to standard methods¹⁰ and to assess their potential to support notable and protected species, including mammals, nesting birds, amphibians and reptiles. Target Notes (TN) were recorded for notable features (e.g., log pile or brown hare siting), as detailed in Appendix B.

The survey was carried out following the Guidelines for Preliminary Ecological Appraisal¹¹.

An Arboricultural Assessment was undertaken for the Site and the results are presented in the Arboricultural Impact Assessment¹² which accompanies the Planning Application.

⁵ UK Government (1997) The Hedgerow Regulations 1997 [Online] Available at: <https://www.legislation.gov.uk/ukxi/1997/1160/contents/made> (Accessed 21/07/2021)

⁶ UK Government (2021) National Policy Planning Framework [Online] Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1004408/NPPF_JULY_2021.pdf (Accessed 21/07/2021)

⁷ UK Government (2013) Ramsar sites [Online] Available at: <https://data.gov.uk/dataset/acc63c60-0850-49a9-afce-88d58cd1a1b2/ramsar-sites> (Accessed 09/07/2021)

⁸ Natural England (2021) Multi Agency Geographic Information for Countryside (MAGIC) [Online] Available at: <https://magic.defra.gov.uk/home.htm> (Accessed 09/07/2021)

⁹ Google LLC (2020) *Google Earth* [Online] Available at: <https://earth.google.com/web/> (Accessed 09/07/2021)

¹⁰ JNCC (2010) *Handbook for Phase 1 habitat survey: a technique for environmental audit*. Nature Conservancy Council.

¹¹ CIEEM (2017) *Guidelines for Preliminary Ecological Appraisal, 2nd Edition*. Chartered Institute of Ecology and Environmental Management, Winchester.

¹² JCA (2021) Arboricultural Impact Assessment to BS 5837:2012

2.3 GCN

2.3.1 *Habitat Suitability Index (HSI) Assessment*

During the Extended Phase 1 Habitat Survey, an HSI Assessment¹³ was carried out on waterbodies (where access was possible) within 250 m of the Site.

The HSI Assessment considers a range of features that affect the suitability of ponds to support GCN (*Triturus cristatus*) (e.g., size of pond, extent of shading, abundance of aquatic plants, presence of fish and quality of surrounding habitat). The assessment results in a score that helps to determine the suitability of ponds and the need for further, more detailed surveys.

The HSI scores are inserted into a table to calculate a score for the pond. The pond suitability for GCN was then assessed on the scale shown in Table 2.1.

In summary, ponds with a higher HSI score are more likely to support GCN than those with lower scores.

Table 2.1: Categorisation of HSI Scores

HSI Score	Pond Suitability for GCN
< 0.5	Poor
0.5 – 0.59	Below average
0.6 – 0.69	Average
0.7 – 0.79	Good
> 0.8	Excellent

2.3.2 *Environmental DNA (eDNA) Surveys*

Following the HSI Assessment, an eDNA survey was undertaken on all waterbodies that were deemed suitable to support GCN to determine presence/ likely absence. All ponds **assessed as 'Below Average' and above were scoped in for further survey.**

In June 2020, an eDNA survey was undertaken on the following ponds: P1, P2, P5a, P5b and P6. Locations of all the waterbodies within 250 m buffer of the Site are shown in Figure 2, Appendix B.

Water samples were collected following technical guidance¹⁴ approved by Natural England. The eDNA kits were then sent to a laboratory for analysis. A positive result is indicative of GCN presence at the time of sampling. A negative result suggests there are no GCN within the sample area. For inconclusive results, it is recommended that analysis is repeated.

Where eDNA testing confirmed the positive presence of GCN in accessible ponds within 250 m of the Site, further GCN population surveys of these ponds, (along with the pre-requisite presence/absence surveys) would be required between March and June 2021. The absence of GCN eDNA, would scope out the requirement for further survey of these ponds.

¹³ Oldham R.S, et al. (2000) *Evaluating the suitability of habitat for the Great Crested Newt (Triturus cristatus)*. Herpetological Journal 10 (4), 143-155.

¹⁴ Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F 2014. *Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (Triturus cristatus) environmental DNA*. Freshwater Habitats Trust, Oxford.

2.3.3 Presence/Absence Surveys

Presence/absence surveys were undertaken in accordance with guidance^{15,16}, and under licence from Natural England, as well as adhering to ARG-UK guidance¹⁷ on minimising the risk of spreading disease (particularly *Chytridiomycosis*) among amphibian populations.

During the surveys a mixture of at least three of the approved surveying techniques from the options below were adopted during each survey visit of each pond:

- *Torchlight survey* – The perimeter of the pond was walked after dark whilst illuminating **the water's edge with a powerful torch**¹⁸. This method is only used when visibility in the water column is not impaired by rain, wind, turbidity or vegetation. Note that distinguishing between female smooth and palmate newts under torchlight is extremely **difficult and so females of these species are classified as 'unidentified small female'** during these surveys;
- *Bottle trapping* – Bottle traps were set within the margin of each pond at an approximate density of one trap per two metres. The traps were set at, or just before, dusk and left overnight, with the number of newts in each trap recorded and released the following morning;
- *Netting* – The perimeter of the pond was sampled with a long-handled dip net with care taken not to disturb the macrophyte community; and
- *Egg searching* – The vegetation within each pond was inspected for the presence of eggs. If eggs are found (and breeding therefore confirmed), no further searches are conducted.

The physical condition of the waterbody (depth, size, turbidity, vegetation, access etc.), determined which survey methods were appropriate. Health and Safety risks were also considered when selecting the survey methods.

As it had not been possible to undertake an eDNA survey of pond P4 due to access restrictions at the time of the eDNA assessment, and therefore presence/ absence surveys were additionally undertaken on this pond.

The results of the presence/absence surveys informed the requirement for further population surveys. Details of the survey dates and weather conditions are provided in Table F.2 in Appendix F.

2.3.4 GCN Population Size Class

The maximum adult count recorded from a waterbody on a single night using a single survey technique is used to estimate the population size class. The different classes are defined in Table 2.2.

Table 2.2: GCN Population Size Classes

Population Size Class	Peak Adult Count
Small	≤10 individuals
Medium	11-100 individuals
Large	>100 individuals

¹⁵ English Nature (2001) *Great crested newt mitigation guidelines*. Peterborough: English Nature.

¹⁶ Griffiths, R.A and Langton, T. (2003) *Herpetofauna Workers' Manual, Chapter 3 Catching and Handling* [Online] Available at: <http://jncc.defra.gov.uk/page-3325> (09/07/21)

¹⁷ ARG UK (2017). *ARG UK Advice Note 4: Amphibian Disease Precautions: A Guide for UK Fieldworkers*. Amphibian and Reptile Groups of the United Kingdom.

¹⁸ Ciulite Clubman Deluxe (CB2), 1 million candle power

2.4 Bat Roost Assessment

During the Extended Phase 1 Habitat Survey, a preliminary assessment of the potential of features within the Site to support bat roosts and/or provide suitable commuting or foraging habitat was conducted. The bat roost assessment and recommendations for further survey (where required) followed guidelines produced by the Bat Conservation Trust (BCT)¹⁹. This initial bat roost assessment informs whether or not further surveys are required to assess the potential effects of the Development on bats.

2.4.1 Roosts

A ground-level inspection of trees was undertaken to identify Potential Roost Features (PRFs) suitable for roosting bats such as woodpecker holes, spilt limbs and peeling bark. Based on these observations, trees were assigned a level of suitability (negligible, low, moderate or high). If evidence of bats were recorded, or the features assessed to provide suitability for bats, then further surveys would have been proposed.

2.4.2 Habitats

A visual assessment of habitats was undertaken to determine their potential to support commuting, foraging or swarming bats, such as good connectivity and linear features. Based on these observations, the Site is assigned a level of suitability. If suitable habitat for bats were recorded, then further surveys would have been required.

2.5 Badger Survey

As part of the Extended Phase 1 Habitat Survey, a thorough inspection of the Site and surrounding habitat up to 30 m (where accessible) was carried out to look for presence of badger (*Meles meles*). Particular attention was paid to dense areas of vegetation to check for badger setts and evidence of badger activity, including presence of:

- Holes with evidence of badger, such as prints, discarded bedding etc.;
- Dung pits and latrines;
- Well-used runs with evidence of badger activity; and
- Other indications of badger activity, such as signs of foraging and prints.

2.6 Ornithological Walkover

An ornithological walkover of the Site and adjacent habitats (where accessible) was carried out at the same time as the Extended Phase 1 Habitat Survey. The aim of this survey was to determine the potential of the Site and surrounding areas to support breeding or wintering birds of conservation concern (for example birds listed in Schedule 1 of the Wildlife and Countryside Act 1981¹ (as amended) and Annex I of the EC Birds Directive²⁰).

2.7 Water Vole Habitat Assessment and Survey

A water vole habitat suitability assessment was undertaken and was based on a scoring system produced by Dean (2021)²¹. A water vole habitat suitability scoring system created by Harris et al. (2009)²² was used to give a general indication of the suitability of the habitat for water voles for each ditch. Due to the large size of the Site and extensive network of ditches, the scoring system was modified slightly identifying water vole habitat suitability as

¹⁹ Collins, J. (ed.) (2016) *Bat Surveys for Professional Ecologists: Good Practice Guidelines* (3rd ed.). The Bat Conservation Trust, London.

²⁰ EUR Lex: Access to European Law *Birds Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds* [Online] Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0147> (Accessed 21/07/2021)

²¹ Dean, M. (2021), *Water Vole Field Sign and Habitat Assessment: A Practical Guide to Water Vole Surveys*. Pelagic Publishing.

²² Harris, J. E., Markwell, H. J., and Raybould, B. R. (2009). *A method for assessing water vole habitat suitability*. In Practice: Bulletin of the Institute of Ecology and Environmental Management. 65: 28 – 31.

'low' (unsuitable), 'moderate' (sub-optimal) and 'high' (optimal). Due to the long length of the ditches, some may have multiple habitat suitability scores. Habitat quality was assessed and noted, with the results informing the water vole (*Arvicola amphibius*) surveys. This assessment was combined with field sign observations and published data on average territory sizes for water vole.) Water vole surveys were carried out on 13th April 2021 and 1st July 2021 by suitably experienced Ecologists, surveying the ditches within the Site boundary (shown on Figure 4, Appendix B). The surveyors walked in pairs along the banks of all accessible watercourses considered suitable for water vole and initially conducted a metre-by-metre search (as far as possible accounting for dense scrub cover) of riparian and emergent vegetation for diagnostic water vole signs (e.g., latrines, faeces, feeding stations, feeding platforms, feeding excavations, burrows, runs and ball nests). If a burrow was discovered, the surveyor switched to an intermittent search approach, searching a 2-3 m wide section approximately every 20 m to minimise disturbance of bankside habitats. The total length of ditches surveyed was approximately 16 km.

The weather conditions on the days of the visits were sunny and warm, with a light breeze. Weather for the week preceding the survey included no known periods of heavy rainfall.

2.8 Limitations and Assumptions

The surveys were undertaken in optimal weather conditions by a suitably experienced ecologist who is an Associate member of the Chartered Institute of Ecology and Environmental Management (CIEEM).

The Extended Phase 1 Habitat Survey was undertaken in December 2019 which is considered a sub-optimal period for botanical growth (optimal survey period March – September, inclusive). However, sufficient data was obtained to enable botanical identification from dead stems and leaf growth, such that habitats could be categorised during the walkover survey. An updated assessment was undertaken in July 2021 to confirm the findings of the 2019 survey and therefore, within the optional survey period.

Furthermore, site conditions were assessed during the subsequent protected species surveys, with no overarching changes noted.

Access to waterbody P3 was not available for the GCN surveys during 2020 or 2021; however, other ponds could be accessed, and when considered in combination, represents an overall minor limitation. Access to P1, was available at a later date in April 2021 than the other ponds and therefore, the population surveys commenced at a later stage. However, this is not considered a limitation to the survey results and the full GCN population surveys were completed in line with standard guidance (as detailed above).

During the water vole survey conducted in July 2021, access to areas of ditches and visibility were hindered by the dense over-grown riparian vegetation present. Whilst efforts were made to fully survey ditches on Site, it is possible that signs were not visible rather than being completely absent.

3 RESULTS

3.1 Desk Study

3.1.1 Designated Sites

3.1.1.1 Statutory

Two National Site Network sites are located within 5 km of the Site. The Lower Derwent Valley is designated as a SAC, SPA, and a NNR and is located 1 km south-west from the Site, and the River Derwent designated as an SAC and SSSI at 4.7 km from Site. The Lower Derwent Valley is also a site designated under the Ramsar convention and has separate international protection. The Description/Reason for Designation is detailed in Table C.1 in Appendix C.

There are four nationally designated sites within 2 km of the Site, the closest being Allerthorpe Common SSSI located adjacent to the northern boundary of the Site. Further details of these sites are presented in Table C.1 in Appendix C.

3.1.1.2 Non-Statutory

There are 21 non-statutory designated sites located within 2 km of the Site, all designated as LWSs.

The closest is Allerthorpe Common LWS, located adjacent to the northern boundary of the Site and is also a Yorkshire Wildlife Trust (YWT) Reserve. Furthermore, Warren Wood Deleted LWS is located adjacent to the eastern Site boundary.

Fourteen of these LWS are designated as 'Deleted LWS', where insufficient LWS site review data is available or the quality of the habitats or ecological features fall below the threshold LWS criteria identified by the LWS site selection panel to continue to be included as a LWS. However, the LWS deleted by East Riding of Yorkshire LWS Panel are still likely to be of higher value to wildlife than other habitats that have never been designated and therefore, are still considered important local habitat as part of a wider habitat network.

White Carr LWS is a Candidate LWS, which has either not been surveyed or the East Riding of Yorkshire LWS Panel are yet to reach their decision, therefore there is evidence to support the LWS having substantive value.

Two LWS are historic LWS and have not been surveyed under the current LWS system (since 2007), but unlike a Candidate LWS, these sites are considered to lack compelling evidence of any substantive value.

Further details of these sites are presented in Table C.1 in Appendix C.1.

3.1.2 Protected and Notable Species

Species records dated from 2010 onwards that are relevant to the habitats present on the Site are summarised in Table 3.1. The distance and orientation given of most recent record for each species is from the approximate central grid reference of the Site.

The species are protected under UK legislation^{1,2} and/or are listed under the NERC Act 2006³ as species of principal importance.

A review of **Natural England's MAGIC database found** GCN eDNA survey data available from District Level Licencing in 2017-2019 showing GCN survey data at three locations within 2 km of the Site, with only the closest of these locations, Allerthorpe Common SSSI, recording GCN presence. No other European Protected Species (EPS) licence applications for GCN or bats were identified within 2 km of the Site.

Due to the volume of bird records, these are excluded from Table 3.1 but are referenced where relevant in the Ornithological Impact Assessment (OIA)²³.

Table 3.1: Protected and Priority Species within 2 km of the Site

Taxonomic Group	Protected & Notable Species	Number of Records	Date of Most Recent Record	Distance and Orientation of Most Recent Record (from Approximate Central Grid Reference of the Site)
Amphibians	Common Toad (<i>Bufo bufo</i>)	1	2013	1.1 km north
Reptiles	Adder (<i>Vipera berus</i>)	7	2015	1.0 km north
	Common Lizard (<i>Zootoca vivipara</i>)	4	2015	1.1 km north
	Slow-Worm (<i>Anguis fragilis</i>)	2	2015	1.1 km north
Terrestrial Mammals	Common Pipistrelle (<i>Pipistrellus pipistrellus</i>)	1	2017	Within the Site
	Brown Long-Eared bat (<i>Plecotus auritus</i>)	2	2017	Within the Site
	Brown Hare (<i>Lepus europaeus</i>)	8	2019	0.7 km west
	European Water Vole	1	2013	1.7 km north
	West European Hedghog (<i>Erinaceus europaeus</i>)	2	2014	1.2 km north-west
Invertebrates	Red-tailed cuckoo bee <i>Bombus rupestris</i>	6	2011	Within the Site

3.1.3 Priority Habitats

Allerthorpe Common SSSI, located adjacent to the northern boundary of the Site, supports areas of lowland heathland, a priority habitat³, and is within the Forestry Commission boundary with conifer plantations.

The Lower Derwent SAC, SPA, Ramsar and NNR, 1 km south-west of the Site, supports large areas of lowland meadow, and coastal and floodplain grazing marsh, both priority habitats³.

Other priority habitats³ within 2 km include open mosaic and several areas of deciduous woodland. One area of deciduous woodland is located approximately 50 m north of the proposed access track, south of the existing Thornton Substation.

Areas of good quality semi-improved grassland were found within 2 km of the Site boundary.

²³ Arcus Consultancy Services Ltd. (2021) *Ornithological Impact Assessment, Soay Solar Farm*. Statkraft UK Ltd.

3.1.4 Site History

Satellite imagery shows the land use over the majority of the Site has remained the same between 2003 and 2020 (i.e., arable land delineated by hedgerows and field drains, often with farm tracks alongside).

However, it appears that new farm outbuildings were constructed adjacent to Warren Farm Cottages in 2004. Aerial photographs from 2003, 2004, 2005, 2007, 2012, 2014, 2015, 2016, 2017, 2019 and 2020 were available for the Site and used in drawing this conclusion.

3.1.5 Site Description

The Site has a generally flat landscape dominated by large fields of arable crops delineated by hedgerows and field drains, often with farm tracks alongside. There is limited livestock on the Site with one field of pigs to the north-west. Mature broadleaved woodland and trees are scattered throughout the Site.

In the wider landscape, further areas of arable fields, occasional fields comprising lawn turf are present to the south and south-east of the Site boundary. To the north of the Site boundary lies Allerthorpe Common. To the north of the proposed access road lies Thornton substation, and Pocklington Canal is located 1.2 km south of the proposed access road.

3.2 Extended Phase 1 Habitat Survey

For the purposes of this report, scientific names are excluded from plant species names in the following sections and only the common names are used. A full list of plant species, including scientific names, is provided in Appendix D.

3.2.1 Arable Land

The majority of the Site comprised arable fields, some were ploughed down to bare earth and others comprised of short crops during the Extended Phase 1 Habitat Survey (Photographs 1 and 4, Appendix E). The majority of the arable fields were separated by species-poor hedgerows, drainage ditches and hedgerows with trees.

3.2.2 Bare Ground and Hardstanding

There was a private access road which leads to Warren Farm Cottages from Common Lane located on the western boundary of the Site. This road was comprised of concrete with a strip of semi-improved grassland on either side of the road.

A further access track is located to the south-east of the Site, immediately south of the existing Thornton Substation, from Back Lane.

An area of bare earth was present along the western boundary of the Site (Figure 1, Appendix B).

3.2.3 Bracken – Continuous and Scattered

An area of dense bracken was present to the north of the Site (Figure 1, Appendix B and Photograph 7, Appendix E). Further patches of bracken were scattered around P2 located to the north of the Site.

3.2.4 *Broadleaved Woodland Plantation*

An area of broadleaved woodland, named Brickpit Plantation is located to the south of Warren Farm Cottages. The trees were relatively young and species included ash, sycamore and oak. Fern, common nettle and ground ivy were present in the understorey. Himalayan balsam, an invasive non-native species, was found scattered to the north-west of Brickpit Plantation surrounding P5a and P5b (Figure 1, Appendix B).

A smaller area of broadleaved woodland located to the north of Warren Farm Cottages, species included sycamore and ash. In the understorey bramble, fern, ground ivy and **dogwood were the most dominant species with occasional devil's bit**-scabious recorded. Log and brush piles were occasionally found within both of the plantation woodlands.

Three Coked Hat plantation was located to the north-east section of the Site. Semi-mature oak, sycamore with occasional elder and hawthorn were present.

A smaller plantation woodland (Blanch Plantation) is located to north-west of Three Coked Hat Plantation. Oak trees were dominant in this area with evidence of pheasant activity (feeding area and pheasant cages).

There is a small area of plantation woodland located to the west of the existing Thornton Substation, species included alder, oak, hazel and silver birch. The understorey and ground **layer comprised bramble, dog's rose**, elder, honeysuckle common nettle and ground ivy.

3.2.5 *Mixed-Woodland Plantation*

To the south of the proposed access track (south of the existing Thornton Substation) an area of mixed woodland plantation with a pond situated within the centre is present. A small area of this woodland is present within the Site.

Tree species present included; elder, scots pine, larch, sycamore, ash, oak, wild cherry and alder. Common nettle was frequently found in the ground layer. Other ground flora species which were occasionally found included; elder, common hogweed, cleavers, ground ivy, **garlic mustard and cow's parsley**.

3.2.6 *Broadleaved Woodland – Semi-Mature*

A small area of semi-mature broadleaved woodland was present along the western boundary of the Site. Tree species included sycamore, oak and ash. Himalayan balsam was dense in the understorey (Figure 1, Appendix B).

3.2.7 *Buildings*

There were a small number of farm buildings located adjacent to the north-west corner of the Site.

3.2.8 *Defunct Hedge - Species-poor*

Species-poor bramble and hawthorn hedgerow was present along some of the field margins on-site with a small strip of semi-improved grassland adjacent (Photograph 2, Appendix E). Ground flora species comprised of common nettle, spear thistle, red campion, common hogweed, hemlock and cleavers.

3.2.9 *Dry Ditches*

There were several dry ditches present on-site which appeared to have been dry for a long period of time, given the amount of terrestrial vegetation growing. Vegetation included red **campion, cleavers, lady's bedstraw and forget-me-not**.

Some ditches at the time of the survey held very small amounts of water where chemical run off was evident through algae blooms and water discolouration.

3.2.10 Hedge with Trees - Species-poor

Species-poor hawthorn hedgerows with semi-mature or mature trees were present throughout the Site bordering the arable fields. Tree species included oak, ash, horse chestnut, hazel, alder and sycamore. The understorey comprised of common nettle, white-dead nettle, red-dead nettle, **cow's parsley**, **hemlock**, **mugwort**, broadleaved plantain, **dove's foot**-cranesbill and cleavers.

3.2.11 Intact Hedge - Species-poor

Some of the hedgerows around the field margins were intact and well-managed and dominated by hawthorn. Ground flora species present included small bugloss, cleavers, white-dead-nettle, burdock and ribwort plantain.

3.2.12 Improved Grassland

A small area of improved grassland was located in the north-west corner of the Site (Figure 1, Appendix B).

3.2.13 Poor Semi-improved Neutral Grassland

Poor semi-improved neutral grassland was noted within the Site to the north of Warren Farm Cottages (Figure 1, Appendix B). Species in the sward mostly comprised of Yorkshire fog, perennial rye-grass and white clover. Common daisy and ribwort plantain was occasionally found along the grass verges adjacent to the access road.

Poor semi-improved neutral grassland was also present along the field margins throughout the Site. The sward height varied throughout the Site, with some areas cut very short and others approximately 30 centimetres (cm) in height.

Species in the sward included: perennial rye-grass, **cock's-foot**, Yorkshire fog, false oat-grass, yarrow, white clover, creeping buttercup, cleavers, herb-Robert, broad-leaved dock, **ribwort plantain**, **spear thistle**, **common bird's-foot** trefoil, red dead nettle, selfheal, groundsel and dandelion.

3.2.14 Running Water

Drainage ditches were present throughout the Site, separating arable fields and broadleaved woodland plantations. The majority of the on-site ditches were shallow with dense aquatic vegetation recorded at the time of the updated Phase 1 Habitat survey conducted in 2021.

During the first water vole survey undertaken in April 2021, some of the ditch banksides had recently been cut exposing the ditches and signs of eutrophication were evident. Himalayan balsam was recorded in a number of ditches located to the north-east of the Site.

3.2.15 Standing Water

There are three ponds situated within the Site (P2, P5a and P5b, Figure 2, Appendix B).

P2 lies within Blanch Plantation and is shaded by scattered oak trees. P5a is to the north-west of Warren Farm Cottages access road and P5b lies within Brickpit Plantation, to the south-west of Warren Farm Cottages. At the time of the 2019 Extended Phase 1 Habitat survey, all on-site ponds contained heavy leaf litter.

3.2.16 Scattered Trees – Broadleaved and Coniferous

There were numerous scattered trees, of varying age and size, present throughout the Site. Mature oak, ash and sycamore trees were present along the field and hedgerow margins. Further species were recorded along the south-eastern boundary such as alder, elder, larch and wild cherry. The scattered trees along the south-eastern boundary were densely covered in ivy. Scattered spruce trees were present along the northern boundary of a small plantation woodland located to the north-east of Warren Farm Cottages.

3.2.17 Scattered Scrub

Scattered scrub comprising of holly and scotch broom was found along the field margins to the east of the Site.

3.2.18 Tall Ruderal Vegetation

A small area of tall ruderal vegetation was found to the east of the proposed access road. Species recorded included oxeye daisy, hogweed, burdock, pineapple weed, ribwort plantain, red campion and selfheal.

Further areas of tall ruderal vegetation were occasionally found along the field margins throughout the Site; teasel was the most dominant to the north of the Site. Sunflower were found to the north-west of the Site, adjacent to the hedgerows with trees boundaries.

3.3 Protected and Notable Species

3.3.1 GCN

A HSI Assessment was carried out on ponds within 250 m of the Site boundary, where accessible. **The identified ponds were considered to have 'Excellent' (P2), 'Good' (P5b), 'Average' (P1, P4, P6) and 'Below Average' (P5a) suitability to support GCN.** Full results of the HSI Assessment are located in Table F.1, Appendix F.

In June 2020, eDNA surveys were undertaken on the following ponds: P1, P2, P5a, P5b and P6. An eDNA survey was not conducted on P4 due to restricted access during 2020. The results of the eDNA analysis indicate that eDNA for GCN was detected in three of the waterbodies (P1, P2 and P5b), and was absent in the other two waterbodies (P5a and P6).

Further GCN presence/absence and subsequent population surveys were carried out for the following ponds: P1, P2, P4, P5a, and P5b between March to June 2021. Due to the proximity of P5a and P5b (the ponds are located adjacent to one another), further surveys were also undertaken on P5a which had returned a negative result from the eDNA surveys.

A small sized GCN population class was recorded in P1, P4 and P5a, as per Table 2.3 this equates to **≤10 individuals**. P1 was also identified as a breeding pond following evidence found during an egg search. GCN populations are expected to be part of the same meta-population based on the absence of barriers to dispersal and close proximity to each other. The full results of the presence/ absence and subsequent population surveys are present in Table F.3, Appendix F.

Smooth newt (*Lissotriton vulgaris*) and palmate newt (*Lissotriton helveticus*) were also recorded in P1, P2, P5a and P5b.

Common frog (*Rana temporaria*) was recorded in P2 and P5b. Common toad (*Bufo bufo*) was recorded in P4 and P5a, with a large population count in P4 (>100 individuals).

3.3.2 Bats

The desk study returned three records for two species of bats (dated 2017); brown long-eared and common pipistrelle, both of which were located approximately 1.3 km north-west of the Site.

3.3.2.1 Trees

Buildings and trees on-site were assessed for their potential to support roosting or hibernating bats. No buildings were suitable to support roosting bats due to their lack of suitable roosting features present.

A total of 69 trees were recorded within the Site and assessed as having PRFs. PRFs included rot holes, woodpecker holes, split limbs, peeling bark and ivy cover.

Four trees on-site were assessed as having high potential, 20 trees on-site were assessed as having moderate potential and 45 trees were assessed as having low potential. All other trees were assessed as having negligible potential to support roosting bats due to their young age and lack of PRFs.

Further details of each tree (e.g., location, roost potential, and PRFs) are provided in Appendix G. The locations of these trees are shown in Figure 3, Appendix B and photos are shown in Appendix E. Further background information on trees identified within this report as having bat roost potential can be found in the separate Arboricultural Impact Assessment that accompanies the planning application.

3.3.2.2 Habitats

Although the Site mostly comprised open arable fields, the mosaic of other habitats, particularly the hedgerows with trees and the adjacent broadleaved woodland, have the potential to support foraging and commuting bats.

These features were connected to suitable habitats in the wider landscape by hedgerows and areas of mature woodland, particularly the larger woodland of Allerthorpe Common SSSI, adjacent to the north of the Site. On this basis and following the BCT guidelines¹⁹, **the Site was classed as having a 'moderate' suitability for foraging, commuting and roosting bats.**

3.3.3 Badger

A separate confidential report has been submitted to East Riding of Yorkshire Council (ERYC). Due to the confidential nature, this report is not within the public domain but is available upon request.

No records of badger were returned by the desk study due to confidentiality reasons.

3.3.4 Birds

The hedgerows with trees, tall ruderal, arable and grassland field margin habitat present within the Site provided good foraging and nesting habitats for birds. Bird species recorded during the walkover survey included: blackbird (*Turdus merula*), pheasant (*Phasianus colchicus*), house sparrow (*Passer domesticus*) and house martin (*Delichon urbicum*).

Ornithology interests within the Site were subject to a series of surveys carried out between October 2019 and July 2020. The details of these surveys and subsequent impact assessment are provided in the OIA²³.

3.3.5 Water Vole

The water vole habitat suitability scores indicate that of the nine ditches, seven were considered to have low suitability for water vole, and two were considered to have low-moderate suitability for water vole. This was reflected in the results, with no evidence of water vole recorded in ditches with low suitability.

Although no evidence was recorded in the remaining on-site ditches, a number of the on-site ditches are connected and are considered to be suitable water vole habitat including D5 – D7 and D8 – D9.

The results differ between the water vole surveys, with overall less field signs found during July 2021 in comparison to the April 2021 survey. As detailed within Section 2.8, access to and visibility were hindered by the dense, over-grown riparian vegetation present within the ditches. Whilst efforts were made to fully survey ditches on Site, it is possible that signs were not recorded rather than being completely absent. Only one record of water vole was returned by the desk study located 1.7 km north of the Site. It is considered possible that water vole populations are present in low densities within the local area.

Water vole are active all year round, however, their peak breeding season is between April to September (inclusive), during which time their population numbers increase and individual water voles will disperse into suitable riparian habitat.

Evidence of water vole feeding remains were identified in D7 and two water vole burrows were identified within D8. The survey results are summarised in Table H.1, Appendix H.

3.3.6 *Otter*

No field signs of otters were detected during the survey and the ditches were not considered likely to support otters, as the drains lacked depth and fish populations that could support a viable prey source. However, there is the potential that otter may occasionally use the drains as a commuting route from off-Site habitat.

Results from the desk study did not identify the presence of otter within 2 km of the Site boundary.

3.3.7 *Reptiles*

No signs of reptile were recorded during the walkover survey. The log and brash piles present throughout the Site and within the plantation woodlands may provide suitable hibernating opportunities for reptile. In addition, the area of bracken to the north of the Site may provide opportunities for foraging and sheltering reptiles. There were several grass mounds present to the north-east of the Site, some of which were south-facing and may provide opportunities for basking reptiles (TN 2, 6-9, Figure 1, Appendix B). Suitable reptile habitat was restricted to the tall ruderal and grassland arable field margins. There is good habitat connectivity between the north of the Site and Allertorpe Common SSSI.

The desk study returned three species of reptiles (adder, common lizard and slow-worm) within 2 km of the Site boundary, the most recent record is for adder, found approximately 1 km north from the Site in 2015. Allertorpe Common is known to support a population of adder (Appendix C, Table C.1).

3.3.8 *Invertebrates*

The array of hedgerows, poor semi-improved grassland and tall ruderal habitats within the Site likely supports a range of commonly occurring invertebrate species. The relatively undisturbed character of some habitats may support a more diverse assemblage of invertebrates than might be recorded in the surrounding agricultural landscape.

3.3.9 *Other Notable Species*

Brown hare (NERC Act 2006³) was observed during the Extended Phase 1 Habitat Survey, running along the hedgerow (TN 3, Figure 1, Appendix B). The Site also offers opportunities for commuting, foraging and hibernating hedgehogs, with log piles, leaf piles and hedgerows present.

Several rabbit (*Oryctolagus cuniculus*) burrows were identified during the Extended Phase 1 Habitat Survey (TN 11, Figure 1, Appendix B).

4 EVALUATION, FURTHER SURVEY REQUIREMENTS AND MITIGATION

4.1 Potential Impact of Development

The Development has the potential to result in the following broad ecological impacts:

- Habitat loss/change during construction and operation;
- Direct harm to, or disturbance of, individuals of species during construction and operations; and
- Legal offences during construction.

The potential ecological effects of these impacts, and the associated mitigation and enhancements, are discussed for each important ecological feature in turn. Where necessary, additional surveys have been recommended to provide further information to help assess the potential ecological effects of the Development and to inform mitigation.

In order to increase the biodiversity value associated with the Development, and to adhere to Government guidance set out in the National Planning Policy Framework 2021 (NPPF)⁶, a range of enhancement measures are detailed below.

The Biodiversity Enhancement Management Plan (BEMP)²⁴ provides further details about habitat enhancements and should be read in conjunction with this report.

4.2 Designated Sites

The Lower Derwent Valley SAC, SPA, NNR, Ramsar site is located approximately 1 km to the south-west of the Site. Due to the proximity of the development to this designated site it is recommended that a Habitats Regulation Assessment is undertaken by ERYC. This assessment should assess Likely Significant Effects and determine the need for an Appropriate Assessment.

Allerthorpe Common SSSI and LWS is adjacent to the north of the Site and is also a YWT reserve. There is habitat connectivity between the north of the Site and Allerthorpe Common SSSI. A further non-statutory designated site, Warren Wood Deleted LWS lies to the east of the Site boundary. This is an area of deciduous woodland.

4.2.1 Mitigation

The layout of the Development includes a 100 m buffer from the nearest statutory designated site, Allerthorpe Common SSSI, which will provide precautionary avoidance mitigation to limit affects on this statutory designated site. The layout of the Development includes a 10 m buffer for all woodland habitats on and adjacent to the Site, which includes Warren Wood deleted LWS and Allerthorpe Common LWS.

Further mitigation has been provided in an Outline Construction Environmental Management Plan (CEMP) that has been produced and accompanies the planning application. The CEMP will focus on mitigating the impacts from the Development on the adjacent designated sites, and to summarise, will incorporate, but not be limited to the following mitigation measures:

- Detail dust control and pollution prevention measures;
- Provide guidance on Contractor briefings and requirement for an Ecological Clerk of Works (ECoW);
- Provide guidance and mitigation measures to ensure protected and priority species that may be present either on-site or in adjacent retained designated habitats during the construction and operational phase of the Development are protected (e.g., nesting birds, mammals, reptiles and amphibians);

²⁴ Arcus Consultancy Services Ltd. (2021) *Biodiversity Enhancement Management Plan, Soay Solar Farm*. Statkraft UK Ltd.

- Control of noise and lighting during the operational and construction phases of the Development; and
- Provide recommendation and management of Sustainable Drainage Systems (SuDS).

A further four statutory sites and 20 non-statutory sites are located within 2 km of the Site boundary. Due to the characteristics of the Development and the lack of clear functional connectivity between the Site and the designated sites, impacts to these designated sites are extremely unlikely, during both construction and operation, and therefore further assessment is not considered necessary.

The Development design will avoid all existing connective habitats during construction (i.e., connective habitats will be retained) and adjacent on-site habitats will be enhanced.

Due to the characteristics of the Development and the avoidance measures implemented (i.e., appropriate buffers, retaining connective habitats), adverse impacts on designated sites are considered to be unlikely, during both construction and operation, and therefore further assessment is not considered necessary.

4.2.2 *Enhancement*

An area of arable land has been designated as a Habitat Enhancement Area (HEA), which in the long-term will improve the habitat connectivity between the Site and designated sites for a range of species, notably GCN. The HEA will be created as part of the Development and is detailed in the BEMP²⁴.

4.3 Habitats

The Development will lead to the loss of predominantly low value arable land and the ecological effects of this are considered minimal.

Higher value habitats, such as scattered trees, hedgerows, on-site waterbodies and woodland will predominantly not be impacted by the Development due to a careful design that has ensured appropriate separation distances as set out in the Landscape and Visual Appraisal (LVA). A small number of Category B trees (with low or negligible bat roosting potential) amounting to *circa* 0.29 ha will require removal in the south-east of the Site to facilitate the Development.

4.3.1 *Mitigation*

The removal of small numbers of trees is not considered to have an adverse impact on habitats present and will be compensated by the proposed tree planting outlined below.

Extensive habitat planting is proposed, which will compensate for the habitat losses arising during construction. These measures also act as mitigation for potential operational effects to habitats and species by providing buffering and screening between the Development and off-site habitats.

Himalayan balsam was found adjacent to P5a and P5b, identified during the eDNA surveys and present within ditches in the north-east of the Site. Himalayan balsam is an invasive, non-native species listed under Schedule 9 of the Wildlife and Countryside Act 1981 (as amended)¹. This means it is an offence to plant or otherwise cause them to grow in the wild.

Due to the limited extent of Himalayan balsam within the Site and location within the riparian corridor, hand pulling is favoured over chemical treatment or mechanical removal such as cutting or strimming. To control and limit the spread of this species, further details on the management of Himalayan balsam is provided in Section 4.8 of the BEMP²⁴.

4.3.2 Enhancement

Habitat creation and enhancements will be implemented to the north and west of the Site, as detailed in the Landscape and Ecology Mitigation and Enhancement Plan²⁵, and will include the planting of:

- Native species hedgerow;
- Native species woodland mix;
- Mixed native scrub and tree planting with tussocky grassland mix;
- Native species grass and meadow mix suitable for sheep grazing around the panels;
- Native species rich grass and wildflower in areas beyond fenced enclosures; and
- Tussocky grassland.

The habitat enhancements summarised above and detailed in the BEMP²⁴, provide an overall net gain of 114.73% within the Defra 2.0 Metrics spreadsheet, and is reported separately within the Biodiversity Metric Assessment²⁶ that accompanies the submitted planning application.

4.4 Protected and Notable Species

4.4.1 GCN

4.4.1.1 Direct Harm / Disturbance

A small population of GCN was recorded in P1, P4, and P5a on and adjacent to the Site. Suitable terrestrial habitats, such as the poor semi-improved grassland field margins, tall ruderal, hedgerows and woodland, are present on Site. Log/brick piles were recorded to the north-west and west of the Site during the Extended Phase 1 Habitat Survey. These habitats provide potential for foraging, commuting, sheltering and hibernating GCN, and other amphibians.

GCN are active throughout the warmer months, generally March to October inclusive, during which they spend time in both water and on land, usually sheltering and foraging in habitats offering cover near to their breeding ponds such as scrub and tall grassland.

Any work on terrestrial habitats likely to support the species, or on areas between the off-site breeding pond (P1) and such habitat, carries the risk of disturbing or harming GCN. Such disturbance or harm could constitute an offence under the Wildlife and Countryside Act 1981¹ (as amended), and Conservation of Habitats and Species Regulations (Amendment) (EU Exit) Regulations 2019².

4.4.1.2 Loss/ Damage to Breeding Ponds

The Development will not directly damage or lead to the functional loss of any of the on-site ponds as these are to be retained with suitable buffers applied. Furthermore, there is a lack of hydrological connectivity between the Site and off-site ponds with GCN potential.

In the absence of mitigation, waterbodies may be subject to adverse impacts such as pollution and contamination with material from adjacent construction works. In order to minimise this risk, appropriate mitigation measures will be put in place, as detailed in Section 4.4.1.4.

²⁵ Arcus Consultancy Services Ltd. (2021) 3404_MOD_LAN_101_Landscape and Ecology Mitigation and Enhancement Plan. Soay Solar Park, Statkraft UK Ltd.

²⁶ Arcus Consultancy Services Ltd. (2021) Biodiversity Metrics Assessment. Soay Solar Park, Statkraft UK Ltd.

4.4.1.3 *Habitat Loss and Fragmentation*

The Development will result in the loss of arable land present within the Site, which is considered to be of negligible value as GCN terrestrial habitat.

The Development is considered to have an overall low impact on habitat loss and fragmentation due to the solar panels and Greener Grid Park infrastructure being located largely within the existing arable fields.

High value habitats such as the on-site ponds, hedgerows and areas of woodland will be largely avoided and retained by the Development design, maintaining habitat connectivity across the Site and with the wider landscape.

The Development will not create any permanent barriers to dispersal and therefore, will not increase habitat fragmentation.

The potential short-term, adverse ecological impacts of GCN habitat loss and disturbance will be offset by the long-term positive impacts of habitat creation and enhancements. Large areas of arable land will be replaced with native species grassland and wildflower meadow planting, providing suitable foraging and commuting habitat for GCN.

The long-term, operational effects of the Development on GCN are therefore considered to be positive at a local scale. The proposed terrestrial habitat creation and enhancements will increase the availability of suitable GCN habitat and improve the habitat connectivity for GCN within the local environment.

4.4.1.4 *Licensing*

Construction works are likely to take place during the GCN active season between March and October, when GCN are active in terrestrial and aquatic habitats and therefore there is the potential for harm or disturbance to GCN during the construction phase of the Development. GCN are fully protected through their inclusion on Schedule 5 of the Wildlife and Countryside Act 1981¹ (as amended), and Schedule 2 of the Conservation of Habitats and Species Regulations 2017² (as amended). Consequently, there is a requirement to obtain a Natural England European Protected Species Mitigation (EPSM) licence prior to the commencement of the Development works.

A licence can only be applied for once planning permission has been granted, and Natural England have a statutory response time of six working weeks to determine an application. Although there can be a longer timeframe to determination.

In order to issue an EPS Mitigation licence it will be necessary to satisfy the requirements of the 'three tests' under Regulation 55 of the Conservation of Habitats and Species Regulations 2017² (as amended). The three tests are:

- **That the proposals are for the purposes of "preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment" (Regulation 55(2)(e));**
- **"That there is no satisfactory alternative" (Regulation 55(9)(a)); and**
- **"That the action authorised will not be detrimental to the maintenance of the species concerned at a favourable conservation status in their natural range" (Regulation 55(9)(b)).**

To satisfy Regulation 55(9)(b), the mitigation approach will need to state how the GCN population present on-Site will be protected and maintained. Where possible, an enhancement of the site for GCN as a result of the proposals should be achieved, to comply with UK and local planning policy.

4.4.1.5 Mitigation

In order for construction works to progress, an EPSM licence is required. Natural England is the Statutory Nature Conservation Organisation (SNCO), and any licence application submitted to them will need to be supported with a Method Statement in order for them to grant a licence.

The mitigation works will need to be carried out during an appropriate time of year when amphibians are fully active (although weather and temperature-dependent; however, GCN are usually active between March to October inclusive). Works outside of this period would only usually be acceptable within negligible value habitat for GCN and at a suitable distance outside of core habitat areas (>50 m).

The mitigation approach will include but not be limited to the following:

- Installation of terrestrial habitat prescriptions within a dedicated Habitat Management Area (HMA) prior to any other works taking place;
- Installation of temporary herptile-proof perimeter and drift fencing prior to construction, along with pitfall traps and artificial refugia;
- A suitable trapping effort will be implemented (30 daily checks, plus 5 clear days) during appropriate weather and temperature conditions; and
- A series of hand searches and destructive searches prior to fencing works and on removal, installation of habitat prescriptions, prior to habitat clearance, and following the completion of the pitfall trapping period.

The detailed procedures for carrying out the licenced works, including capture and translocation of individual GCN, will be specified within the Method Statement that will be submitted as part of the EPSM licence application and as agreed with Natural England. Following the licence determination from Natural England, works can then take place under the licenced GCN ecologist or an accredited agent, who will need to be present during these works.

In undertaking the mitigation approach, this will need to be with consideration to other protected species, including nesting birds. Nesting birds have been addressed within the OIA and are not considered further within this report.

As stated above, mitigation will be targeted at areas where GCN are present however, measure and locations will be agreed with Natural England prior to implementation, following pre-construction surveys.

4.4.1.6 Enhancements

The two HEAs, within the north and western boundaries of the Site, will strengthen habitat connectivity to higher value habitats. The HEA located to the north of the Site will link pond P2 with Allerthorpe Common SSSI, and the HEA on the western boundary of the Site will connect P5a to other pockets of woodland in the wider landscape.

The tree, grassland and scrub habitat planting within these HEAs will be provided as mitigation to reduce any adverse impacts from the Development on GCN.

At present, GCN are restricted to the narrow linear habitat features on-site. The existing negligible value habitats of arable fields where the Development is located, will be managed as grassland. Native species grassland will be primarily beneath and between the solar panels, with wildflower meadow planting outside of these fenced areas. These areas of grassland will provide a significant enhancement to GCN as it will create extensive foraging and commuting habitat and significantly improve connectivity across the entire Site and immediate surrounds.

Creating hibernacula strategically across the Site will also improve sheltering and **hibernating opportunities' for GCN.**

The Development will significantly improve biodiversity on-site and within the local area, through proposed planting and the designated HEAs. The long-term impacts of the Development during the operational phase will be positive not only to GCN but to many other species, including reptiles and birds.

4.4.2 *Bats*

4.4.2.1 *Buildings and Trees*

No buildings have potential to support roosting bats within the Site. All trees identified with high or moderate roosting potential will be retained and not be directly impacted by the Development. The Development boundary fencing has been designed to ensure root protection areas (RPAs) are avoided. Remedial tree works to low bat roost potential trees will however be required to facilitate the Development specifically:

- Felling of seven trees with low bat roost potential:
 - Arcus T34 / AIA H240
 - Arcus T38 / AIA T49
 - Arcus T39 / AIA T45
 - Arcus T60 / AIA T235
 - Arcus T65 / AIA T237
 - Arcus T66 / AIA T238
 - Arcus T67 / AIA T239
- Part-removal of a hedgerow near one moderate bat roost potential tree:
 - Arcus T11 / AIA H227
 - T11 itself will be fully retained and not impacted by part removal of H227

Where low potential trees require felling, these will be climbed by a bat licenced climber and assessed via an endoscope in advance of any felling works. Soft felling techniques will be required under the supervision of a bat licenced ecologist.

If for any reason there is a requirement to prune or fell trees with high or moderate bat roost potential, it is recommended that a tree climbing inspection of each impacted tree is undertaken by a bat licenced ecologist using a pair of binoculars, endoscope and high-powered torch to look for signs of bats (i.e., droppings, scratch marks, and staining), or determine the presence or otherwise of roosting bats.

The findings of these surveys, if required, will inform the need for further surveys, or type and level of mitigation.

4.4.2.2 *Habitats*

The Site **has been classed as having a 'moderate' suitability for foraging and commuting** bats. However, no further surveys are recommended due to the low and spatially restricted impacts of the Development, along with the extensive proposed habitat mitigation and enhancements that will provide an improved habitat quality for foraging and commuting bats.

The Development will mainly affect arable land which is of low value to foraging and commuting bats. Higher value linear features such as the tree lines, hedgerows and ditches will predominantly be retained and therefore not impacted by the Development.

Nonetheless, bats are active in most habitats and as such, it is reasonable to consider potential impacts and range of good practice mitigation measures are proposed. The proposed HEAs will provide additional foraging and commuting habitats for local bat species, improving connectivity to habitats in the wider landscape.

The long-term, operational effects of the Development on bats is likely to be positive as habitat quality and availability will be increased. Furthermore, strengthened linear features

(e.g., gaped up hedgerows and tree planting within hedgerows) augment conditions for commuting bats, and sheltered habitat between and beneath solar panels will provide still conditions suitable for insects foraged by bats.

4.4.2.3 Mitigation and Enhancements

Mitigation will include, but not be limited to:

- Ensuring all site operatives are made aware of current legislation protecting bats via a Toolbox Talk or site induction materials; and
- In the unlikely event bats are encountered, works will cease and an ecologist contacted for advice.

As an enhancement, sixteen bat boxes will be installed on trees to provide enhanced roosting opportunities. Boxes will be installed in accordance with good practice²⁷.

4.4.2.4 Lighting and Disturbance

Bats are nocturnal mammals and are typically active during the night (between the hours of dusk to dawn). Artificial lighting can have adverse impacts on bats and other nocturnal species. The artificial lighting of a known or potential roost, and foraging or commuting pathways cause disturbance, roost abandonment or result in fragmentation of habitat.

The Site is located in an arable setting, and is not located adjacent to settlements that would cause significant light pollution which may disturb bats. It is considered likely that low levels of agricultural disturbance e.g., machinery operating at night with lighting, exist and occurs within the Site, however, this would likely to be temporary and not cause significant disturbance to bats present. When operational, the Development would be remotely operated and subject to limited maintenance visits, which would likely take place during daylight hours. Any lighting would be motion activated security lighting. Where permanent lighting is required for either construction or operation, this will be limited and designed in line with good practice, such as minimising light spill and directing it away from boundaries and retained habitats, such as the scrub and adjacent woodland.

New lighting will be designed in line with good practice^{28,29} to ensure the Site can provide continued undisturbed foraging and commuting habitats for bats. Should lighting be required (during both construction and operation), the following measures are recommended:

- Motion-sensitive security lighting and avoidance of floodlighting;
- Avoidance of lighting with Ultra-Violet (UV) components in areas where lighting is required for public safety purposes. UV light is particularly disruptive to bat behaviour^{30,31};
- Use of flat-glass protectors on luminaires to help reduce light spill above angles greater than 70° from the vertical plane; and
- Avoiding light spill on to surrounding high value habitats for bats by using accessories such as shields, louvres, hoods and cowls.

²⁷ Bat Conservation Trust (2021) Bat Boxes [Online] Available at: http://www.bats.org.uk/pages/bat_boxes.html (Accessed 21/07/2021)

²⁸ Bat Conservation Trust and Institute of Lighting Professionals (2018) *Guidance Note 08/18: Bats and artificial Lighting in the UK*. ILP, Rugby.

²⁹ Bat Conservation Trust (2014) *Artificial Lighting and Wildlife: Interim Guidance: Recommendations to help minimise the impact artificial lighting* [Online] Available at: https://cdn.bats.org.uk/pdf/BCT_Interim_Guidance_Artificial_Lighting_June_2014.pdf?mtime=20181101151319 (Accessed 09/07/2021)

³⁰ Fure, A. (2006) *Bats and Lighting*. The London Naturalist, No. 85.

³¹ Emery, M. (2008) *Effect of Street Lighting on Bats*. Urbis Lighting Ltd.

4.4.3 *Badger*

A separate confidential report has been submitted to ERYC. Due to the confidential nature, this report is not within the public domain but is available upon request.

4.4.4 *Birds*

A range of bird surveys (breeding birds, wintering birds and Nightjar surveys) have been carried out and the results of which are provided in the OIA. The OIA includes impact assessment and details of mitigation and enhancements as required, and should be read in conjunction with this report.

4.4.5 *Water Vole*

4.4.5.1 *Direct Harm / Disturbance*

The results of the surveys confirm the presence of water vole on-site. Evidence of feeding remains were recorded in D7 and two burrows were located along D8, indicating a low population is present. The survey results are summarised in Table H.1, Appendix H.

The Development will involve the construction of six new watercourse crossings within the Site.

Two crossings are located to the north-west of Field L1 and north-east of Field O (as detailed on associated Landscape & Ecology Mitigation and Enhancement Plan³²) and have the potential to cause harm or disturbance to water vole during construction (Appendix B, Figure 4). The creation of watercourse crossings will impact riparian habitat which support water vole and carries the risk of disturbing or damaging burrows (places of shelter) and/or killing or injuring water vole. Such disturbance or harm could constitute an offence under the Wildlife and Countryside Act 1981¹ (as amended).

All other works have been designed to avoid indirect impacts to water vole by avoiding and retaining suitable habitat within the Site.

All other construction works (with the exception of watercourse crossings) will maintain a minimum of a 10 m buffer from watercourse suitable to support water vole. Whilst clearance from known water vole burrows requires a minimum 5 m distance, a 10 m buffer is proposed in the development design to ensure impacts to all aquatic habitats and species can be avoided.

4.4.5.2 *Habitat Loss and Fragmentation*

The construction of the new watercourse crossings will result in the loss of suitable water vole habitat. However, the volume of habitat that will be lost is considered to have a minor adverse impact on the water vole population present.

The watercourse crossings would comprise a standard culvert, with a road over the top. This would allow water to continue to flow and would allow water voles to navigate along the ditch, thereby maintaining habitat connectivity to other areas of suitable water vole habitat within the Site.

The Development will not create any permanent barriers to dispersal and as such, will not result in habitat fragmentation.

4.4.5.3 *Mitigation*

Ditch Crossing Points (Field L1 and Field O)

³² Arcus Consultancy Services Ltd. (2021) Landscape and Ecology Mitigation and Enhancement Plan.

For the two new watercourse crossings to the north-west of Field L1 and north-east of Field O, it is necessary for these works to proceed under a Natural England Displacement Class Licence due to the identified water vole presence (see Figure 4).

This would impose timing restrictions on the required drainage ditch crossing works on ditches within Field L1 and O as displacement can only be undertaken between 15th February to 15th April inclusive³³ under a Displacement Class Licence. No construction/habitat clearance works within this area could commence until an appropriately licenced ecologist has completed all necessary licencing documentation. Terrestrial works beyond 10 m of the Displacement Areas would not be restricted by this timing or licencing requirement.

The Natural England Displacement Class Licence is appropriate given that the new watercourse crossings would:

- Not impact more than 50 m of ditch in length;
- Only one Displacement would take place within 500 m on the same watercourse; and
- There is sufficient retained habitat adjacent to the proposed watercourse crossing to support the displaced population.

Habitat enhancement or creation will be necessary as part of the Natural England Displacement Class Licence to ensure a net gain for the on-site water vole population.

Given that works to the ditches will not take place for a number of years, it is necessary that an updated water vole survey of the Site is undertaken within one year prior to construction works commencing, to determine if there are any changes to the water vole populations and inform appropriate licencing specifics. All works will proceed with licencing requirements provided at that point.

All displacement will be undertaken in full adherence with the CL31 Displacement Class licence.

Ditch Crossing Points (Field P and Field Q)

Ditch locations are shown on Figure 4. No water vole field sign evidence was identified present within either of these field ditches and as such, no water vole mitigation is required for the construction of these two new watercourse crossings. Further, these ditches are located approximately 700m from the closest evidence of water vole presence.

Given that works to the ditches will not take place for a number of years, it is necessary that an updated water vole survey of the Site is undertaken one year prior to construction works commencing, to determine if there are any changes to the water vole populations and inform appropriate licencing specifics. All works will proceed with licencing requirements provided at that point, if applicable.

Other Ditches

The Development layout has been designed to ensure that a minimum buffer of 5 m is maintained between infrastructure and ditches (with the exception to four new watercourse crossings), and that existing crossings are utilised to avoid habitat fragmentation, as far as possible.

It is necessary that during the works, best working practises are in place to minimise damage to the banks of the watercourse during construction and to reduce the risk of a pollution incident occurring. These measures are detailed within a CEMP and should be read in conjunction with this report.

³³ 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.

4.4.6 *Otter*

No evidence of otter was recorded during the Extended Phase 1 Habitat Survey. However, given their wide territory range, there is the potential that otters may occasionally use the on-site ditches as a commuting route and may be active in the local landscape.

In the absence of mitigation, there is a low potential that the Development will cause harm or disturbance to otters during construction of the Development. Aquatic habitats have largely been avoided as part of the design of the Development, both during construction and the operational phase. Therefore, no further surveys for otter are required; however, precautionary mitigation to protect otters commuting across land on-site has been provided.

4.4.6.1 *Mitigation Requirements*

Suitable habitats are present that have the potential to support otter, whilst this species has not been identified on-site, simple precautionary controls are to be implemented during the construction phase:

- During spring through to autumn, works within 10 m of aquatic or riparian habitats ideally needs to be avoided, and in the limited areas where this is not possible, construction works are to be limited to the hours from dawn to one hour before sunset; Cover excavations overnight to prevent animals falling into them. Inspect excavations daily for the presence of animals before recommencing work on them;
- Any deep excavations that are to be left open overnight should include a means of escape for any animals that may fall in;
- Store building materials above ground on pallets, with any pipework materials capped to avoid otters becoming trapped; and
- Should any new mammal burrows (e.g., holts) be identified, works in the area will need to stop and a suitably experienced ecologist contacted for advice.

4.4.7 *Reptiles*

The Site has the potential to support basking, foraging and sheltering reptiles, particularly along the field margins where strips of poor semi-improved grassland, tall ruderal and hedgerows are present. These areas of habitat will be largely avoided and retained by the design of the Development. The majority of infrastructure will be installed on the arable land and therefore, adverse impacts to reptiles will be minimal.

In the long term, the Development is likely to have a positive impact on reptile populations, creating and enhancing suitable reptile habitat through proposed planting and species-specific measures such as hibernacula. The additional HEAs to the north and west of the Site will provide further opportunities for invertebrates through foraging, commuting, basking and sheltering.

4.4.8 *Invertebrates*

The Development is considered unlikely to significantly encroach upon, or impact the connectivity of, habitats of high value to invertebrates. Therefore, no further surveys or specific mitigation is recommended.

In the long term, the Development is likely to have a positive impact on invertebrates if the swards of grassland (beneath and between solar panels) and native shrub and tree planting are managed appropriately. The additional HEAs to the north and west of the Site and enhancements e.g., hibernacula created for other species, will provide further opportunities for invertebrates improving foraging, commuting and sheltering opportunities within the local area.

4.4.9 Other Species

4.4.9.1 Brown Hare

Brown hare (UK BAP priority species³⁴) were seen during the Extended Phase 1 Habitat Survey (Target Note 3, Figure 1, Appendix B) and during the subsequent Protected Species Surveys.

No further surveys are recommended for brown hare however, the mitigation measures provided below are sufficient to safeguard these species during construction of the Development:

- Where possible, cover excavations overnight to prevent animals falling into them, and inspect excavations daily for the presence of animals before recommencing work on them;
- End caps will be added to cable or drainage tubes that are left on-site, to avoid mammals becoming trapped overnight;
- Any deep excavations that need to be left open overnight will include a means of escape for any animals that may fall in;
- The creation of large stock piles of earth will be avoided as these may be attractive for mammals and other animals;
- Store building materials above ground on pallets; and
- Should any new mammal burrows be identified, works in the area will need to stop and a suitably experienced ecologist contacted for advice.

In addition, the inclusion of mammal gates within the perimeter fencing will continue to ensure that the brown hare's spatial range is maintained on-site.

4.4.9.2 Hedgehog

Habitats on-site provide suitable terrestrial habitats for hedgehog, which are a rapidly declining priority species. Although, no specific surveys for hedgehogs are recommended, the habitat enhancements and mitigation within the BEMP²⁴ will be sufficient to address potential impacts on hedgehogs.

4.4.9.3 Rabbit

Several rabbit burrows were identified along the field margins to the south-east of the Site.

Although rabbit do not have the same level of protection as some other species (e.g., badger), if any warrens are due to be lost either of the following measures will be implemented:

- A pest control company is consulted prior to works to ensure any animals can be humanely dispatched and no unnecessary suffering caused as a result of construction; or
- Excavation of the den/warren under full ecological supervision is completed to ensure no entombment of animals present. This process would need to be undertaken slowly and in stages.

³⁴ Brown Hare. Natural England Species Information [Online] Available at: <http://adlib.everysite.co.uk/resources/000/122/160/SIN001.pdf> (Accessed 09/07/21)

5 CONCLUSION

This report outlines the baseline results from the PEA undertaken in 2019 with an updated assessment in 2021. The PEA identified the potential for a range of important ecological features that may be sensitive to development and further survey work has been undertaken, including GCN Surveys and water vole surveys, to inform an EclA.

In the absence of mitigation, there is potential for adverse ecological affects given the findings of the further surveys. Mitigation to address potential adverse ecological affects of disturbance and harm to GCN from the Development will be detailed in a Method Statement submitted as part of an EPSM mitigation licence application to Natural England. Construction works can commence in line with the requirements of this EPSM licence once this licence is granted by Natural England.

The design of the Development will avoid and retain all known on-site ponds, hedgerows and woodland habitats, with appropriate buffer zones, mitigation and licencing measures provided. With the application of mitigation outlined in Section 4, a low adverse temporary impact is anticipated on habitats and species identified in this report during construction.

In order to increase the biodiversity value of the Site, and to adhere to Government guidance set out in the NPPF⁶, a range of enhancement measures have been provided, which are detailed within the BEMP²⁴ and Biodiversity Metrics Assessment Report which accompanies the planning application. The BEMP²⁴ has been drafted in consultation with the BBCT.

Further enhancement measures have been provided for a range of protected species. These will have an overall positive impact on habitats, with wildflower planting providing food sources for pollinators, along with two new HEAs which will provide connectivity for commuting bats, badgers, reptiles and other mammals to Allerthorpe Common SSSI to the north of the Site and to the west of the Site.

The creation of native species grassland, primarily between and beneath the solar panels, and wildflower meadows (outside of fenced areas), will also create a large quantum of new habitat that would not be possible in the absence of the Development. The proposed habitat creation and enhancement will result in a marked increase in biodiversity value as a result of the Development, and as reported in the Biodiversity Metric Assessment report, delivers an overall net gain of 114.73%.

APPENDIX A – PLANNING POLICY AND LEGISLATION

The Wildlife & Countryside Act 1981

The Wildlife and Countryside Act 1981¹, as amended by the Countryside and Rights of Way Act (CROW) 2000³⁵ and the Natural Environment and Rural Communities Act (NERC) 2006³, consolidates and amends existing national legislation to implement the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) and Council Directive 79/409/EEC on the Conservation of Wild Birds (Birds Directive)²⁰, making it an offence to:

- Intentionally kill, injure or take any wild bird or their eggs or nests (with certain exceptions) and disturb any bird species listed under Schedule 1 to the Act, or its dependent young while it is nesting;
- Intentionally kill, injure or take any wild animal listed under Schedule 5 to the Act; intentionally or recklessly damage, destroy or obstruct any place used for shelter or protection by any wild animal listed under Schedule 5 to the Act; intentionally or recklessly disturb certain Schedule 5 animal species while they occupy a place used for shelter or protection; and
- Pick or uproot any wild plant listed under Schedule 8 of the Act. Schedule 9, Part II of the Act also lists many species for which it is an offence to plant, or otherwise cause to grow, in the wild. Any material containing Japanese knotweed is also identified as controlled waste under the Environment Protection Act 1990 and must be disposed of properly at licenced landfill according to the Environmental Protection Act (Duty of Care) Regulations 1991.

Habitat Regulations 2017

The Conservation of Habitats and Species Regulations 2017² (**the 'Habitat Regulations'**), as amended by the Conservation of Habitats and Species and Planning (Amendment) (EU Exit) Regulations 2019³⁶, are the principal means by which Council Directive 92/43/EEC on the **Conservation of Natural Habitats and Wild Flora and Fauna (the 'Habitats Directive')** is transposed into law in England and Wales. The objective of the Habitats Directive is to protect biodiversity through the conservation of natural habitats and species of wild fauna and flora. The Directive lays down rules for the protection, management and exploitation of such habitats and species and makes it an offence to deliberately capture, kill or disturb wild animals protected under the Habitat Regulations. It is also an offence to damage or destroy a breeding site or resting place of such an animal (even if the animal is not present at the time).

Natural Environment & Rural Communities (NERC) Act 2006

The NERC Act 2006³ places a duty on local planning authorities to have due regard for biodiversity and nature conservation during the course of their operations, and thus ensures that biodiversity is a key consideration in the planning process.

³⁵ UK Government (2000) The Countryside and Rights of Way Act 2000 [Online] Available at: <http://www.legislation.gov.uk/ukpga/2000/37/contents> (Accessed 27/07/2021)

³⁶ UK Government (2019) The Conservation of Habitats and Species and Planning (Amendment) (EU Exit) Regulations 2019 [Online] Available at: <http://www.legislation.gov.uk/ukdsi/2019/9780111176573> (Accessed 27/07/2021)

Protection of Badgers Act 1992

Badgers receive strict protection under the Protection of Badgers Act 1992⁴, which prohibits the taking, injuring, selling, possessing or killing of badgers and makes it an offence to ill-treat any badger, damage, destroy, disturb or cause a dog to enter a badger sett. The 1992 Act defines a badger sett as ***"any structure or place, which displays signs indicating current use by a badger"***.

The Hedgerow Regulations 1997

The Hedgerow Regulations 1997⁵ (as amended by the Hedgerow [Amendment] [England] Regulations 2002; hereafter collectively called the Hedgerow Regulations) were made under Section 97 of the Environment Act in 1995 providing the necessary legislation for the protection of certain hedgerows. The overall aim of the Hedgerow Regulations is to secure the retention of important countryside hedgerows, principally ancient and species-rich hedges. The Hedgerow Regulations also introduced new arrangements for planning authorities in England and Wales to protect important hedgerows in the countryside by controlling their removal through a system of notification.

National Planning Policy Framework 2019

The National Planning Policy Framework (NPPF)⁶ 2021 **sets out the Government's** requirement for the planning system in England and in doing so establishes framework within which local planning authorities can develop their own planning policies. The NPPF explicitly addresses the conservation and enhancement of the natural environment, including biodiversity, through paragraphs 174–177.

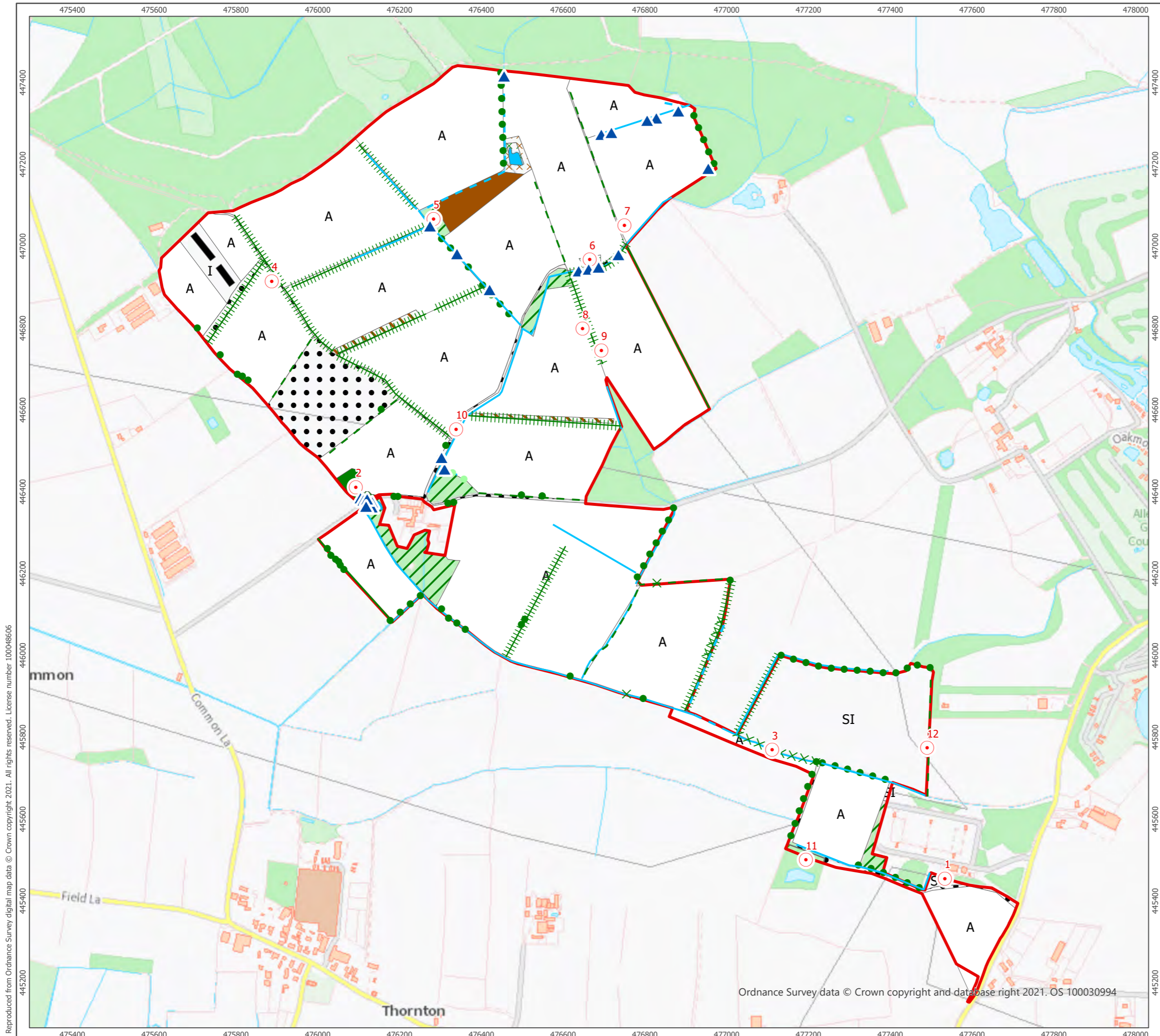
Biodiversity Action Plans

The UK Biodiversity Action Plan (UKBAP) was developed to fulfil the Rio Convention on Biological Diversity in 1992, to which the UK is a signatory. The UK Post-2010 Biodiversity **Framework' now (as of July 2012) succeeds the UKBAP, although the UKBAP** priority species and habitats are retained through the NERC Act. Regional and local BAPs have also been organised to develop plans for species/habitats of nature conservation importance at regional and local levels.

APPENDIX B – FIGURE AND TARGET NOTES

Target Notes

Target Note	Description
1	Pylon adjacent to existing access track
2	Log pile and grass mound – suitable for reptiles
3	Brown hare seen
4	Log pile
5	Fenced area for pheasants
6	Soil mound
7	Grass mound
8	Grass mound
9	Grass mound
10	Mammal burrow at water's edge
11	Several rabbit burrows identified



- Planning Boundary
- Broadleaved woodland - semi-natural
- Broadleaved woodland - plantation
- Mixed woodland - plantation
- Scrub - scattered
- Other tall herb and fern - ruderal
- Improved grassland
- SI Poor semi-improved grassland
- Bracken - continuous
- Bracken - scattered
- Standing water
- A Cultivated/disturbed land - arable
- Buildings
- Bare ground
- Broadleaved Parkland/scattered trees
- ××× Scrub - scattered
- Coniferous Parkland/scattered trees
- Running water
- Defunct hedge - species-poor
- Intact hedge - species-poor
- Hedge with trees - species-poor
- Dry ditch
- ⊙ Target Note
- × Scrub - scattered
- Broadleaved parkland/scattered trees
- ▲ Himalayan Balsam

1:9,000 Scale @ A3
 0 200 400 m ▲ NORTH

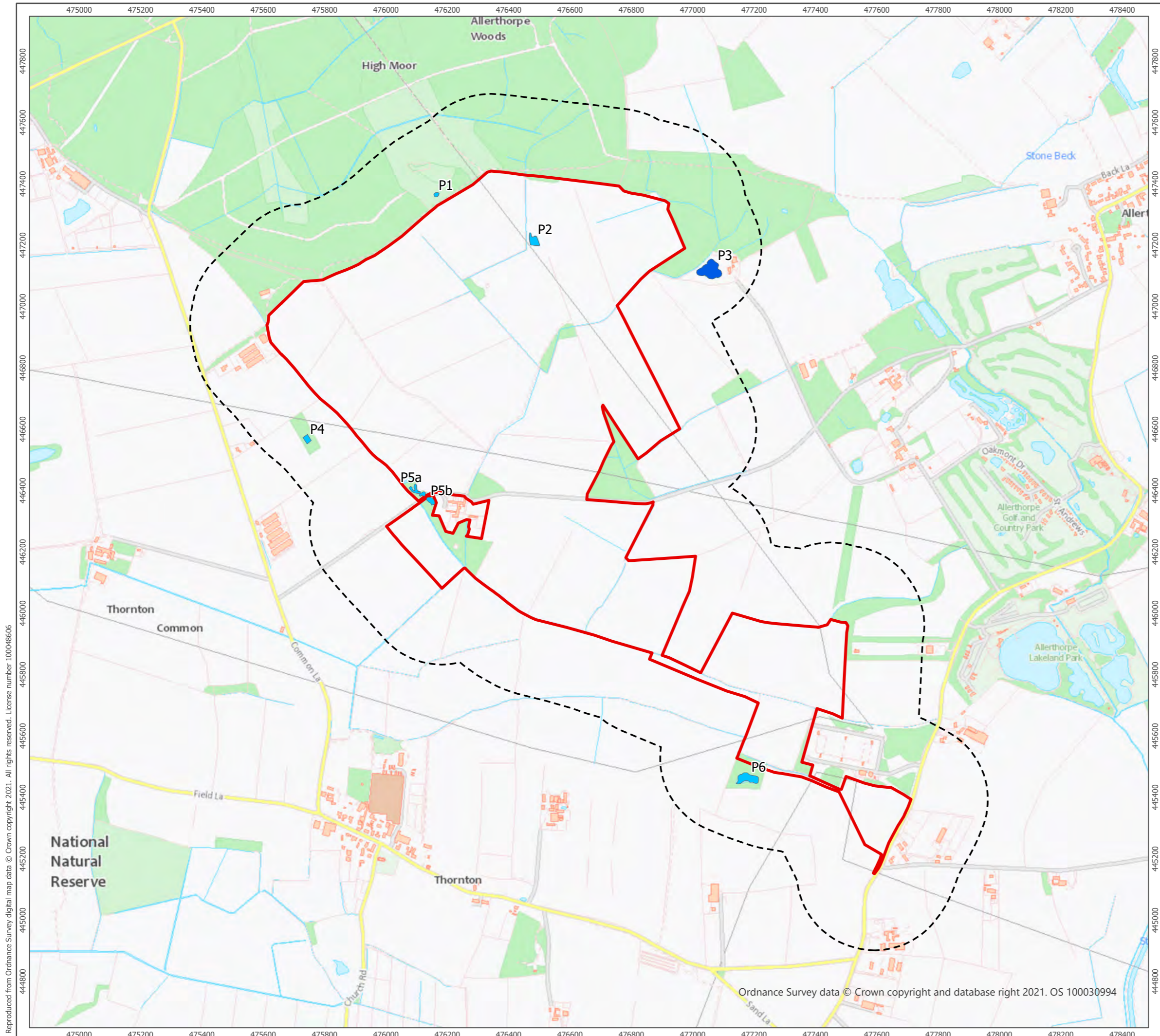
Produced By: CW	Ref: 3404-REP-022
Checked By: SC	Date: 13/08/2021

Phase 1 Habitat Survey
Figure 1

**Soay Solar Farm
and Greener Grid Project
Ecological Impact Assessment**

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- Planning Boundary
- Survey Area - 250 m Buffer
- Standing Water - Accessed
- Standing Water - No Access

1:12,000 Scale @ A3

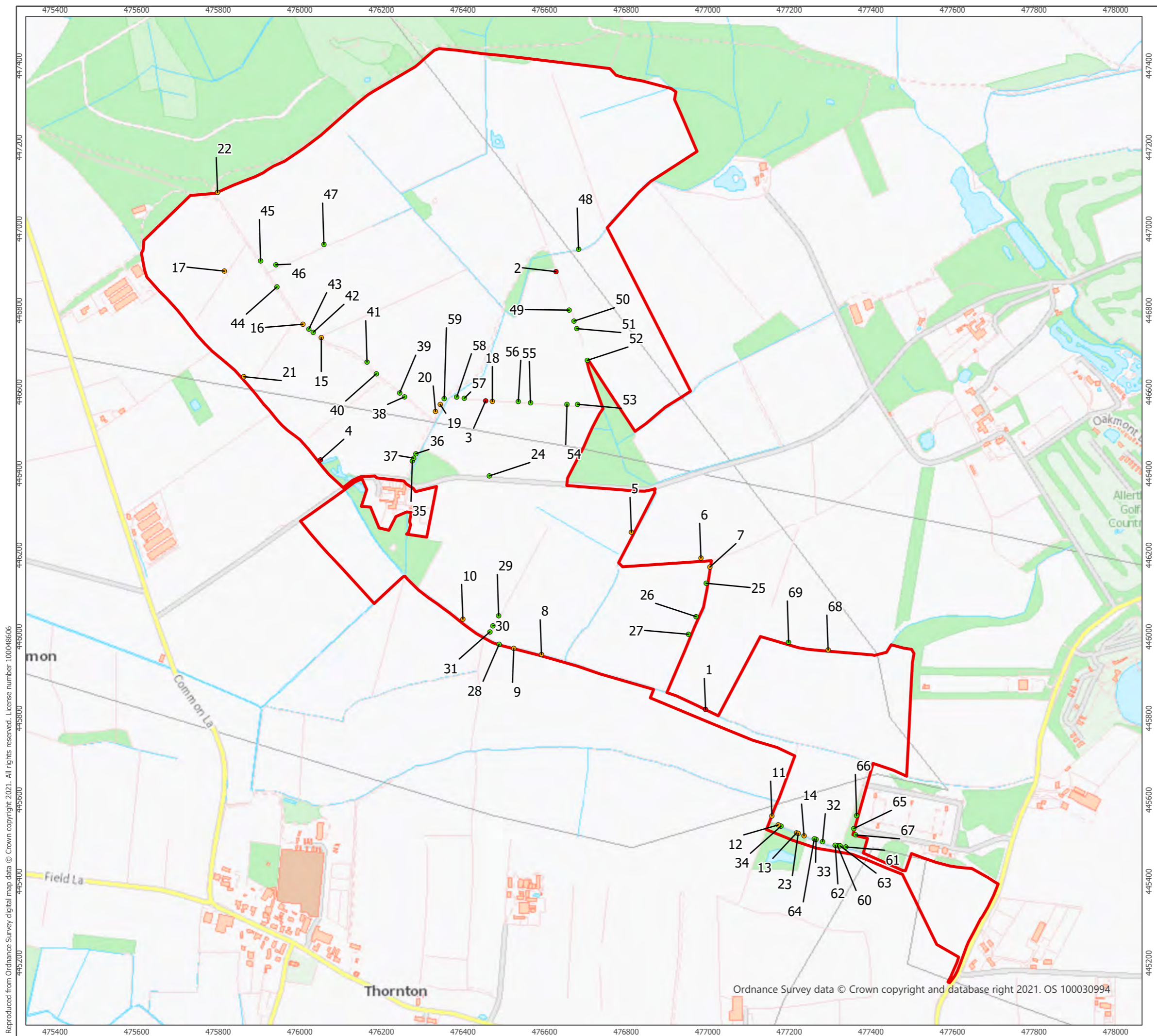
Produced By: CW	Ref: 3404-REP-054
Checked By: SC	Date: 13/08/2021

Waterbody Locations
Figure 2

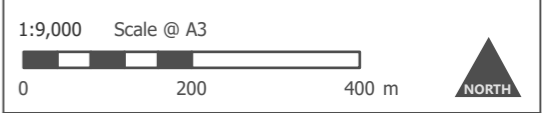
**Soay Solar Farm
and Greener Grid Project
Ecological Impact Assessment**

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- Planning Boundary**
- Bat Roost Assessment**
- Low
 - Moderate
 - High



Produced By: CW	Ref: 3404-REP-055
Checked By: MJ	Date: 13/08/2021

**Bat Roost Assessment
- Tree Locations
Figure 3**

**Soay Solar Farm
and Greener Grid Project
Ecological Impact Assessment**

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- Planning Boundary
- Ditch
- Water Vole Field Signs**
- ▲ Potential Burrow
- ▲ Feeding Remains
- Water Vole Displacement Required



Produced By: CW	Ref: 3404-REP-056
Checked By: MJ	Date: 13/08/2021

Water Vole Survey Results
Figure 4

**Soay Solar Farm
and Greener Grid Project
Ecological Impact Assessment**

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APPENDIX C – Designated Sites

Table C.1: Designated sites and their proximity to the Site.

Site	Status	Minimum Distance and Direction (km) from the Site	Description/Reason for Designation
Statutory designated sites			
Allerthorpe Common	SSSI	Located adjacent to northern boundary	<p>One of the three remaining heathlands on sandy glacial soils in the Vale of York. During 1960's the site was extensively afforested with pine so that heathland communities are now largely confined to a 6-ha nature reserve, and an unplanted area in the northeast corner of the common. The site supports a mosaic of wet and dry heath flora communities, into which birch (<i>Betula pendula</i>) woodland has encroached.</p> <p>Site supports heathland bird community, including breeding nightjar (<i>Caprimulgus europaeus</i>), tree pipit (<i>Anthus trivialis</i>) and whinchat (<i>Saxicola rubetra</i>).</p>
Pocklington Canal	SSSI	0.8 km east	<p>The unrestored section of the Canal above Melbourne is one of the most important canal sites in England, notable for its assemblage of aquatic, fringing swamp and tall fen plant communities, which include a number of rare and local species. The Canal is flanked by neutral grassland, usually in association with ditches, becks, hedgerows and small areas of scrub, a complex of habitats which is important for invertebrates and breeding birds. The Canal and its margins support a breeding bird community typical of lowland open waters and their margins, including tufted duck (<i>Aythya fuligula</i>), kingfisher (<i>Alcedo atthis</i>), grey wagtail (<i>Motacilla cinerea</i>), sedge warbler (<i>Acrocephalus schoenobaenus</i>), reed warbler (<i>Acrocephalus scirpaceus</i>) and reed bunting. Fringing hedges and scrub hold species such as turtle dove (<i>Columba turtur</i>) and whitethroat (<i>Sylvia communis</i>).</p>

Site	Status	Minimum Distance and Direction (km) from the Site	Description/Reason for Designation
Lower Derwent Valley	SAC, SPA, Ramsar, NNR	1 km south-west	<p>Designated for the following priority habitats and species:</p> <ul style="list-style-type: none"> • Lowland hay meadows (<i>Salvia officinalis</i>, <i>Alopecurus pratensis</i>) • Alluvial wood with (<i>Alnus glutinosa</i>, <i>Fraxinus excelsior</i>) • Alluvial flood meadow • Otter (<i>Lutra lutra</i>) • Assemblage of migratory waders (passage), waterbird assemblage (wintering), Bewick's swan (<i>Cygnus columbianus bewickii</i>), golden plover (<i>Pluvialis apricaria</i>), ruff (<i>Philomachus pugnax</i>), Shoveler (<i>Anas clypeata</i>), wigeon (<i>Mareca penelope</i>) • Wetland invertebrate assemblage
Melbourne and Thornton Ings	SSSI	1 km south-west	<p>Comprises a series of flood meadows, pasture and woodland associated with the Beck and the Pocklington Canal, support a rich diversity of plant species and of outstanding ornithological interest. Breeding wildfowl are of particular importance with 13 species including pintail (<i>Anas acuta</i>), garganey (<i>Anas querquedula</i>) and gadwall (<i>Mareca strepera</i>). Breeding waders include high densities of curlew (<i>Numenius arquata</i>), lapwing (<i>Vanellus vanellus</i>), snipe (<i>Gallinago gallinago</i>) and redshank (<i>Tringa totanus</i>), as well as numbers of oystercatcher (<i>Haematopus ostralegus</i>) and common sandpiper (<i>Actitis hypoleucos</i>). In the winter the grasslands support teal (<i>Anas crecca</i>) and significant numbers of Bewick's swan and wigeon.</p> <p>Furthermore, the area supports a considerable assemblage of dragonflies, with 13 species recorded.</p> <p>Otter is also known to frequent use the site.</p>

Site	Status	Minimum Distance and Direction (km) from the Site	Description/Reason for Designation
White Carr Meadow	SSSI	1 km east	A small damp hayfield situated on alluvial gley soils. The meadow is important as one of the best remaining examples of unimproved, species-rich damp neutral grassland in North Humberside and is maintained by traditional management for hay. Such are restricted in distribution due to agricultural improvement. The grassland supports a diverse assemblage of forbs, grasses and sedges.
River Derwent	SAC, SSSI	4.7 km west	<p>Designated for the following habitats and species:</p> <ul style="list-style-type: none"> • Watercourses of plain to montane levels with <i>Ranunculetum fluitantis</i>; • Sea lamprey (<i>Petromyzon marinus</i>), river lamprey (<i>Lampetra fluviatilis</i>), bullhead (<i>Cottus gobio</i>); and • Otter <p>The River is considered to represent one of the best British examples of the classic river profile, rich in nutrients and relatively unpolluted, supported an aquatic flora uncommon in Northern Britain. Furthermore, the River has an exceptionally rich assemblage of invertebrates and is noted for its diversity of fish species.</p> <p>The riverine habitat also supports an excellent breeding bird community including common sandpiper, dipper (<i>Cinclus cinclus</i>), kingfisher, yellow wagtail (<i>Motacilla flava</i>) and grey wagtail. During the winter the Lower Derwent is internationally population of Bewick's swans.</p>
Non-statutory designated sites			

Site	Status	Minimum Distance and Direction (km) from the Site	Description/Reason for Designation
Allerthorpe Common	LWS, YWT Reserve	At northern boundary	Supports a range of habitats including lowland heath, wet heath, dry heath, acid grassland, woodland, scrub and open water. Patches of scrub and mature woodland support birds including great spotted woodpecker (<i>Dendrocopos major</i>). A large pool and several smaller ponds support numerous damselfly and dragonfly species including broad-bodied chaser (<i>Libellula depressa</i>) and blue-tailed damselfly (<i>Ischnura elegans</i>). Adder (<i>Vipera berus</i>) are present on site.
Warren Wood	Deleted LWS	Located adjacent to eastern boundary	Supports an area of deciduous woodland.
Coat's Bridge Lane	Deleted LWS	0.2 km south-east	No citation available.
Letterbox Plantation	Deleted LWS	0.4 km east	Supports an area of deciduous woodland.
Allerthorpe Verge Nature Reserve (VNR)	Deleted LWS	0.5 km north-west	A roadside verge containing important grassland, ditch and hedgerow habitats, providing refuges for wildflowers, animals and wildlife such as butterflies. Plays a role as a wildlife or green corridor.
Waplinton	Deleted LWS	0.6 km east	Supports an area of deciduous woodland.
Canal Side Wood	Deleted LWS	0.6 km east	Supports are area of young trees.
Gray Plantation	Deleted LWS	0.7 km north	Supports an area of deciduous woodland.
Waplinton Hall	Deleted LWS	0.7 km east	Supports an area of deciduous woodland.
Hedge, Sand Land, East Moor	LWS	0.8 km south	No citation available.
Pocklington Canal Meadows	Deleted LWS	0.8 km east	No citation available.
Allerthorpe Crossroads Drain	Deleted LWS	0.8 km south	No citation available.
Thornton's Wood	Historic LWS	0.8 km south-east	Supports an area of deciduous woodland.
White Carr	Candidate LWS	0.9 km east	Supports areas of lowland meadows.

Site	Status	Minimum Distance and Direction (km) from the Site	Description/Reason for Designation
Unimproved Meadow	Deleted LWS	0.9 km east	Supports areas of lowland meadows.
Barmby Bottoms	Historic LWS	1.1 km north-west	Supports an area of deciduous woodland.
Hedge, Walbut House	Deleted LWS	1.3 km south	No citation available.
Singleton's Whin	Deleted LWS	1.4 km east	No citation available.
A1079, Allerthorpe Corner	Deleted LWS	1.7 km north	Adjacent to lowland heathland.
Haxby and Mickfield Plantations	Historic LWS	1.7 km west	Supports an area of deciduous woodland.
Holmes Field Reserve (Allerthorpe Gravel Pits)	LWS	2 km east	No citation available.

APPENDIX D - PLANT SPECIES LIST

List of plant species recorded



Common name	Latin name
Alder	<i>Alnus glutinosa</i>
Ash	<i>Fraxinus excelsior</i>
Bracken	<i>Pteridium aquilinum</i>
Bramble	<i>Rubus fruticosus agg.</i>
Broadleaved plantain	<i>Plantago major</i>
Broad-leaved dock	<i>Rumex obtusifolius</i>
Burdock	<i>Arctium sp.</i>
Cleavers	<i>Galium aparine</i>
Cocksfoot	<i>Dactylis glomerata</i>
Common bird's-foot trefoil	<i>Lotus corniculatus</i>
Common daisy	<i>Bellis perennis</i>
Common groundsel	<i>Senecio vulgaris</i>
Common ivy	<i>Hedera helix</i>
Common nettle	<i>Urtica dioica</i>
Cow's parsley	<i>Anthriscus sylvestris</i>
Creeping buttercup	<i>Ranunculus repens</i>
Dandelion	<i>Taraxacum officinale agg.</i>
Devils'-bit-scabious	<i>Succisa pratensis</i>
Dogwood	<i>Cornus sanguinea</i>
Dove's-foot crane's-bill	<i>Geranium molle</i>
Elder	<i>Sambucus nigra</i>
False oat-grass	<i>Arrhenatherum elatius</i>
Fern	<i>Tracheophyta sp.</i>
Forget-me-not	<i>Myosotis sp.</i>
Garlic mustard	<i>Alliaria petiolata</i>
Hawthorn	<i>Crataegus monogyna</i>
Hazel	<i>Corylus avellana</i>
Hemlock	<i>Conium maculatum</i>
Herb-Robert	<i>Geranium robertianum</i>
Himalayan balsam	<i>Impatiens glandulifera</i>
Hogweed	<i>Heracleum sphondylium</i>
Holly	<i>Ilex aquifolium</i>
Horse chestnut	<i>Aesculus hippocastanum</i>
Lady's bedstraw	<i>Galium verum</i>
Larch	<i>Larix sp.</i>
Mugwort	<i>Artemisia vulgaris</i>

Common name	Latin name
Oak	<i>Quercus robur</i>
Oxeye daisy	<i>Leucanthemum vulgare</i>
Perennial rye-grass	<i>Lolium perenne</i>
Pineapple weed	<i>Matricaria discoidea</i>
Red campion	<i>Silene dioica</i>
Red-dead-nettle	<i>Lamium purpureum</i>
Ribwort plantain	<i>Plantago lanceolata</i>
Scotch broom	<i>Cytisus scoparius</i>
Scot's pine	<i>Pinus sylvestris</i>
Selfheal	<i>Prumella vulgaris</i>
Small bulgloss	<i>Anchusa arvensis</i>
Spear Thistle	<i>Cirsium vulgare</i>
Spruce	<i>Picea</i> sp.
Sunflower	<i>Helianthus annuus</i>
Sycamore	<i>Acer plantanus</i>
Teasel	<i>Dipsacus fullonum</i>
Thistle	<i>Cirsium vulgare</i>
Wild cherry	<i>Prunus avium</i>
White Clover	<i>Trifolium repens</i>
White-dead-nettle	<i>Lamium album</i>
Yarrow	<i>Achillea millefolium</i>
Yorkshire fog	<i>Holcus lanatus</i>

APPENDIX E - PHOTOGRAPHS

Photographs taken during the Extended Phase 1 Habitat Survey

 <p>15 Dec 2020 at 09:23:33 +53.908306,-0.832740 4° N York England YO42 United Kingdom</p>	 <p>15 Dec 2020 at 09:14:33 +53.907763,-0.831505 177° S Waplington Lane, Waplington York England YO42 United Kingdom</p>
<p>Photograph 1: Overview of arable fields.</p>	<p>Photograph 2: Defunct species-poor hedgerows.</p>
 <p>15 Dec 2020 at 13:07:59 +53.909660,-0.840175 295° NW York England YO42 United Kingdom</p>	 <p>15 Dec 2020 at 14:19:05 +53.915361,-0.833981 69° E York England YO42 United Kingdom</p>
<p>Photograph 3: Species-poor hedgerows with mature trees.</p>	<p>Photograph 4: Arable crops to the west of the Site.</p>
 <p>15 Dec 2020 at 14:44:08 +53.91779,-0.834851 130° SE York England YO42 United Kingdom</p>	 <p>15 Dec 2020 at 09:23:00 +53.906315,-0.832743 307° NW York England YO42 United Kingdom</p>
<p>Photograph 5: Grass mounds to the north-east of the Site.</p>	<p>Photograph 6: On-site drainage ditches which have been recently cut.</p>
 <p>15 Dec 2020 at 13:51:52 +53.914379,-0.839135 101° E York England YO42 United Kingdom</p>	 <p>15 Dec 2020 at 10:21:42 +53.905680,-0.840200 359° N York England YO42 United Kingdom</p>

<p>Photograph 7: Large area of bracken to the north of the Site.</p>	<p>Photograph 8: Small broadleaved plantation woodland to the north of Warren Farm Cottages.</p>
	
<p>Photograph 9: P2 to the north of the Site.</p>	<p>Photograph 10: Oak tree with bat roost potential, large cavity on the western elevation.</p>

APPENDIX F – HABITAT SUITABILITY INDEX (HSI) ASSESSMENT

Table F.1 Great Crested Newt HSI results

Pond Reference and HSI Scores						
HSI Description	P1	P2	P4	P5a	P5b	P6
1. Geographic location	1	1	1	1	1	1
2. Pond area	0.2	0.95	0.8	1	0.4	0.8
3. Pond permanence	1	1	1	0.5	1	0.9
4. Water quality	0.33	0.67	0.33	0.33	0.67	0.33
5. Shade	1	1	1	0.2	1	1
6. Water fowl effect	1	1	0.33	1	1	0.01
7. Fish presence	1	1	0.67	0.67	1	1
8. Pond Density	0.9	0.9	0.7	0.8	0.65	0.5
9. Terrestrial habitat	1	1	0.67	1	1	0.67
10. Macrophyte	0.3	0.3	0.3	0.3	0.3	0.3
HSI Score	0.67	0.84	0.62	0.59	0.74	0.43
Pond suitability	Average	Excellent	Average	Below Average	Good	Poor

Table F.2 Great Crested Newt survey dates and weather conditions

Visit	Date	Weather Conditions
1	23.03.21	Temperature: 10°C Overnight low: 6°C Precipitation: 0 Wind (Beaufort Scale): 3 Cloud Cover: 65%
	24.03.21	Temperature: 9°C Precipitation: 0 Wind (Beaufort Scale): 2 Cloud Cover: 70%
2	29.03.21	Temperature: 18°C Overnight low: 6 °C Precipitation: 0 Wind (Beaufort Scale): 3 Cloud Cover: 85%
	30.03.21	Temperature: 9°C Precipitation: 0 Wind (Beaufort Scale): 2 Cloud Cover: 40%
3	20.04.2021	Temperature: 11°C Overnight low: 7°C Precipitation: 0 Wind (Beaufort Scale): 3 Cloud Cover: 40%
	21.04.2021	Temperature: 7°C Precipitation: 0 Wind (Beaufort Scale): 1 Cloud Cover: 10%
4	27.04.2021	Temperature: 9°C Overnight low: 6°C Precipitation: 0 Wind (Beaufort Scale): 4 Cloud Cover: 40%
	28.04.2021	Temperature: 7°C Precipitation: 0 Wind (Beaufort Scale): 3 Cloud Cover: 25%

Visit	Date	Weather Conditions
5	10.05.2021	Temperature: 11°C Overnight low: 7°C Precipitation: 1 Wind (Beaufort Scale): 3 Cloud Cover: 50%
	11.05.2021	Temperature: 9°C Precipitation: 1 Wind (Beaufort Scale): 3 Cloud Cover: 60%
6	17.05.2021	Temperature: 13°C Overnight low: 6 °C Precipitation: 2 Wind (Beaufort Scale): 2 Cloud Cover: 60%
	18.05.2021	Temperature: 9°C Precipitation: 0 Wind (Beaufort Scale): Cloud Cover: 40%
5 (P1 only)	25.05.2021	Temperature: 10°C Overnight low: 7°C Precipitation: 2 Wind (Beaufort Scale): 2 Cloud Cover: 90%
	26.05.2021	Temperature: 9°C Precipitation: 2 Wind (Beaufort Scale): 1 Cloud Cover: 100%
6 (P1 only)	02.07.2021	Temperature: 13°C Overnight low: 11°C Precipitation: 0 Wind (Beaufort Scale): 1 Cloud Cover: 40%
	03.07.2021	Temperature: 13°C Precipitation: 0 Wind (Beaufort Scale): 1 Cloud Cover: 80%

Table F.3 Results of Presence/Absence and Population Surveys

Key				
GCN = Great crested newt		m – Male	p = Pregnant	t = Tadpoles
SN = Smooth newt		f – Female	CF = Common frog	fs = Frog spawn
PN = Palmate newt		u – Unknown	CT = Common toad	ts = Toad spawn
Visit Number: 1	Survey Method			Peak GCN ³⁷
Waterbody	Torching	Bottle Traps	Egg Search	
P2	No amphibians recorded	No amphibians recorded	No eggs found	0
P4	30x CT	No amphibians recorded	No eggs found	0
P5a	1x CT	1x GCN m, 2x SN m	No eggs found	1
P5b	No amphibians recorded	1x SN f	fs	0
Visit Number: 2	Survey Method			Peak GCN
Waterbody	Torching	Bottle Traps	Egg Search	
P2	1x SN m, 1x CF	1x SN m	No eggs found	0
P4	139x CT	No amphibians recorded	ts, fs	0
P5a	No amphibians recorded	1x SN f	No eggs found	0
P5b	No amphibians recorded	2x SN m, 2x SN f	No eggs found	0
Visit Number: 3	Survey Method			Peak GCN
Waterbody	Torching	Bottle Traps	Egg Search	
P1	No amphibians recorded	1x GCN f, 1x PN m, 2x PN f	No eggs found	1
P2	No amphibians recorded	1x SN m, 1x CF	No eggs found	0
P4	No amphibians recorded	No amphibians recorded	ts	0
P5a	1x SN f	2x SN m, 2x SN f	No eggs found	0
P5b	No amphibians recorded	1x SN m	No eggs found	0
Visit Number: 4	Survey Method			Peak GCN
Waterbody	Torching	Bottle Traps	Egg Search	
P1	No amphibians recorded	1x GCN f, 1x PN f	No eggs found	1
P2	1x SN m, 2x SN f	1x SN f	No eggs found	0
P4	No amphibians recorded	1x GCN f	ts	1
P5a	No amphibians recorded	No amphibians recorded	No eggs found	0
P5b	1x CF	No amphibians recorded	No eggs found	0

³⁷ Peak count is highest number recorded over all survey methods.

Visit Number: 5	Survey Method			Peak GCN
Waterbody	Torching	Bottle Traps	Egg Search	
P1	1x CT	2x PN m	No eggs found	0
P2	1x SN m	1x SN m	No eggs found	0
P4	5x CT & t	t	t	0
P5a	No amphibians recorded	1x SN f	No eggs found	0
P5b	1x CT	No amphibians recorded	No eggs found	0
Visit Number 6:	Survey Method			Peak GCN
Waterbody	Torching	Bottle Traps	Egg Search	
P1	No amphibians recorded	1x GCN f, 1x PN m, 2x PN f, 1x SN m & 1x SN f	No eggs found	1
P2	1x SN f	No amphibians recorded	No eggs found	0
P4	No amphibians recorded	1x SN m	ts	0
P5a	No amphibians recorded	No amphibians recorded	No eggs found	0
P5b	No amphibians recorded	No amphibians recorded	No eggs found	0
Visit Number 5:	Survey Method			Peak GCN
Waterbody	Torching	Bottle Traps	Egg Search	
P1	1x SN m	4x GCN f & 1x PN m	No eggs found	4
Visit Number 6:	Survey Method			Peak GCN
Waterbody	Torching	Bottle Traps	Egg Search	
P1	1x GCN u, 2x PN m, 2x PN f, 2x SN m & 1x CT	3x GCN m, 4x GCN f, 1x PN f & 1x SN m	No eggs found	8

APPENDIX G – BAT ROOST ASSESSMENT - TREES

Table G.1 Descriptions of Trees with Potential Roosting Features

Tree No	Tree ID	Bat Roost Potential	Potential Roost Features
1	Common Ash	High	Missing limbs on E elevation, cavities in main trunk and spilt bark on all aspects
2	English Oak	High	Cavity on main trunk on W elevation, missing and spilt bark on SW and SE elevations, 7-10 m
3	Unidentified dead tree	High	Lots of cavities on all aspects at various heights
4	English Oak	High	Splits in bark and hollow main trunk
5	Common Alder	Moderate	Rot hole on W elevation, missing limbs and spilt bark NW elevation
6	Common Hazel	Moderate	Large cavities and missing limbs on all aspects
7	English Oak	Moderate	Rot holes and missing limbs
8	Common Ash	Moderate	Rot hole on E elevation, 6 m
9	Common Ash	Moderate	Cavity on E elevation, 7 m and missing limbs on NW elevation
10	English Oak	Moderate	Deadwood and cavities, large rot hole on NW elevation, 4 m
11	English Oak	Moderate	Missing limbs and cavities on all aspects
12	English Oak	Moderate	Dense covering of ivy on main trunk and adjacent branches, all aspects
13	Common Ash	Moderate	Dense covering of ivy on main trunk and adjacent branches, all aspects, cavity at 4 m
14	English Oak	Moderate	Dense covering of ivy on main trunk and branches, all aspects
15	English Oak	Moderate	Missing and spilt limbs on all aspects
16	English Oak	Moderate	Missing and spilt limbs on all aspects
17	English Oak	Moderate	Cavity 2-3 m & 1.5-2m on E aspect
18	English Oak	Moderate	Spilt bark on lower crown
19	English Oak	Moderate	Missing limbs on E elevation, 2 m
20	English Oak	Moderate	Cavity at 2 m, several areas of deadwood on all aspects
21	Common Alder	Moderate	2x cavities in main trunk at 2-4 m
22	English Oak	Moderate	Cavity in main trunk on 5-8 m
23	English Oak	Moderate	Dense ivy cover on main trunk and adjacent branches, all aspects
24	English Oak	Low	Missing limbs, spilt bark
25	English Oak	Low	Small cavities seen on all aspects
26	English Oak	Low	Deadwood and some cavities on all aspects
27	English Oak	Low	Deadwood and some cavities on all aspects
28	Common Ash	Low	Spilt, damaged bark on all aspects
29	English Oak	Low	Missing limbs, cavities and deadwood on W elevation, 2-6 m

Tree No	Tree ID	Bat Roost Potential	Potential Roost Features
30	English Oak	Low	Missing limbs, cavities and deadwood on W elevation, 2-6 m
31	English Oak	Low	Missing limbs, cavities and deadwood on W elevation, 2-6 m
32	English Oak	Low	Missing limbs, spilt bark on NW and SE elevations, 6-8 m
33	English Oak	Low	Dense covering of ivy on main trunk, all aspects
34	Common Ash	Low	Dense ivy cover on main trunk and adjacent branches, all aspects
35	Sycamore	Low	Several cavities at 4m
36	Common Ash	Low	Ivy cover on main trunk on all aspects
37	Common Alder	Low	Ivy cover on main trunk on all aspects
38	English Oak	Low	Deadwood on all aspects
39	English Oak	Low	Cavities on main trunk at 2 m, W elevation
40	English Oak	Low	Deadwood on all aspects, 4-5 m
41	English Oak	Low	Deadwood on S elevation, 1 m
42	English Oak	Low	Deadwood at 3 m on all aspects
43	English Oak	Low	Cavities at base of main trunk, W elevation, missing limbs
44	English Oak	Low	Missing/spilt bark on main trunk
45	English Oak	Low	Deadwood on all aspects
46	English Oak	Low	Missing branch on E elevation, 4 m and small cavity SW at 4 m
47	English Oak	Low	Deadwood on all aspects
48	English Oak	Low	Large cavity at 2 m
49	Sycamore	Low	Missing limbs on all aspects
50	English Oak	Low	Large cavity at base of main trunk
51	English Oak	Low	Damaged limbs on SW elevation
52	Common Beech	Low	Minor cavities and missing limbs
53	English Oak	Low	Damaged limbs on N elevation at 2 m
54	English Oak	Low	Damaged limb on W elevation and deadwood on all aspects
55	English Oak	Low	Spilt limbs on W elevation at 2 m and deadwood on S elevation at 4-5 m
56	English Oak	Low	Deadwood on all aspects
57	English Oak	Low	Deadwood at 3 m
58	English Oak	Low	Deadwood at 2.5- 3m
59	English Oak	Low	Broken branches and missing limbs at 2 – 4 m
60	Common Alder	Low	Ivy cover on main trunk and adjacent branches, all aspects
61	Common Alder	Low	Ivy cover on main trunk and adjacent branches, all aspects

Tree No	Tree ID	Bat Roost Potential	Potential Roost Features
62	Common Alder	Low	Ivy cover on main trunk and adjacent branches, all aspects
63	Common Alder	Low	Ivy cover on main trunk and adjacent branches, all aspects
64	English Oak	Low	Ivy cover on main trunk and adjacent branches, all aspects
65	Alder	Low	Dense ivy covering main stem on all aspects
66	Goat Willow	Low	Dense ivy covering main stem on all aspects
67	Hazel	Low	Dense ivy covering main stem on all aspects
68	Willow	Moderate	Large split on main stem on southern aspect, south facing, approximately 1.5m high
69	Sycamore	Low	Rot hole on main stem, south-eastern aspect, 3m high

APPENDIX H – WATER VOLE SURVEY RESULTS

Table H.1 Results of the Water Vole Surveys

Transect ID	Transect length (m)	Evidence of water vole *	Evidence of rat	Evidence of mink or other predators	Water vole habitat Suitability	Description of habitat
D1	332.5	No	Yes- several rat droppings found on northern bank	No	Low	Very low water levels, Aquatic vegetation present: willowherb, soft rush, small growth of <i>Typha</i> and watercress. Water is very clear with a gentle east to west flow. Bank profile is <45° angle.
D2	172.5	No	No	No	Low	Shallow, gentle flow with no aquatic vegetation present. Bank profile is <45° angle.
D3	1,063	No	No	No	Low	Mud substrate, gentle flow, some areas shaded by overhanging trees and scrub, this is mostly to the west and east, the centre of the ditch is very open with no shade. Bank profile is >45° angle.
D4	230	No	No	No	Low	Very shallow, mud substrate, little aquatic vegetation. Lots of bramble covering and trees – 100% shade. Bank profile is <45° angle.
D5	264	No	No	No	Low	Shallow very clear water, mud substrate, little vegetation with a steady current Sloped banksides – appear to have been recently cut, very open no shade. Bank profile is <45° angle.
D6	213	No	No	No	Low	Heavily shaded from overhanging trees and hedge/bramble. Shallow water, mud substrate. Culverted to the north. Choked with duckweed. Bank profile is >45° angle.
D7	230	Yes – feeding remains identified on both banksides.	No	No	Low-Moderate	Very open no shade, Water quality is very good clear, stickleback was seen swimming alongside other aquatic invertebrates (pond swimmers, pond snails and water boatman).

Transect ID	Transect length (m)	Evidence of water vole *	Evidence of rat	Evidence of mink or other predators	Water vole habitat Suitability	Description of habitat
						Bank profile is >45° angle.
D8	1,023	Yes – 2x burrows on both banksides	No	No	Low-Moderate	Water turbid Bank sides recently cut Steady flow of water, shallow in places. Bank profile is <45° angle.
D9	291	No	No	No	Low	Water quality is poor, very turbid with lots of leaf litter. No aquatic vegetation present. Water was still and bank sides appear to have been recently cut. Bank profile is >45° angle.