

Great Crested Newt Survey Report

PR0915d

Cannon Hall Park

Plincke Landscape Limited

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accessEcology

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FIGURE 1: LOCATION PLAN

FIGURE 2: WATERBODY NUMBERS AND LOCATIONS AND RISK ASSESSMENT PLAN

A SUMMARY

- 1 Eight waterbodies on the Cannon Hall Park site and a further five waterbodies within 500m of the site boundary were surveyed to determine the presence or otherwise of great crested newts *Triturus cristatus* between March and June 2016 (please refer to Appendix A for plan detailing site boundary).
- 2 No great crested newts were recorded in any of waterbodies on site; waterbodies 01, 02, 04, 05, 07 & 08.
- 3 Waterbodies 06, 09 & 10 were not surveyed as part of this survey investigation due to access constraints. These waterbodies are located between 20m and 140m from the site boundary.
- 4 A moderate population of great crested newts were recorded in 4 waterbodies, ponds 13, 14, 15 16 approximately 430m to the west of the site boundary.
- 5 The presence of this population does not require a European Protected Species Licence from Natural England to allow the proposed development to take place on the Cannon Hall Park site.
- 6 However, a constraint to development is that a method statement must be followed, including safe systems of working and good practice guidelines. This method statement is included at the end of this report.

B INTRODUCTION

7 The report details the results of the ecological surveys undertaken at Cannon Hall Park (Grid reference: SE 27485 08124) between March and June 2016.

8 The aim of the survey was to determine the presence of, and if present, an estimate of population size, of great crested newts *Triturus cristatus* in the water bodies at Cannon Hall Park and within a 500m radius of the Cannon Hall site boundary. It identifies constraints posed by the protected species and presents opportunities for maintaining the biodiversity value of the site.

B.1 Background to the survey

9 Access Ecology Ltd was commissioned in March 2016 by Plincke Landscape Limited to undertake great crested newt surveys of the ponds around Cannon Hall Park, Cawthorne, Barnsley (Location map Appendix A1).

B.2 Habitat description summary

10 The Cannon Hall Park site is 36.5ha containing a mosaic of 14 different habitats including mixed broadleaved semi-natural woodland and plantation, mature and veteran trees. The main body of the site is a large central area of amenity grassland with scattered parkland trees.

11 Daking Brook flows west to east across the southern part of the site, the banks of which are vegetated by wetland plants, scrub and trees. Adjacent to the main public car park on the south western edge of the site are 2 ephemeral drainage ponds (Waterbodies W04 & W05). The walled garden contains a pond (W08), vegetable plots, a large number of fruit trees, three greenhouses and a mushroom house. The Pleasure Garden contains an additional pond (W07), and a mosaic of small pockets of lawn and copses of woodland.

12 Just outside the site to the north is an additional area of woodland surrounding Shutts Pond (W11). Further off site to the west are an additional 8 water bodies which are surrounded by a mix of agricultural pasture and mature broadleaved woodland.

13 There is an abundance of suitable great crested newt habitat for use in their terrestrial phase.

C Planning policy and legislation

- 14 This legal information is presented in summary form and is intended for general guidance only. It is recommended the original documentation is referred to for detailed and definitive information. Web addresses are located in section 0

Habitat Regulations

- 15 The Conservation of Habitats and Species Regulations 2010 transpose Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Flora and Fauna (Habitats Directive) into English law, making it an offence to deliberately capture, kill or disturb wild animals listed under Schedule 2 of the 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 absent at the time).

Wildlife & Countryside Act 1981

- 16 The Wildlife and Countryside Act 1981, as amended by the Countryside and Rights of Way Act (CRoW) 2000 and the Natural Environment and Rural Communities Act (NERC) 2006 (which also places a duty on authorities to have due regard for biodiversity and nature conservation) 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), making it an offence to:
- 17 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;
- 18 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;
- Pick or uproot any wild plant listed under Schedule 8 of the Act.
 - Plant or otherwise cause any species listed in part 2 of Schedule 9 (Which includes Japanese Knotweed) to grow in the wild.

National Planning Policy Framework

- 19 The NPPF outlines government planning policies and how they should be applied within local authorities. The framework places an emphasis on sustainable development, encouraging the re-use of land that has previously been developed over using land that has a higher environmental value and by minimising impacts on biodiversity. The NPPF states that developments should aim to conserve or enhance biodiversity and encourages opportunities to incorporate biodiversity in and around developments.

Biodiversity Action Plans

- 20 The original objective of the UK Biodiversity Action Plan (UKBAP) was to fulfil the requirements of the Rio Convention on Biological Diversity in 1992, to which the UK is a signatory. A list of national priority species and habitats has been produced with specific action plans defining the measures considered necessary to ensure their conservation. Regional and local BAPs have also been developed for species/habitats of nature conservation importance both regionally and locally.

Local Structure Plans

- 21 County, District and Local Councils have Structure Plans and other policy documents that include targets and policies which aim to maintain and enhance biodiversity through the planning system.

D Methods

D.1 Scope of assessment – waterbody locations

22 Table 1 details all waterbodies within 500m of the survey site. Please refer Appendix A.1 for associated map.

Table 1. Ponds at Cannon Hall and within 500m of the site boundary

Waterbody code	Pond name	Within site boundary	Distance site	Bearing ¹	Grid reference	Area (M2)	Presence /absence Survey ²
01	Daking brook top	Yes	On site	WS	SE 27375 07900	6081	CA
02	Daking brook middle	Yes	On site	WS	SE 27683 07997	16,632	CA
03	Daking brook bottom	Yes	1m	SE	SE 27815 08137	5744	CA
04	Stew pond North	Yes	On site	WS	SE 27277 08024	980	Yes
05	Stew pond South	Yes	On site	WS	SE 27291 07995	799	Yes
06	West lodge pond	No	140m	SW	SE 26999 07966	262	AC
07	Fairyland	Yes	On site	WS	SE 27446 08307	275	Yes
08	Vegetable garden	Yes	On site	WS	SE 27295 08413	73	Yes
09	Gardener cottage large	No	20m	W	SE 26952 08265	3156	AC
10	Gardener cottage small	No	100m	W	SE269082	43	AC
11	Shutts pond	Yes	160m	NW	SE 26965 08469	918	Yes
12	Track side pond	No	385m	W	SE 26693 08358	49	Yes
13	Game pond small	No	430m	W	SE 26570 08358	357	Yes
14	Game pond large	No	450m	W	SE 26539 08344	464	Yes
15	Deffers wood pond	No	530m	NW	SE 26396 08544	646	Yes
16	Maize pond	No	480m	NW	SE 26624 08637	1129	Yes

¹N=north, NE=northeast, E=east, SE=southeast, S=south, SW=southwest, W=west, NW=northwest, W/S=with site. ²CA = 'continually assessed' throughout the survey period for suitability to support GCN. AC= Not surveyed due to 'Access Constraints'

D.2 Pre-existing survey information

D.2.1 Data search

23 From the data search carried out in 2015, five Amphibian records were found within the site boundary; 2 common toad *bufo bufo* and one common frog *Rana temporaria* records were found to the north eastern end of the site. On 1st June 2005 1 gravid female smooth newt *Triturus vulgaris* plus 10 more were recorded emerging from the base of the wall at the "walled garden pond" towards the north eastern end of the site.

24 In March 2010 Dr Phil Eades, Consultant Ecologist; PhD, BSc.MCIEEM was called out to site to identify a newt found under a greenhouse in the vegetable garden. He made a positive identification of a great crested newt from a photograph and located a number of smooth newts. He reported this to Natural England.

D.2.2 Phase 1 habitat survey

- 25 A Phase 1 Habitat Survey was carried out in July 2015 by Belinda Wiggs (Senior Ecologist) and Paul Liptrot (Ecologist) to gain an overview of the habitats and species present. The results of this survey can be seen in the Phase 1 Habitat Survey report published in November 2015 by Access Ecology Ltd. As the site supported abundant habitat suitable for terrestrial newts and a number of waterbodies suitable for breeding newts, the report recommended further surveys to assess the presence or absence of great crested newts.

D.2.3 GCN Habitat Suitability Index (HSI) assessment

- 26 During the Phase 1 Habitat Survey 2015 the waterbodies on site (01, 02, 04, 05, 07 & 08) were assessed using a Habitat Suitability Index (HSI) (Oldham, Keeble, Swan, & Jeffcote, 2000) for their potential to provide habitat for breeding great crested newts. The additional 5 waterbodies off site were subject to an HSI assessment in March 2016 by Paul Liptrot (Ecologist) and Aran Leaf (Seasonal Ecologist). The waterbodies were assessed using the HSI methodology guidelines provided by the National Amphibian and Reptile Recording Scheme (NARRS, 2008 based on Oldham et al., 2000).

- 27 The habitat suitability assessment uses ten key habitat criteria and is based on the assumption that habitat quality can be used as a tool to determine whether a pond is likely to contain great crested newts and the likely population size (Oldham et al. 2000). The criteria are as follows:

- SI1 = geographic location
- SI2 = pond area
- SI3 = pond permanence
- SI4 = water quality
- SI5 = pond shading
- SI6 = number of waterfowl
- SI7 = occurrence of fish
- SI8 = pond density
- SI9 = proportion of 'newt friendly' habitat
- SI10 = macrophyte (aquatic plant) content

- 28 Of these, SI2, SI3, SI5, SI6, SI8, SI9 and SI10 are assessed using objective measures, whilst SI1, SI4 and SI7 are assessment quality.

- 29 The HSI is derived using the following equation: $HSI = (SI1 \times SI2 \times SI3 \times SI4 \times SI5 \times SI6 \times SI7 \times SI8 \times SI9 \times SI10)^{1/10}$

- 30 The results of the HSI calculation were compared to categorized HSI scores used by the National Amphibian and Reptile Recording Scheme (NARRS 2008) to identify the probability

of a pond to support great crested newts (GCN). The five categories are summarised in Table 2 below.

Table 2. HSI Potential Scores

Probability of ponds supporting GCN	HSI Scores
Poor	Below 0.5
Below average	0.5 – 0.59
Average	0.6 – 0.69
Good	0.7 – 0.79
Exceptional	Above 0.8

D.2.4 Great crested newt terrestrial habitat assessment

- 31 The habitat within the survey area was assessed for its suitability to support terrestrial GCN. Any features of particular interest for GCN were noted and mapped during the Phase 1 habitat assessment and compared against the terrestrial habitat requirements of GCN detailed in the Great Crested Newt Conservation Handbook (Langton, Beckett, & Foster, 2001) and Great Crested Newt Mitigation Guidelines (English Nature, 2001).
- 32 Particular features searched for and assessed were daytime refugia (logs, bricks, and rubble); undergrowth and leaf litter for foraging and overwintering; rough grassland, pasture and hedgerows for foraging, movement between ponds and dispersal; and refugia in mammal burrows and tree stump voids for when the weather becomes colder.

D.3 Great crested newt presence/absence survey

D.3.1 Survey effort

- 33 Waterbodies 04, 05, 07, 08 and 11 to 16 were surveyed over 6 separate visits; 4 visits to determine presence / absence and additional 2 visits to inform the population class assessment (English Nature, 2001) Please refer to Table 3 for survey dates and Table 4 for surveyors and relevant qualifications. At least 1 licenced surveyor was present during each survey visit. All water bodies within 500m of the site boundary, 13 out of the possible 16 water bodies, (3 had access constraints) were surveyed 6 times between mid-March and mid-June with two of the visits undertaken between mid-April and mid-May. Water bodies 01, 02 and 03 the cascades on Daking Brook were not surveyed during every visit due to constraints (flow).
- 34 During each visit, three of the four survey methodologies described below were used on each waterbody.
 - Bottle trapping – bottle traps are placed at intervals of 2m around selected parts of the accessible shoreline of each waterbody at dusk. The following morning the traps are

checked for GCN and other amphibians, which are removed and replaced. All GCN and other amphibians found are recorded and released.

- Torching – surveyors search shallow waters of the waterbody for adult GCN using a torch of at least 1,000,000 candle power.
- Egg searching – emergent vegetation is searched for GCN eggs. Once eggs have been confirmed at a waterbody the search is terminated to minimise disturbance.
- Netting – a long handled net is used to sweep selected areas to attempt to capture adult GCN by sampling the area around the pond edge at a rate of 15 minutes of netting per 50m of shoreline.

35 The waterbodies were surveyed for great crested newts, however, surveyors also recorded smooth newts *Lissotriton vulgaris* and palmate newts *Lissotriton helveticus*, common frog, *Rana temporaria* and common toad *Bufo bufo* and any other notable species seen or captured during the surveys.

Table 3. GCN presence and absence survey

Visit	Dates
V01	Wednesday 30 th March / Thursday 31 st March 2016
V02	Wednesday 4th May/ Thursday 5th May 2016
V03	Tuesday 10th May/ Wednesday 11th May 2016
V04	Tuesday 24th May/ Wednesday 25th May 2016
V05	Monday 6th June / Tuesday 7th June
V06	Thursday 9th June / Friday 10th June

Table 4. Surveyors

Surveyors	Position	Qualifications
Belinda Wiggs	Senior Ecologist	GCN Class 2 Survey Licence (formerly CLS01079) 2015-8552-CLS, BAHons, experienced field ecologist and full member of the Chartered Institute of Ecology and Environmental Management (MCIEEM)
Paul Liptrot	Ecologist	GradCIEEM, GCN Class 1 Survey Licence CLS16847
Donna Tubridy	Assistant Ecologist	GradCIEEM, GCN Class 1 Survey Licence CLS18647
Aran Leaf	Assistant Ecologist	GradCIEEM, GCN Class 1 Survey Licence CLS23466
Jonathan Moore	Senior ecologist	BSc, MSc, MCIEEM, GCN Class 2 Survey Licence
Gareth Llewelyn	Trainee Ecologist	BSc Biology
Catherine Hammond	Trainee Ecologist	BSc Biology

- 36 Table 5 shows the methods used during each survey visit
- 37 Where appropriate, the ponds were surveyed a total of six times between 30th March and 10th June 2016. Methods used were bottle trapping, torching and egg searching in the majority of the ponds. In waterbody 08 bottle trapping was not possible due to the presence of a pond lining; therefore, netting was used as an alternative method. Netting was also used where there was little accessible aquatic vegetation for egg searching, such as in waterbody 11 Shutts Pond.
- 38 Torching was carried out on waterbodies 01, 02 and 03 along the Daking Brook during the first survey visit. However, after the initial survey, it was decided that it was not necessary or appropriate to survey these three water bodies as the water was too deep, fast flowing and turbid and did not provide appropriate habitat for breeding great crested newts.
- D.4 Constraints**
- 39 Waterbodies 01, 02 and 03, the lakes on the Daking Brook, were considered to offer potential for GCN in November 2015, as when first assessed using the HSI parts of these waterbodies had the characteristics of ponds, with still water and shallow pools present at the edges (Access Ecology Ltd, 2015).
- 40 However during the site visit in March 2016 (V01) Waterbodies 01, 02, and 03 were considered unsuitable for bottle trapping due to the presence of a fast flow, deep water and little or no aquatic vegetation. Consequently, these waterbodies were torched, netted and egg searched during this first visit and continually assess as to their suitability thereafter. In April 2016 during the second visit (V02), after a period of heavy rainfall the water was much deeper and faster flowing and had the characteristics of a river/brook, this made the lakes both unsuitable for bottle trapping and unsuitable for GCN. As a result they were not included in the remaining scope of GCN presence /absence surveys.
- 41 Access to Waterbody 06, 09 and 10 was sought. No response was forthcoming and access was not granted therefore these waterbodies were not included in this survey.
- 42 The remaining 10 waterbodies were surveyed four times to ascertain presence /absence. During each visit, three of the four survey methodologies described in section were employed depending on the suitability of each individual waterbody.

Table 5 GCN presence and absence survey effort

Visit	Technique	W01	W02	W03	W04	W05	W06	W07	W08	W09	W10	W11	W12	W13	W14	W15	W16
V01	Bottle trapping	x	x	x	25	35	x	15	x	x	x	20	20	20	20	20	20
	Netting	✓	✓	✓	x	x	x	x	✓	x	x	✓	x	x	x	x	x
	Egg search	✓	✓	✓	✓	✓	x	✓	✓	x	x	x	✓	✓	✓	✓	✓
	Torching	✓	✓	✓	✓	✓	x	✓	✓	x	x	✓	✓	✓	✓	✓	✓
V02	Bottle trapping	x	x	x	20	18	x	15	x	x	x	21	20	20	19	20	20
	Netting	x	x	x	x	x	x	x	✓	x	x	✓	x	x	x	x	x
	Egg search	x	x	x	✓	✓	x	✓	✓	x	x	x	✓	✓	✓	✓	✓
	Torching	x	x	x	✓	✓	x	✓	✓	x	x	✓	✓	✓	✓	✓	✓
V03	Bottle trapping	x	x	x	20	18	x	10	x	x	x	22	14	15	19	16	20
	Netting	x	x	x	x	x	x	x	✓	x	x	✓	x	x	x	x	x
	Egg search	x	x	x	✓	✓	x	✓	✓	x	x	x	✓	✓	✓	✓	✓
	Torching	x	x	x	✓	✓	x	✓	✓	x	x	✓	✓	✓	✓	✓	✓
V04	Bottle trapping	x	x	x	20	20	x	10	x	x	x	20	14	13	15	16	20
	Netting	x	x	x	x	x	x	x	✓	x	x	x	x	x	x	x	x
	Egg search	x	x	x	✓	✓	x	✓	✓	x	x	✓	✓	✓	✓	✓	✓
	Torching	x	x	x	✓	✓	x	✓	✓	x	x	✓	✓	✓	✓	✓	✓
V05	Bottle trapping	x	x	x	13	5	x	10	x	x	x	19	8	13	20	16	10
	Netting	x	x	x	x	x	x	x	✓	x	x	x	x	x	x	x	x
	Egg search	x	x	x	✓	✓	x	✓	✓	x	x	✓	✓	✓	✓	✓	✓
	Torching	x	x	x	✓	✓	x	✓	✓	x	x	✓	✓	✓	✓	✓	✓
V06	Bottle trapping	x	x	x	13	0	x	10	x	x	x	19	0	15	20	15	10
	Netting	x	x	x	x	x	x	x	✓	x	x	x	x	x	x	x	x
	Egg search	x	x	x	✓	✓	x	✓	✓	x	x	✓	x	✓	✓	✓	✓
	Torching	x	x	x	✓	✓	x	✓	✓	x	x	✓	x	✓	✓	✓	✓

E RESULTS

E.1 Habitat suitability assessment

E.1.1 GCN Terrestrial habitat assessment

43 The habitat assessment for terrestrial GCN found that there are extensive areas of suitable terrestrial habitat on site and in the adjacent area particularly to the west and north of the site. This includes area of unimproved grassland, hedgerows and scattered scrub, including refugia, foraging, commuting and overwintering habitat. The habitat on site can be seen on the Phase 1 Habitat Map in the Phase 1 Habitat Survey 2015.

E.1.2 GCN Habitat Suitability Index (HSI) assessment

44 Sixteen waterbodies were located either within the site or within 500m of the site boundary. Access was not granted to waterbodies 06, 09, and 10. The thirteen accessible waterbodies were subject to the Habitat Suitability Index (HSI) assessment. The summary results from the assessment are shown in Table 6 .

Table 6 Summary of HSI assessment results

Pond Number	Pond name	HSI score	HSI Category
1	Daking Brook Top	0.48	Poor
2	Daking Brook Middle	0.49	Poor
3	Daking Brook Bottom	0.48	Poor
4	Stew Pond North	0.65	Average
5	Stew Pond South	0.62	Average
6	West Lodge Pond		Not surveyed
7	Fairyland Pond	0.49	Poor
8	Vegetable Garden Pond	0.63	Average
9	Gardener Cottage Large		Not surveyed
10	Gardener Cottage Small		Not surveyed
11	Shutts Pond	0.66	Average
12	Trackside Pond	0.68	Average
13	Game Pond Small	0.74	Good
14	Game Pond Large	0.83	Excellent
15	Deffers Wood Pond	0.89	Excellent
16	Maize Field Pond	0.68	Average

Waterbody 01, 02 & 03

- 45 Waterbody 01 (Daking Brook Top, 0.6ha), waterbody 02 (Daking Brook Middle, 1.2ha) and waterbody 03 (Daking Brook Bottom 0.4ha) are manmade lakes formed and separated by cascades along Daking Brook. During the initial assessment (Access Ecology Ltd, 2015) in November 2015 the water was noted to be slow flowing, with shallow pools of still water in selected points along the banks of the brook (W01,W02,& W03). In spring months 2016 the brook was noted to be fast flowing, deep and turbid and as such unsuitable for GCN. The banks are vegetated by marginal aquatic plants, self-set scrub and trees.

Waterbody 04

- 46 Stew Pond North is 980m², and is a roughly square manmade drainage pond located in the south west corner of the survey site immediately east of the main public car park. There are abundant emergent and marginal aquatic plants, such as reed mace *Phragmites latifolia*. The gently sloping banks are vegetated by frequent willow trees and scrub. It has good potential to support GCN because it is seasonally inundated and therefore does not support fish, which would predate GCN eggs and larvae. However the proximity of the hard standing in the car park does not offer good terrestrial habitat along western edge of the pond. Throughout the 6 survey visits the water level dropped significantly.

Waterbody 05

- 47 Stew Pond South is 799m² and is also located in the south western corner of the survey site. It is a roughly square manmade drainage pond, just to the south of Pond 4 and just to the east of the car park. The emergent and marginal vegetation and the banks are dominated by willow scrub. It has good potential to support GCN because it is seasonally inundated and therefore does not support fish, which would predate GCN eggs and larvae. However the adjacent hard standing in the car park does not offer good terrestrial habitat along that edge of the pond. Throughout the survey the water level dropped significantly and the willow scrub within the pond grew prolifically until there was no water and just deep mud present by the last 2 surveys.

Waterbody 06

- 48 West Lodge Pond is located approximately 140m west of site boundary and was not included in the survey as access permission was not granted. The waterbody is located in the south western corner of the garden of West Lodge which is adjacent to Bark House Lane to the west of the site.

Waterbody 07

- 49 Fairyland Pond is located within the north eastern corner of the site within the Pleasure Garden. It is approximately 275m² with water flowing in at the north and out of an overflow to the south. It is silty, has a concrete wall on one side and marginal aquatic vegetation and ornamental shrubs on the eastern bank. There are large carp and abundant small fish; therefore it is not a suitable breeding pond for GCN as the fish will predate the eggs and larvae.

Waterbody 08

- 50 The Vegetable Garden Pond is an artificial, lined, rectangular, concrete pond of 73m² located in the north eastern corner of the survey site. It has floating, submerged and emergent aquatic vegetation and is located in the walled vegetable garden. It contains a small population of small fish.

Waterbody 09 & 10

- 51 Gardener Cottage Large (W09) and Gardener Cottage Small (W10) are located in the garden of Gardener Cottage 50m to 100m outside the site boundary to the west, and were not included in the survey as access permission was not granted.

Waterbody 11

- 52 Shutts Pond is part of the Cannon Hall Park landholding and is located 170m to the northwest of the main survey site boundary. It is 918m² and is surrounded on all sides by willow scrub, pine *Pinus sylvatic*, beech *Fagus sylvatica* trees and willow scrub. There is little in the way of aquatic vegetation and there is an abundance of small fish making it low potential for breeding GCN.

Waterbody 12

- 53 Trackside Pond is 385m west of the site boundary and consists of two small ponds covering 49m², linked together by a narrow channel. It is at the edge of an agriculture pasture field at the side of a track. The eastern side of the pond was highly vegetated by floating sweet grass *Glyceria fluitans* and by the 6th survey visit there was no water remaining. The western section had no aquatic vegetation and by the end of the survey there was no water and just deep mud remaining.

Waterbody 13

- 54 Game Pond Small is 430m west of the site boundary and covers 357m². It is located within an area of mature mixed deciduous woodland. The edges of the pond and the banks are dominated by the invasive non-native species swamp stonecrop or New Zealand pigmyweed *Crassula helmsii*. There is water forget-me-not *Myosotis aquatica* on the margins. Throughout the 6 survey visits the water level dropped significantly and the quality of the water deteriorated until it was brown and turbid.

Waterbody 14

- 55 Game Pond Large is located 10m to the west of waterbody 13 within mature mixed deciduous woodland. It covers 464m² and is deeper and more stable than waterbody 13. The water level was also noted to have dropped throughout the 6 survey visits but it was still a viable pond. There was little aquatic vegetation except the submerged pond weed *Elodea* sp. There were abundant tadpoles. The banks were steep and vegetated by dense continuous willow scrub on the northern side and there was significant disturbance on the southern bank where soil had been dumped.

Waterbody 15

- 56 Deffers Wood Pond is 530m to the west of the site and covers 646m². It has woodland on one side and an arable field on the other. It supports grassy banks with some willow scrub. Dominant patches of *Crassula* are encroaching into the pond. There were abundant tadpoles.

Waterbody 16

- 57 Maize Field Pond is surrounded by a patch of mixed deciduous woodland, dominated by willow scrub, which is in turn surrounded by a maize field. It is 480m north-west of the site boundary and covers 1129m². It has shallow wooded banks and shallow muddy water. There were abundant tadpoles present and the water level receded during the 6 survey visits.

E.2 Presence and absence survey – highest counts

- 58 Table 7 Highest counts, shows the highest counts of for great crested newt, smooth newt and palmate newt recorded in each waterbody throughout the 6 survey visits.

Table 7 Highest counts

	V01					V02					V03					V04					V05					V06				
	GCN	Smooth newt	Palmate newt	Common frog	Common toad	GCN	Smooth newt	Palmate newt	Common frog	Common toad	GCN	Smooth newt	Palmate newt	Common frog	Common toad	GCN	Smooth newt	Palmate newt	Common frog	Common toad	GCN	Smooth newt	Palmate newt	Common frog	Common toad	GCN	Smooth newt	Palmate newt	Common frog	Common toad
W04	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2	0	0	0	0	0	0	0
W05	0	0	0	0	0	0	4	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W07	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W08	0	3	0	0	33	0	10	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W12	0	2	0	0	0	0	6	0	0	0	0	3	2	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0
W13	1	1	2	0	0	0	26	27	0	0	1	6	14	0	0	5	22	26	0	0	0	3	20	0	0	0	1	5	0	0
W14	0	14	0	0	4	7	9	2	0	0	15	32	0	0	0	10	6	6	0	0	0	0	0	0	0	6	0	2	0	0
W15	0	0	0	0	0	0	9	5	0	0	1	2	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
W16						1	5	2	0	0	0	2	0	0	0	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0
Highest Count	1	14	2	0	33	7	26	27	1	0	15	32	14	0	0	10	22	26	1	0	0	3	20	0	0	6	1	5	0	0
Total	1	20	2	0	37	8	70	36	1	0	17	46	29	0	0	17	31	33	1	0	0	6	22	0	0	6	1	7	0	0

Great crested newt (GCN)

- 59 No Great crested newts (GCN) were recorded within the survey site. GCN were confirmed to be present off site, in waterbodies 13, 14, 15 and 16. A low population was recorded in waterbodies 13, 15 and 16 with highest counts 5, 1 and 2 recorded, respectively. A moderate population of GCN was recorded in Game Pond Large (W14). The population size class is the maximum number of newts recorded in ponds within 250m of each other during one survey. This was 17 newts on visit 3 across all ponds.

Palmate newt

- 60 Palmate newts were found in small numbers in Trackside Pond and Game Pond Small (W12 and W14) and in larger numbers in Deffers Wood Pond (W15) and the highest count of 27 newts in any one survey in Game Pond Small (W13).

Smooth newt

- 61 The results in **Error! Reference source not found.** show that smooth newts were found in low numbers in the waterbodies on site, Stew Pond North (W04), Stew Pond South (W05) and Vegetable Garden Pond (W08). The maximum number of smooth newts found on site during one survey method on any one survey occasion was 10 newts in Vegetable Garden Pond (W08).

E.3 Environmental conditions

- 62 Table 8 shows the environmental conditions recorded on site during the 6 survey visits. The temperature during visit 1 and 2 dropped below 5°C which is considered unsuitable for GCN activity. However the temperature at the start of each survey visit was suitable for survey.

Table 8 Climate data for each separate survey occasion

Survey Visit	Date	Max Temp °C	Min Temp °C	Precipitation mm	Wind (beaufort scale)
1	30/03/2016	8°C	1°C	0.8	2
2	04/05/2016	15°C	4°C	0	2
3	10/05/2016	14°C	9°C	13.0	2
4	24/05/2016	14°C	5°C	0	1
5	06/05/2016	23°C	12°C	0	1
6	09/06/2016	22°C	12°C	0	1

F INTERPRETATION AND EVALUATION OF RESULTS

F.1 Interpretation

F.1.1 Great crested newt

63 No GCN were recorded with any of the waterbodies on the Cannon Hall Park site (W04, W05, W07, W08 and W11). GCN were recorded in 4 waterbodies (W13, W14, W15 & 16) located to the west of the survey site. These waterbodies are between 430m and 530m from the western boundary of the main site and are all within 250m of each other. As such when pooling the survey results it indicates that a moderate population of GCN are present to the west of the survey site.

64 No GCN were recorded within any of the waterbodies within 250m of the survey site. However, only one of the four waterbodies (Shuts Pond, W11) within 250m was surveyed as part of this investigation. Three ponds within 250m of the site boundary were not surveyed due to access restrictions. Shutts pond (W11), contains an abundant population of fish as such is considered unsuitable for GCN and other amphibians.

F.1.2 Palmate newt

65 No Palmate newts were recorded in the waterbodies on the Cannon Hall site. However, a small population was recorded in waterbodies 12, 13 and 14 over 430m from the site.

F.1.3 Smooth newt

66 A moderate population of smooth newts was recorded on site in Vegetable Garden Pond (W 08.) A moderate population was also located off site in waterbodies 12, 13, 14 15 and 16 with a maximum count of 32 in Game Pond Large (W 14.)

F.1.4 Common toad

67 During the first survey on 30/03/16, 34 toads were recorded in Vegetable Garden Pond (W 08). On this survey 4 toads were recorded in waterbody 14.

68 Abundant tadpoles, which could have been toad or frog, were seen in waterbodies 05, 08, 13, 14, 15, 16

F.1.5 Common frog

69 One frog was recoded in waterbody 08.

70 Abundant tadpoles, which could have been toad or frog, were seen in waterbodies 05,08, 13, 14, 15, 16

F.2 Evaluation

F.2.1 Great created newt

71 As great crested newts are a European Protected Species the individuals present here are of national and local importance.

F.2.2 Palmate newt

72 Palmate newts are not a European Protected Species so these individuals are not of national importance. However, they are rare in the Barnsley area and therefore this moderate population is of local importance.

F.2.3 Smooth newt

73 Smooth newts are not a European Protected Species. The small population present is not significant

F.2.4 Common toad

74 Common toad is not a European Protected Species. However toads are scarce locally and therefore this moderate population is of local significance

G CONCLUSIONS AND RECOMMENDATIONS

G.1 Great Crested Newt Survey

75 The GCN surveys revealed that the five ponds within the Cannon Hall Park site boundary do not support breeding GCN.

76 Four ponds to the west of the site do support a moderate population of GCN. However, these ponds are up to 530m from the site boundary.

77 Therefore the presence of this population does not mean that a European Protected Species Licence is required to allow the development on the Cannon Hall site.

78 However, a survey constraint was that access to the three waterbodies 06, 09 and 10 was not granted and therefore these three ponds were not included in this survey. They are located 140m, 20m and 100m respectively from the boundary of the Cannon Hall site. A moderate population of great crested newts was recorded 300m to the west of these waterbodies. Therefore, as they were not surveyed, it cannot be ruled out that there may be great crested newts occurring in these waterbodies and therefore a population may exist within 250m of the site boundary.

79 Taking into account the scale and nature of the proposed development on site, for example no ponds destroyed and potential loss and disturbance to up to 1ha terrestrial habitat, by following the method statement this will minimise the risk of disturbance or destruction of any GCN that may be on site in their terrestrial phase.

80 Therefore, to mitigate the development works, a Method Statement will be followed, with good practice working procedures for any works taking place within 500m of West Lodge Pond (W06) Gardener Cottage Large (W09) and Gardener Cottage Small (W10). These methods will minimise the likelihood of disturbance to great crested newts, negating the need for a European Protected Species Licence form Natural England for the works.

G.2 Method Statement for GCN

G.2.1 Area covered by Method Statement

81 The Method Statement will cover the proposed development works on site within 500m of West Lodge Pond (W06) Gardener Cottage Large (W09) and Gardener Cottage Small (W10) adjacent to the north-west corner of the site. Works in this area can be undertaken at any time of the year.

- Prior to works commencing on site, a destructive search of suitable terrestrial features, including rolling back suitable areas of grassland turf and tarmac, inspecting stone walls and log piles of refugia for great crested newts will be undertaken by a suitably licensed Ecologist
- Once the ecologist is satisfied that all terrestrial features with the potential to support terrestrial great crested newts have been cleared, they will perform a toolbox talk to all

contractors to inform them of the possibility that great crested newts may be in the work area.

- If great crested newt(s) are discovered in the work area at any point during the clearance and construction phases of the development, all works will cease immediately and Access Ecology Ltd be contacted for advice (Tel: 0114 258 7819).

82 Therefore In addition to the methods above, the following reasonable avoidance measures will be in place and adhered to for the duration of the clearance and construction phases of the development:

- Site notices regarding great crested newt identification and protection measures should any be found will be posted in suitable locations across the development site.
- Any building materials will be stored off the ground i.e. on pallets. Removed vegetation and other construction waste will be stored off the ground or in a suitable container (i.e. a skip) until it can be disposed of responsibly off-site.
- Any trenches left overnight will be covered and/or left with a means of escape for any animals that may become trapped in them overnight. Every morning the trenches will be checked prior to works commencing. Should great crested newts, or other animals, be present in the trenches in a morning, works will not commence until Access Ecology Ltd have been contacted for advice (Tel: 0114 258 7819).

Table 9. Works to be covered by the method statement

Ref	Item and Description	To be covered by the method statement good working practice
1	Stew ponds managed to enhance biodiversity, including removal of overgrown. Vegetation and improved access path between the ponds.	yes
2	Silt to be dredged and lakes restored back to their Georgian splendour.	
3	Improved setting to cafe including feature wall and sculptural seating.	yes
4	Woodland nature/heritage trail. (Bark mulch path)	If within 500m of 500m of West Lodge Pond (W06) Gardener Cottage Large (W09) and Gardener Cottage Small (W10).
5	Clearing of overgrown vegetation to allow area for events such as concerts/plays in the southern approach woodland	If within 500m of 500m of West Lodge Pond (W06) Gardener Cottage Large (W09) and Gardener Cottage Small (W10).
6	Restoration to deer shelter and adjacent walls.	yes
7	Access to woodland heritage/nature trail.	If within 500m of 500m of West Lodge Pond (W06) Gardener Cottage Large (W09) and Gardener Cottage Small (W10).
8	Removal of self set trees to enhance views from the Museum through the original vista.	If within 500m of 500m of West Lodge Pond (W06) Gardener Cottage Large

		(W09) and Gardener Cottage Small (W10).
9	Uncovering the end of the Ha-Ha by clearing overgrown vegetation.	yes
10	Informal mown grass path along the ha-ha as a continuation of the trail.	yes
11	Improved access and minor repairs to the ice house	yes
12	Space for marquee for weddings and open days including new access steps.	If within 500m of 500m of West Lodge Pond (W06) Gardener Cottage Large (W09) and Gardener Cottage Small (W10).
13	Improve forecourt to enhance setting to the Hall and Spencer Wing and provide	If within 500m of 500m of West Lodge Pond (W06) Gardener Cottage Large (W09) and Gardener Cottage Small (W10).
14	Restoration of the south terrace and adjoining paths using a higher quality surface material.	
15	Restoration to Walled Garden refer to drawing CHP-PLI-S2-DR-LC2-0221. - Restoration work to north range glass house - Opening the frontage to south range glass house (Muscat vine house) - Restoration work to the stable blocks (improvements to interior, replacing windows, new cast iron guttering and new heating and electrical systems. - Gardeners cottage to be restored as friends of Cannon Hall shop - Removal of the cart sheds to improve connection between the courtyard, museum and the walled garden	yes
16	Restoration of garden paths, planting beds and traditional growing areas.	yes
17	New access to the walled garden through the pinery including new link path from the Ha- Ha through new herbaceous planting borders.	yes
18	Restore historic pinery as a feature seating area. - Replace inner lintels. - Replace flaunching to brickwork inner wall head. - Carefully realign cornices. - New design for internal paving.	yes
19	Woodland activity area for bat walks and bush craft, Improved access and management of overgrown vegetation. (Bark mulch path)	If within 500m of 500m of West Lodge Pond (W06) Gardener Cottage Large (W09) and Gardener Cottage Small (W10).
20	Improve access to the historic plunge pool and plant up with woodland vegetation	yes

21	Reintroduce historic pond and sympathetically replace footbridge.	yes
22	Restoration of the listed bridge including clearing vegetation, repairs to stonework and	no
23	Improved access between the car park and the Cascades	no
24	Clearance of vegetation around cascades and repairs to maintain character	No
25	Restoration of Pleasure Gardens including improvements to paths, overgrown bed clearance and introduction of flower borders using planting palettes associated with 18th century landscape.	yes
26	Minor repairs to fairly land architectural relics (arches and window fragments)	yes
27	Restoring access to the historic midden and carrying out minor repairs (no access to general public).	yes
28	Selective removal of self-set trees to the lakes and around the car park to allow views to and from Cannon Hall.	If within 500m of 500m of West Lodge Pond (W06) Gardener Cottage Large (W09) and Gardener Cottage Small (W10).

H REFERENCES

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Hill, D., Fasham, M., Tucker, G., Shewry, M. & Shaw, P., (2005) Handbook of Biodiversity Methods, Survey, Evaluation and Monitoring, Cambridge: UK

Oldham, R.S., Keeble, J., Swan, M.J.S., and Jeffcote, M. (2000) Evaluating the Suitability of Habitat for the Great Crested Newt (*Triturus cristatus*). Herpetological Journal 10: 143-155.

UK legislation and policy web address:

Conservation of Habitats and Species Regulations 2010:

http://www.opsi.gov.uk/si/si2010/uksi_20100490_en_1

Habitats Directive:

www.europa.eu.int/eur-lex/en/lif/dat/1992/en_392L0043

Wildlife and Countryside Act 1981:

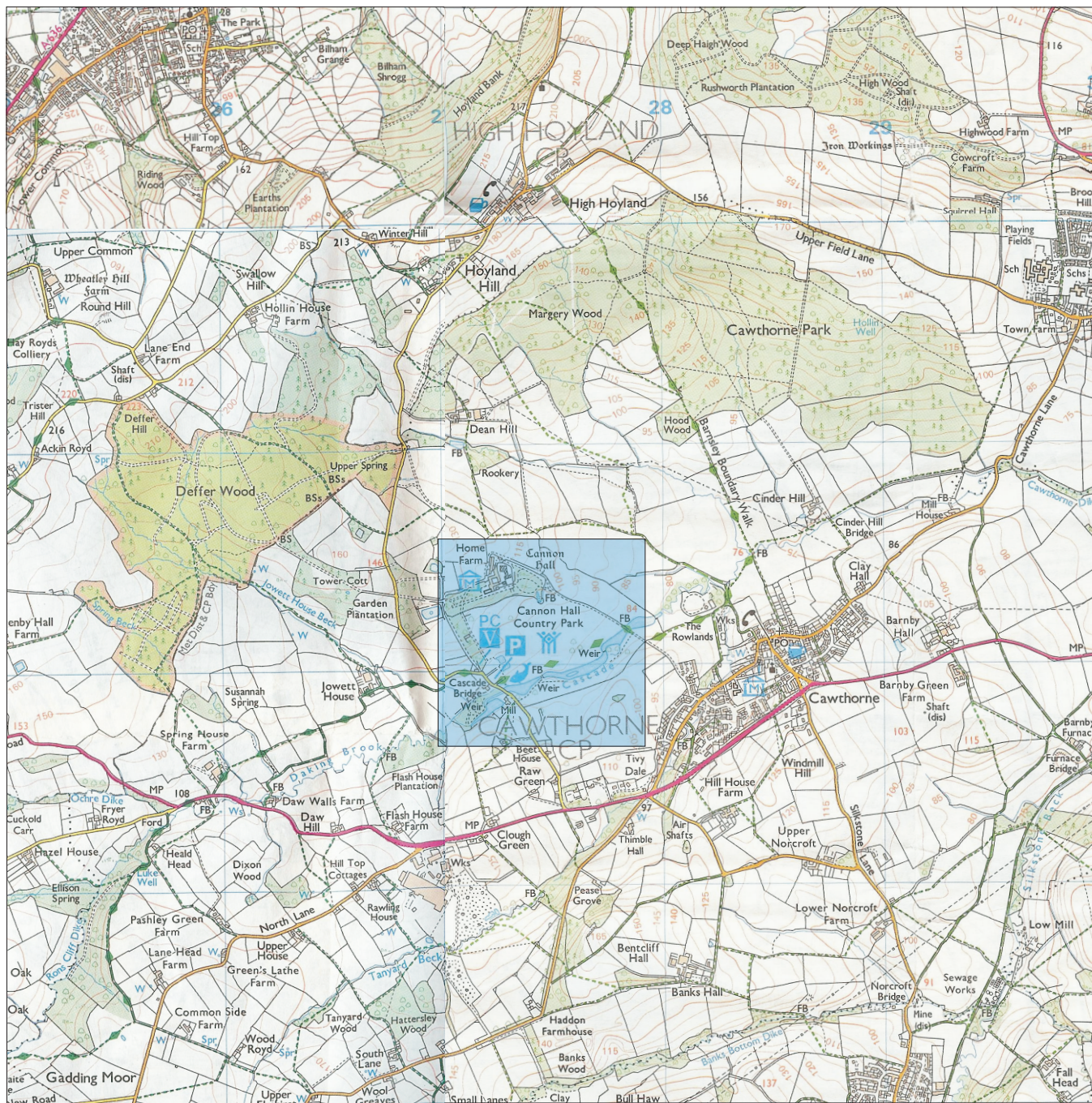
www.opsi.gov.uk/RevisedStatutes/Acts/ukpga/1981/cukpga_19810069_en_1

National Planning Policy Framework:

<http://www.communities.gov.uk/documents/planningandbuilding/pdf/2116950.pdf>

Hedgerow Regulations 1997:

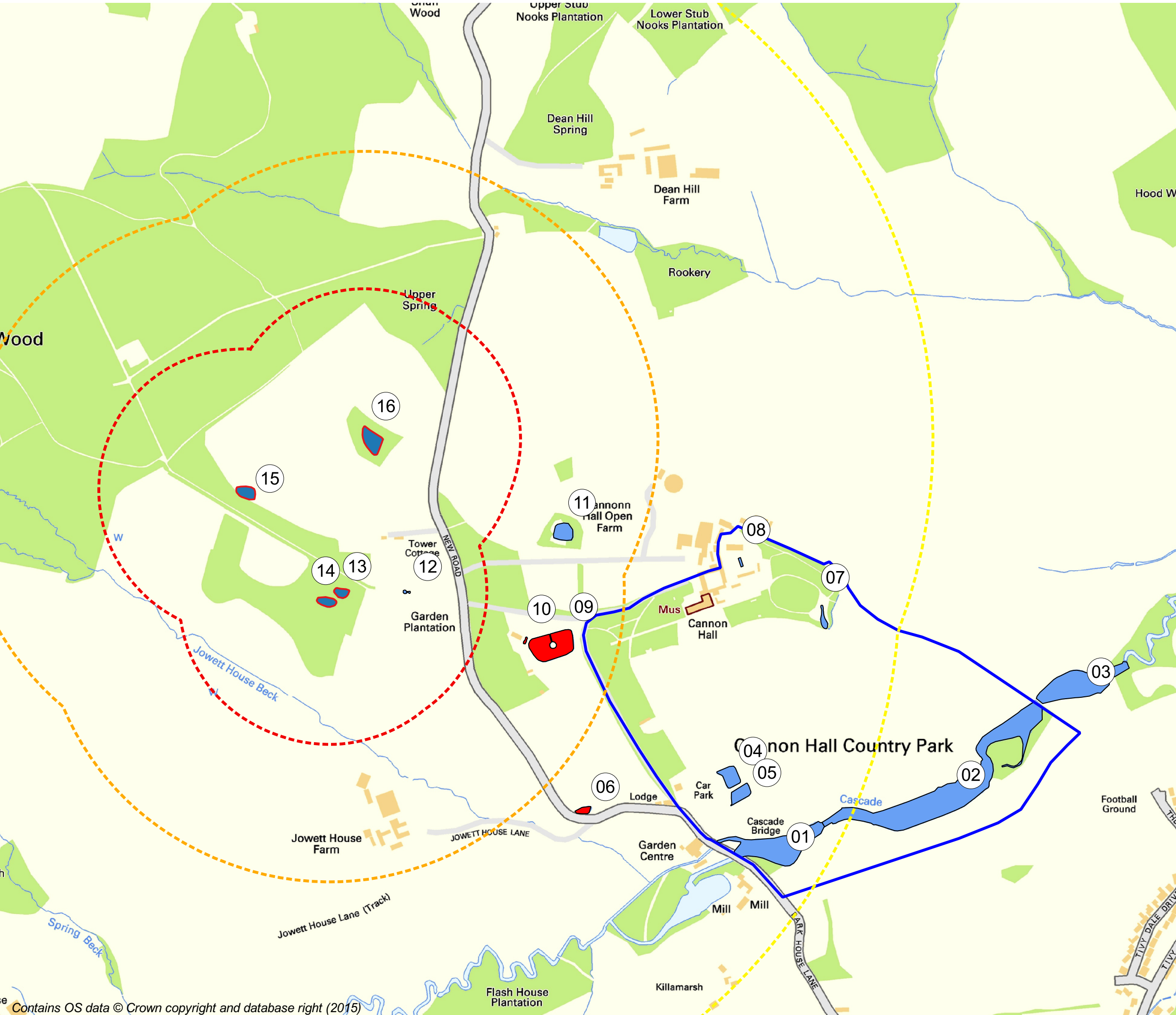
<http://www.legislation.gov.uk/uksi/1997/1160/made>



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	Legend	Project	0915 - Cannon Hall
	 Site location	Title	Appendix A. 1 Location Plan
R1b Riverside Block Sheaf Bank Business Park Sheffield S2 3EN info@accessecology.co.uk		Client	Plincke Landscape Urbanism Design
		Date	August 2015
	www.accessecology.co.uk	Ref	0915Fig1JHloc



Legend

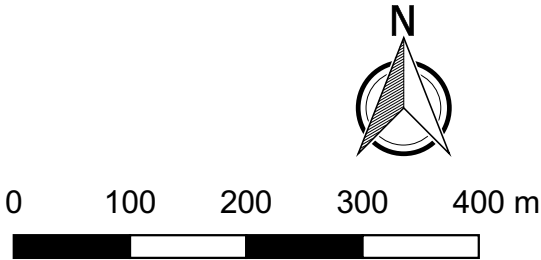
Waterbodies risk assessment

- GCN adsent
- GCN present
- No survey undertaken

Risk zones

- 250m buffer - high
- 500 buffer - moderate
- 1000m buffer low

code	Name	Area m2
01	Daking brook top	6081
02	Daking brook middle	16632
03	Daking brook bottom	5744
04	Stew pond north	980
05	Stew pond south	799
06	West lodge pond	262
07	Fairyland/plunge pool	275
08	Veg garden	73
09	Gardener cottage large	3156
10	Gardener cottage small	43
11	Shutts pond	918
12	Track side pond	49
13	Game pond small	357
14	Game pond large	464
15	Deffer wood Pond	646
16	Maize pond	1129



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Project	0915.Cannon Hall		
Title	Risk Assessment Plan		
Site XY	427427,408132		
Client	Plincke Landscape Limited		
Map date	Size	Author	Version
20/06/2016	A3	PL	V01