

ENVIRONMENTAL STATEMENT – VOLUME 3 – APPENDIX 8.2

Amphibian Survey Report

Drax Bioenergy with Carbon Capture and Storage

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations, 2009 –

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EXECUTIVE SUMMARY

Drax Power Limited intends to install post combustion carbon capture technology at the biomass power generating units at the Drax Power Station in Selby, North Yorkshire in order to remove approximately 95% of the carbon dioxide from the flue gas, resulting in overall negative emissions of greenhouse gases. Consent for the Proposed Scheme is being sought via the Development Consent Order (DCO) application process. WSP UK Ltd. was commissioned by Drax Power Limited to conduct amphibian surveys of an area surrounding Drax Power Station.

A desk study undertaken as part of the PEA (March 2021) identified three records of great crested newt *Triturus cristatus* to be locally present, the closest of which was 2.9 km from the Proposed Scheme. Furthermore, great crested newt presence was confirmed to the north-west of the Proposed Scheme in June 2020 (WSP, 2021a). Five ponds and areas of suitable terrestrial habitat were identified that were relevant to the Proposed Scheme.

The five ponds were initially assessed as having potential to support great crested newt but following a further Habitat Suitability Index (HSI) assessment, Pond 5 was scoped out. Great crested newt presence/likely absence surveys were carried out on the remaining four ponds to determine the presence or likely absence of the species. During the four visits to Pond 1, no great crested newt presence was identified. Ponds 3 and 4 both had great crested newt presence; as a result, a further two surveys at each pond were carried out to determine the population size classes. Both were demonstrated to have a small population size class. An eDNA survey was carried out on Pond 2 due to access issues preventing the required amount of presence absence surveys from being undertaken. The eDNA laboratory analysis of this sample returned a positive result for great crested newt, confirming the presence of this species in Pond 2.

Given the proximity of the ponds to each other, lack of significant dispersal barriers, and suitable terrestrial habitat, it can be assumed that Ponds 1-4 comprise a metapopulation of great crested newts, with individuals moving between the ponds across and between years.

The ecological impact assessment and any recommendations for mitigation and/or enhancement measures for amphibians will be set out in the Environmental Statement that will accompany the Proposed Scheme DCO Application.

1. INTRODUCTION PROJECT

1.1. BACKGROUND

- 1.1.1. WSP UK Ltd. (hereafter referred to as 'WSP') was commissioned by Drax Power Limited to conduct amphibian surveys of ponds surrounding Drax Power Station, located near Drax, Selby (centred on National Grid Reference SE 66477 26590).
- 1.1.2. Drax Power Limited intends to install post combustion carbon capture technology at up to two of the existing 600 MW biomass power generating units at the Drax Power Station in Selby, North Yorkshire (hereafter referred to as the 'Proposed Scheme'). This will remove approximately 95% of the carbon dioxide from the flue gas, resulting in overall negative emissions of greenhouse gases.
- 1.1.3. The Proposed Scheme includes the following:
 - a. Up to two Carbon Capture Plants;
 - **b.** Additional Common Plant infrastructure and modification works to the Drax Power Station;
 - c. Infrastructure to transport compressed carbon dioxide from the Carbon Dioxide Processing and Compression Plant to storage and transport infrastructure operated by National Grid Carbon Limited;
 - d. Additional supporting infrastructure and other works;
 - e. Temporary construction laydown areas (Drax Power Station Site Construction Laydown Areas and the East Construction Laydown Area); and
 - f. Habitat Provision Area to the north and east of the Drax Power Station.
- 1.1.4. A full description of the Proposed Scheme (as of the time of writing) is given Chapter 2 (Site and Project Description) (document reference 6.1.2). The Proposed Scheme is shown on Figure 1, highlighted by the red line boundary.
- 1.1.5. The Site is approximately 290 ha and is split into the following parcels:
 - a. Drax Power Station Site the land occupied by the Drax Power Station;
 - b. East Construction Laydown Area area required during the construction phase of the Proposed Scheme for temporary works situated to the east of the Drax Power Station, across New Road. (N.B There are several parcels of land within the Drax Power Station Site which would be used for construction laydown. These areas have been termed the 'Drax Power Station Construction Laydown Areas');
 - c. Habitat Provision Area the land within the Order Limits that may be used for environmental mitigation for the Proposed Scheme. This parcel is located to the north and east of the Drax Power Station; and
 - **d.** Surrounding road network.

1.2. ECOLOGICAL BACKGROUND

- 1.2.1. In April 2021, WSP conducted a Preliminary Ecological Appraisal (PEA) to gather information on ecological features relevant to the Proposed Scheme. This also included a desk study which was carried out in March 2021 (WSP, 2021b)).
- 1.2.2. The desk study identified three records of great crested newt *Triturus cristatus*, the closest of which was 2.9 km from the Proposed Scheme. Great crested newt presence was identified in a pond to the north-west of the Proposed Scheme during ecological surveys for the Flue Gas Demolition (FGD) project in June 2020 (WSP, 2021a). The PEA identified multiple areas of standing water within and outside of the Proposed Scheme, as well as suitable terrestrial habitat for foraging and sheltering comprising rubble piles within marshy grassland to the north-west of the Proposed Scheme (WSP, 2021b). Due to records of great crested newt and the presence of suitable great crested newt habitat in and around the Proposed Scheme, targeted amphibian surveys were subsequently completed.
- 1.2.3. The purpose of these surveys was to establish the presence or likely absence of great crested newt at the Proposed Scheme.

1.3. BRIEF AND OBJECTIVES

- 1.3.1. Drax Power Limited commissioned WSP UK Ltd to:
 - a. Complete a Habitat Suitability Index (HSI) assessment of ponds on the Proposed Scheme and within 500 m of the red line boundary (shown on Figure 1) to assess their suitability as aquatic habitat for great crested newt and determine if further survey was required;
 - b. Complete a conventional amphibian survey to determine the presence or likely absence of great crested newt and other amphibian species from ponds providing suitable habitat for amphibians within and up to 500 m from the existing Power Station Site and laydown areas of the Proposed Scheme. This were completed for ponds in which amphibian populations may be affected by the Proposed Scheme:
 - c. Complete two additional conventional survey visits to ponds where great crested newt were found to be present, to determine the great crested newt population size class; and
 - **d.** In the case of ponds where it was not possible to conduct conventional amphibian surveys, environmental DNA (eDNA) surveys were completed to determine GCN presence or likely absence.
- 1.3.2. The results of these surveys are presented in this report.

2. METHODS

2.1. OVERVIEW

2.1.1. Five ponds were initially identified as being suitable for great crested newts (Ponds 1 – 5, see **Figure 2** for locations). Of these, Ponds 1, 3 and 4 had at least four conventional amphibian survey visits, with Ponds 3 and 4 undergoing a further two great crested newt population size class assessment survey visits. Pond 2 was visited five times, but it was not possible to conduct the required number of traditional surveys to determine presence or likely absence of great crested newts. The eDNA survey method was therefore used for this pond. It was not considered necessary to undertake an HSI at Pond 2 because of the completion of an eDNA survey. Pond 5 was scoped out of targeted survey work following an updated HSI which identified it as being of poor suitability for great crested newt and confirmed the presence of fish populations.

2.2. DESK-BASED ASSESSMENT

A desk-based assessment was undertaken prior to any site-based survey work to review the existing information available in the public domain. A search for ponds within and up to 500 m from the existing Power Station Site and laydown areas of the Proposed Scheme were identified through inspection of 1:25,000 OS mapping, cross referenced against aerial photography.

Multiple bodies of water were found to exist, most of which were able to be scoped out from further amphibian surveys as they were considered to provide unsuitable habitat for breeding newts. There was flow present in multiple drains within and around the red line boundary, in Carr Dike flowing eastwards through the centre of the Proposed Scheme, and in the River Ouse to the north of the red line boundary; therefore, these were all considered unsuitable for amphibian surveys.

The cooling water infrastructure also had flow, as well as being contained within steep-sided structures which were isolated from suitable great crested newt terrestrial habitat by expanses of hard-standing. The ponds present at the sewage works are similarly isolated. Therefore, no further surveys were required here.

A number of ponds exist to the south-east of the red line boundary. These were isolated from the main development area by main roads, and therefore it is not considered that any amphibian population present in these ponds will be affected by the Proposed Scheme.

Following the desk study, the five ponds previously mentioned were identified as being suitable amphibian breeding habitat, populations of which may be impacted by the Proposed Scheme.

2.3. HABITAT SUITABILITY INDEX (HSI) ASSESSMENT

2.3.1. The five ponds inside and within a 500 m radius of the Proposed Scheme which were found to be suitable habitat following the desk-based assessment were considered

- further. Their suitability to support great crested newts was assessed in May 2020, using the standard HSI assessment method (ARG UK, 2010, based on Oldham *et al.* (2000)).
- 2.3.2. Ponds were assessed and scored on ten key variables which are known to influence breeding populations of great crested newts, in accordance with standard methods (ARG UK, 2010). These variables are:
 - a. Geographic location;
 - **b.** Pond area;
 - c. Pond permanence;
 - **d.** Water quality;
 - e. Pond shading;
 - Impact of waterfowl;
 - g. Fish stocks;
 - h. Number of ponds within 1 km;
 - i. Terrestrial habitat around the pond; and
 - j. Macrophyte (aquatic vascular plant) cover of the pond.
- 2.3.3. Scores for each of the above variables were used to calculate an overall HSI value for each pond. This was then cross referenced with the guidelines (ARG, 2010) to assign the pond to one of five categories, poor, below average, average, good or excellent. HSI calculation is not a failsafe method of identifying whether a pond supports great crested newts or not; therefore, professional judgement and availability of records of great crested newt in the locality were also used to inform the requirement for further survey.

2.4. PRESENCE / LIKELY ABSENCE SURVEY

- 2.4.1. All ponds found to provide suitable habitat for great crested newt and other amphibians, to which access was possible, were subject to further survey to determine the presence or likely absence of the native amphibian species.
- 2.4.2. The survey comprised four visits to each pond, spread across the recommended survey period (mid-March to mid-June, with at least two of the visits falling between mid-April and mid-May). Survey visits were completed under suitable weather conditions, when overnight temperatures were above 5°C and wind and rain were not sufficient to affect the torchlight survey results (through disturbance to the water surface).
- 2.4.3. At least three survey techniques were used during each survey visit to search for the presence of great crested newt in line with good practice (English Nature, 2001); these included:
 - a. Torchlight searching each pond was searched systematically for amphibians after dark using a bright torch; all amphibians observed were recorded, with the number of male, female and juveniles (where identifiable) of each species noted. The duration of the torchlight survey was determined by the time taken to walk slowly around the pond perimeter;

- b. Bottle-trapping each pond was trapped using bottle traps constructed and set in accordance with standard guidance (JNCC, 1998). Traps were set at a ratio of one for every 2 m of pond perimeter with a maximum of 50 per pond. The traps were set prior to dusk, and checked and removed the following morning;
- c. Egg searching suitable vegetation in each pond was searched for newt eggs, which are often laid on submerged or floating leaves that are folded around the egg. The duration of the egg search was either the amount of time required to search thoroughly all vegetation present, or a maximum of 15 minutes per survey visit. Egg searching in any pond was suspended once the presence of great crested newt eggs was confirmed;
- d. Netting a pond net was used to sample each pond at regular intervals (every 2 m) around the pond perimeter.

2.5. POPULATION SIZE CLASS ASSESSMENT

- 2.5.1. A further two survey visits were completed to ponds where great crested newt were found to be present. This enabled an assessment of the great crested newt population size class present. Two survey techniques, bottle-trapping and torchlight searching, were used during the further two survey visits in order to determine population size classes of great crested newt. However, a further survey technique was also used to determine the presence of other amphibians.
- 2.5.2. The peak adult counts of great crested newts were then cross referenced with standard guidelines to establish the population size class (English Nature, 2001). The population size class categories within the guidelines are reproduced below for information:
 - **a.** Small maximum peak adult counts of up to and including ten;
 - **b.** Medium maximum peak adult counts of between 11 and 100 inclusive; and
 - **c.** Large maximum peak adult counts over 100.

2.6. EDNA SURVEY

- 2.6.1. An eDNA survey was conducted on Pond 2 in June 2021 by suitably experienced ecologists accredited on a Natural England great crested newt survey licence. The method used followed the accepted methodology described by Biggs *et al.* (2014) and set out in Appendix 5 of the Natural England approved guidelines.
- 2.6.2. A total of 20 water samples from the pond were collected into a sample bag, from locations evenly spaced around the pond. The contents of the bag were mixed and pipetted into six 50 ml bottles.
- 2.6.3. Following collection, the water samples were sent for laboratory analysis, where they were analysed to detect the presence of great crested newt DNA. DNA was precipitated by centrifugation at 14,000 x g and extracted using Quagen Blood and Tissue extraction kits. DNA was detected using qPCR amplification, carried out in 12 replicates per sample, using the primers and probe described by Biggs *et al.* (2014), in the presence of both positive and negative controls.

2.7. DATES OF SURVEY AND PERSONNEL

2.7.1. The dates for each survey visit are displayed in Table 2.1 beneath.

Table 2.1 – Survey Dates and Personnel

		HSI	Survey Visit 1	Survey Visit 2	Survey Visit 3	Survey Visit 4	Survey Visit 5	Survey Visit 6
Da	te	May 2020	31/03/21	19/04/21	27/04/21	06/05/21	03/06/21	07/06/21

- 2.7.10. Pond 2 was also visited on 07/06/21 following the rescheduling of visit 4 due to cattle presence.
- 2.7.11. Survey visits 5 and 6 were completed for Ponds 3 and 4 only.
- 2.7.12. The surveyors were suitably experienced ecologists with great crested newt experience and accredited on a Natural England great crested newt surveying licence.

2.8. NOTES AND LIMITATIONS

- 2.8.1. It should be noted that pond naming has changed since the production of the FGD project Ecological Impact Assessment report (WSP, 2020). The ponds referred to in this report are labelled on **Figure 2**.
- 2.8.2. On visits 2 and 4, it was not possible to conduct bottle-trap surveys as the air temperature dropped to below 5°C during the night. However, this is not considered a limitation as three survey methods other than bottle-trapping were able to be carried out in each case during the evening prior to the temperature falling, whilst the air temperature remained at 5°C and above.
- 2.8.3. Due to a combination of access limitations and cattle presence, only two conventional amphibian surveys of Pond 2 could be completed. This is not a limitation, as the presence of great crested newt has been confirmed in Pond 2. Therefore, it was not considered necessary to undertake an HSI on this pond.

3. RESULTS AND EVALUATION

3.1. OVERVIEW

- 3.1.1. The first habitat suitability survey in 2020 indicated that each of the Ponds 1 5 provided suitable habitat for great crested newt. However, Pond 5 was later scoped out following an updated HSI assessment in May 2021, in which it was assessed as having poor suitability for great crested newt. Ponds 3 and 4 were assessed as having excellent suitability for great crested newt, while Pond 1 had average suitability for this species. All five of the ponds are clustered with no major barriers to dispersal between them.
- 3.1.2. Great crested newt were identified in Ponds 3 and 4 (see photographs in Table A.1 in Appendix A). Peak adult counts indicate a small population size class was present in each pond. The eDNA survey returned positive results for great crested newt presence in Pond 2, with the population size class unknown. No evidence of great crested newt was recorded in Pond 1. Great crested newt are therefore considered unlikely to make use of Pond 1.
- 3.1.3. Smooth newts *Lissotriton vulgaris* were confirmed to be present in Ponds 1 to 4 during the conventional amphibian surveys, while palmate newts *Lissotriton helveticus* were identified in Pond 1 only.

3.2. HABITAT SUITABILITY INDEX ASSESSMENT (HSI)

A summary of the HSI results and location information for the ponds is included in Table 3.1. Pond numbers correspond to those in **Figure 2**, with photographs of the ponds in Appendix A. The HSI calculation is included in Appendix B.

Table 3.1 – Summary	y of HSI Results
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Pond Ref.	Grid Reference	HSI Score	HSI Category
Pond 1	SE 66295 28121	0.69	Average
Pond 3	SE 66160 28341	0.83	Excellent
Pond 4	SE 66230 28425	0.87	Excellent
Pond 5	SE 66534 28630	0.45	Poor

3.3. PRESENCE / LIKELY ABSENCE SURVEY AND POPULATION SIZE CLASS ASSESSMENT

3.3.1. Great crested newt were found to be present in Ponds 3 and 4. The results of the great crested newt presence / likely absence and population size class survey are summarised in Table 3.2 below. Photos are shown in Appendix A.

Table 3.2 - Results of the Great Crested Newt Presence / Likely Absence and Population Size Class Survey

Pond Ref.	Adult GCN Peak Count	Breeding Activity Recorded	GCN Population Size Class	Incidental Species Recorded
Pond 1	0	None	N/A	Palmate and smooth newts
Pond 3	9	Eggs confirmed, 1 eft found during netting	Small	Smooth/palmate newt eft while netting
Pond 4	0	Eggs confirmed, 2 efts found during bottle trapping	Small	Smooth/palmate newt eft while netting

3.3.4. All surveys were completed under appropriate conditions and pond conditions suitable for methods used to be effective.

3.4. EDNA SURVEY

Laboratory analysis of the eDNA results returned a positive result for great crested newt DNA in Pond 2, indicating presence of this species. The negative controls were blank; the extraction blank control was negative; and the positive controls and replicates were standard. This indicates the result is likely to be reliable.

4. INTERPRETATION OF RESULTS

- 4.1.1. Great crested newt presence has been confirmed in Ponds 3 and 4, with low population size classes present in each pond. Presence of great crested newt has been confirmed in Pond 2 through eDNA survey. A population size class estimate cannot be provided for this pond. Some conventional surveys were completed at Pond 2 despite the access limitations; it is therefore unlikely an especially large population is present. Pond 5 has been found to be highly unsuitable for great crested newt.
- 4.1.2. The results of the 2021 conventional surveys suggest great crested newt are unlikely to breed in or make regular use of Pond 1. Due to the proximity of Ponds 3 and 4 (which support the species) to Pond 1 and the presence of suitable intervening terrestrial habitat, it is possible that Pond 1 is periodically used by great crested newt.
- 4.1.3. Suitable terrestrial habitat including rubble piles and semi-improved grassland in the north-west of the Proposed Scheme provides suitable terrestrial habitat which allows for the assumption that great crested newt forage and shelter on the site outside the breeding season. This is within the Habitat Provision Area (**Figure 1**), and therefore will not be affected by the Proposed Scheme.
- 4.1.4. Ponds 1 4 are likely to comprise a metapopulation, with great crested newt individuals moving between them across and between years. Ponds 2 4 are located within the Habitat Provision Area, and so again will not be affected by the Proposed Scheme. Great crested newt typically use suitable terrestrial habitat within 250 m of breeding ponds, and less frequency 500 m. Therefore, terrestrial habitats further than 500 m from the ponds in which great crested newt presence has been confirmed are unlikely to be used by great crested newt. Given this, the quality of the habitat present and the negative survey result in 2021, use of Pond 1, located within the Drax Power Station Site, is likely to be limited.
- 4.1.5. For further information on mitigation and enhancement recommendations with regard to great crested newt, refer to the Chapter 8 (Ecology) of the Environmental Statement (document reference 6.1.8).

5. REFERENCES

5.1. PROJECT REFERENCES

WSP (2020) Drax Flue Gas Desulphurisation (FGD) Demolition Ecological Impact Assessment.

WSP (2021a) Drax Bioenergy with Carbon Capture and Storage Preliminary Environmental Information Report – Vol 1.

WSP (2021b) Drax Bioenergy with Carbon Capture and Storage Preliminary Ecological Appraisal Report.

WSP (2021c) Drax Bioenergy with Carbon Capture and Storage Environmental Impact Assessment Scoping Report.

5.2. TECHNICAL REFERENCES

Amphibian and Reptile Groups of the United Kingdom (2010) ARG UK Advice Note 5: Great Crested Newt Habitat Suitability Index. ARG UK, UK

Biggs, J., Ewald, N., Valentini, A., Gaboriaud, C., Griffiths, R. A., Foster, J., Wilkinson, J., Arnett, A., Williams, P., and Dunn, f. (2014). Analytical and methodological developments 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.

English Nature (2001). Great Crested Newt Mitigation Guidelines. English Nature, Peterborough.

Oldham R.S., Keeble J., Swan M.J.S., and Jeffcote M. (2000) Evaluating the suitability of habitat for the great crested newt. Herpetological Journal 10: 143-155

Figure 1 – Indicative	Site Layout Plan	

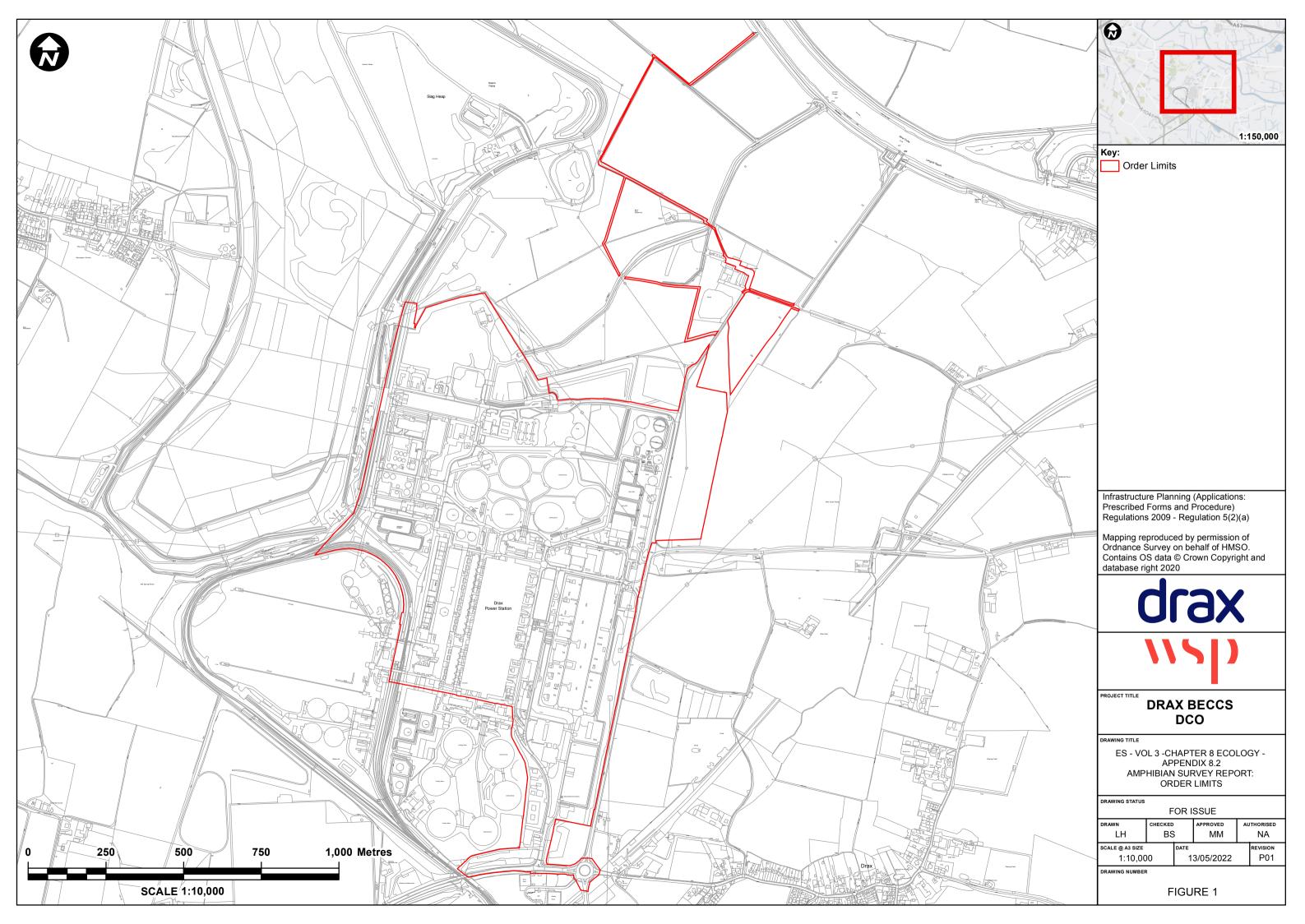
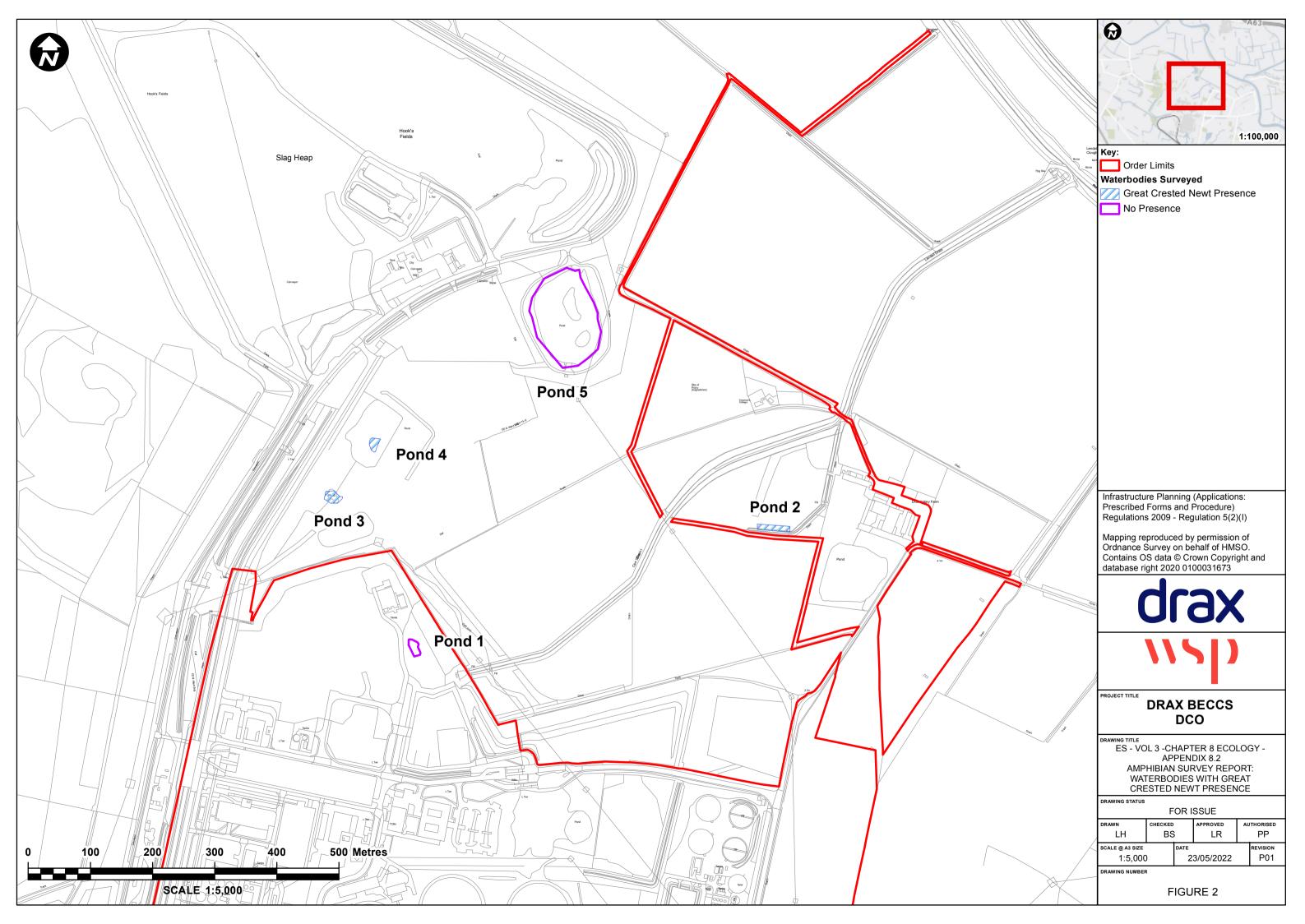


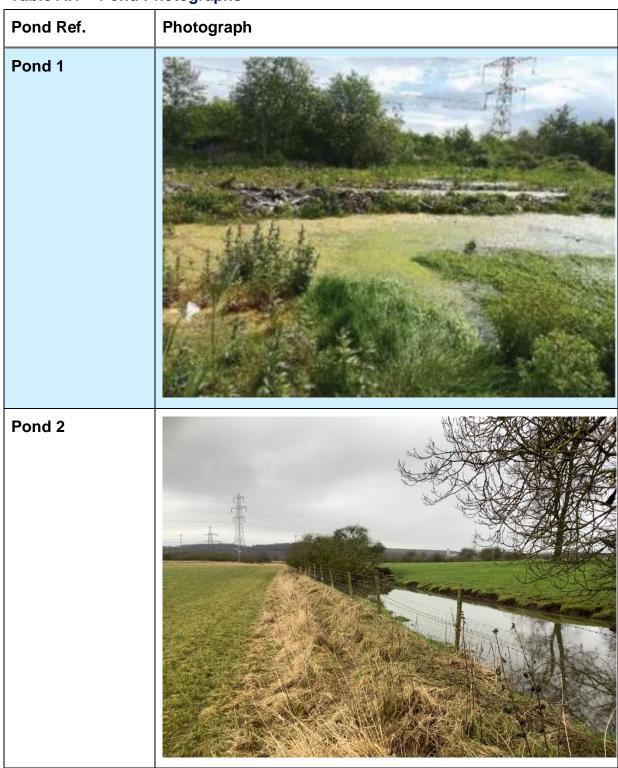
Figure 2 - Survey Results: Presence / Likely Absence	

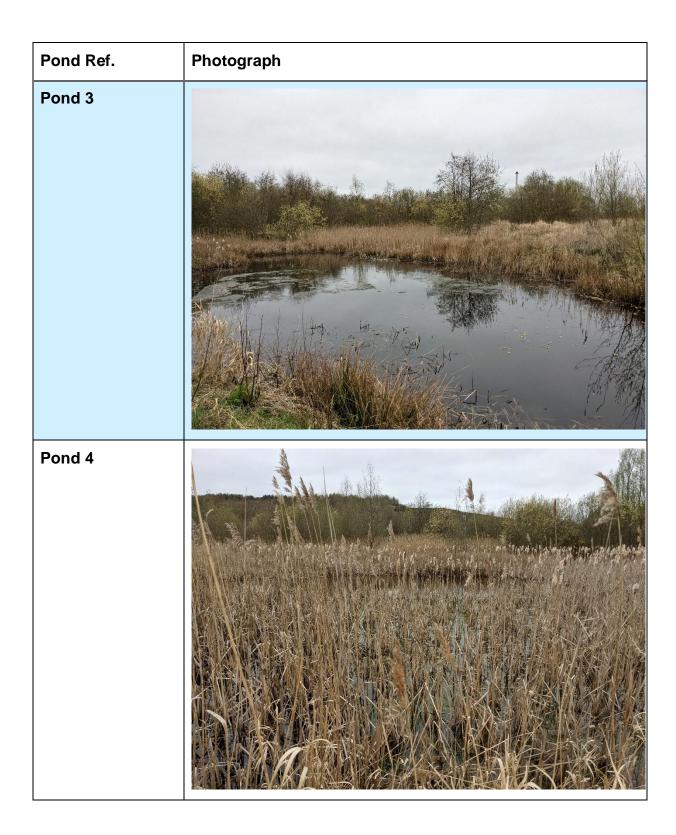


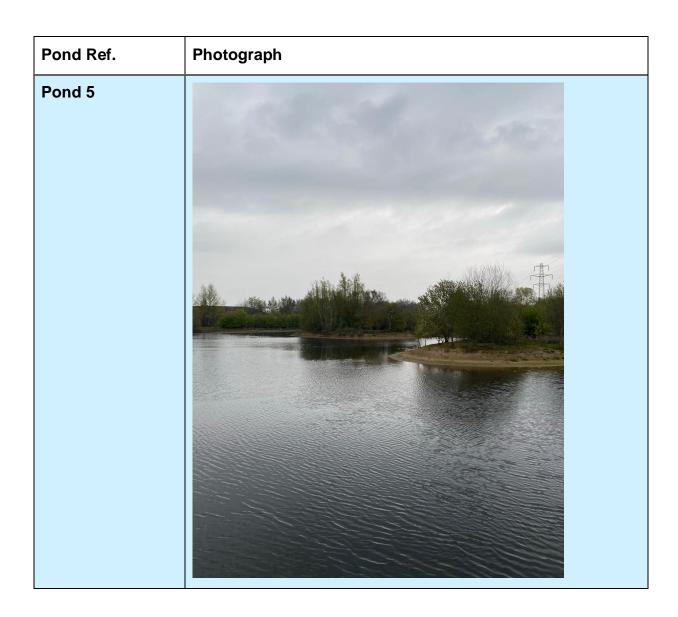
APPENDICES

APPENDIX A - IMAGES

Table A.1 – Pond Photographs







APPENDIX B – HSI CALCULATIONS

Table B.1 - HSI Calculations

Pond Ref.	S1: Geographic location	S2: Pond area	S3: Pond permanence	S4: Water quality	S5: % Shade (1 m from bank)	S6: Impact of waterfowl	S7: Fish stocks	S8: Number of ponds <1km	S9: Terrestrial habitat	S10: Macrophyte cover (%cover)	HSI Score	HSI Category
1	1	1	0.1	0.67	1	0.67	1	1	1	0.35	0.69	AVERAGE
3	1	0.5	0.9	1	1	1	0.7	1	1	0.5	0.83	EXCELLENT
4	1	1	0.9	0.67	1	0.67	0.7	1	1	0.9	0.87	EXCELLENT
5	1	0.8	0.9	0.33	1	0.01	0.7	0.84	0.67	0.35	0.45	POOR

APPENDIX C - PRESENCE / LIKELY ABSENCE SURVEY RESULTS

Table C.1 – Pond 1 Survey Results

Pond 1											
Date	GCN detected	Peak adult count	GCN eggs or larvae present	Air temp (°C)	Vegetation cover (0-5)	Turbidity (0-5)	Other amphibians recorded	GCN population size class			
31/03/21	No	0	0	17	2	1	Smooth newts, palmate newts	N/A			
19/04/21	No	0	0	12	2	4	Smooth newt	N/A			
27/04/21	No	0	0	7	1	2	Smooth newt	N/A			
06/05/21	No	0	0	5	1	3	None	N/A			

Table C.2 – Pond 3 Survey Results

Pond 3	Pond 3											
Date	GCN detected	Peak adult count	GCN eggs or larvae present	Air temp (°C)	Vegetation cover (0-5)	Turbidity (0- 5)	Other amphibians recorded	GCN population size class				
31/03/21	Yes	1	No	17	2	2	Smooth newt	Small				
19/04/21	Yes	1	Yes	12	2	1	No	Small				
27/04/21	Yes	1	Eggs found, but not unwrapped for ID	7	2	1	No	Small				
06/05/21	No	0	Eggs found, but not unwrapped for ID	5	2	1	No	Small				
03/06/21	Yes	9	No	17	2	1	No	Small				
07/06/21	Yes	5	No	17	2	1	Smooth/palmate newt eft while netting	Small				

Table C.3 – Pond 4 Survey Results

Pond 4	ond 4											
Date	GCN detected	Peak adult count	GCN eggs or larvae present	Air temp (°C)	Vegetation cover (0-5)	Turbidity (0- 5)	Other amphibians recorded	GCN population size class				
31/03/21	No	0	0	17	3	3	No	N/A				
19/04/21	Yes	0	Eggs confirmed	12	4	3	Smooth newt	Small				
27/04/21	No	0	0	7	4	3	No	N/A				
06/05/21	No	0	Eggs found, but not unwrapped for ID	5	4	3	No	N/A				
03/06/21	No	0	0	17	4	3	No	N/A				
07/06/21		0		17	4	3	Smooth newt					