



# CLEVE HILL SOLAR PARK

ENVIRONMENTAL STATEMENT  
VOLUME 4 - TECHNICAL APPENDIX A8.2a  
AMPHIBIAN SURVEY

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# Cleve Farm – Amphibian Survey Report



2015

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## 1 Summary

AECOM was commissioned in April 2015 by Hive Energy Ltd to undertake a suite of great crested newt (*Triturus cristatus*) and amphibian surveys at the proposed Cleve Farm site, Graveney, Kent (hereafter known as the Site). The purpose of this was to identify any potential constraints to works related to the presence of this protected species within the Site boundary and with regards to great crested newt, 500m surrounding the Site boundary.

The Site is to be developed for a sustainable solar energy farm. The Site consists of large arable fields intersected by a network of drainage ditches. The Swale Special Protection Area (SPA), Site of Special Scientific Interest (SSSI) and Ramsar site is adjacent to the north, east and west of the Site.

Great crested newt is afforded full protection under the Wildlife and Countryside Act (1981 as amended) and the Conservation of Habitats and Species Regulations 2010 (as amended). It is an offence to deliberately capture, injure, disturb or kill a great crested newt, or to deliberately take or destroy its eggs. It is also an offence to deliberately or recklessly damage, destroy or obstruct access to any structure which a great crested newt uses for shelter or protection.

A suite of six surveys were conducted between April and June 2015 to assess the presence of amphibians including great crested newt within suitable water bodies located within both the Site boundary and within 500m of the proposed works. A minimum of three survey methods were used during each survey visit, namely bottle trapping, torching, egg searching and netting.

Great crested newts were observed within three water bodies located outside of the Site boundary, all of which had a small population size class (1-10 individuals). No great crested newts were recorded in any of the water bodies present within the Site boundary. Amphibians recorded from within the Site boundary included a single observation of a smooth newt (*Lissotriton vulgaris*), together with occasional common frog (*Rana temporaria*) and marsh frog (*Pelophylax ridibundus*).

## 2 Introduction

AECOM was commissioned in 2015 by Hive Energy to undertake a suite of great crested newt surveys at the Cleve Farm site, in Graveney, Kent. The purpose of this was to identify any potential constraints to works related to the presence of this protected species within the Site boundary.

It is understood that the Site is to be developed for sustainable solar energy. At the time of writing the detailed design regarding the scale and layout of the development has not been determined.

The Site is comprised of a number of arable fields surrounded by a network of wet drainage ditches. The Swale Special Protection Area (SPA), Site of Special Scientific Interest (SSSI) and Ramsar site border the Site to the north, east and west.

A desk study undertaken for the Site found records of great crested newt within 2km of the Site boundary, with the most recent record dating from 2012.

## 3 Legislation

### 3.1.1 Great crested newts

Great crested newts are afforded full protection under the Wildlife and Countryside Act (1981 as amended) and the Conservation of Habitats and Species Regulations 2010 (as amended).

Through the implementation of these Regulations, it is an offence to deliberately capture, injure, disturb or kill a great crested newt, or to deliberately take or destroy its eggs. It is also an offence to deliberately or recklessly damage, destroy or obstruct access to any structure which a great crested newt uses for shelter or protection. This protection includes both the breeding pond itself and terrestrial habitat utilised for foraging and hibernation which may be distant from the breeding pond.

Great crested newt habitat is widely considered to extend up to 500m (the accepted maximum roaming distance) from a breeding pond where areas of connective suitable habitat exist (English Nature, 2001).

Great crested newt is listed as a species of principal importance within Section 41 of the Natural Environment and Rural Communities Act (2006) (NERC s41) and a priority species under the Kent Biodiversity Action Plan (KBAP).

### 3.1.2 Common amphibians

The four common amphibians in Britain, namely common frog, common toad (*Bufo bufo*), palmate newt (*Lissotriton helveticus*) and smooth newt have no legal protection other than that provided by subsection 9.5 of the Wildlife & Countryside Act 1981 (as amended) which makes it an offence to sell them. However, general animal welfare guidelines do apply (i.e. causing an animal to suffer unnecessarily).

Common toad is listed as a NERC s41 species of principal importance based on its rapid decline over the last 25 years. The common toad is also listed as a priority species under the KBAP.

### 3.1.3 Non-native Invasive amphibian species

The Site supports marsh frog (*Pelophylax ridibundus*), a non-native invasive species which has become established in the southeast of England.

This species has no protection under UK legislation. Marsh frog are on Schedule 9 of the Wildlife and Countryside Act (as amended) 1981 (WCA) which means that it is an offence to release this species into the wild.



## 4 Methodology

### 4.1.1 Habitat Suitability Index (HSI)

The HSI is a method devised to quantify the suitability of a water body to support great crested newts (Oldham *et al.*, 2000). Water bodies located both within the Site and within a 500m radius of the Site boundary were subject to an assessment using the HSI on the 30<sup>th</sup> April 2014 and 29<sup>th</sup> March 2015 by experienced ecologists who hold Natural England Class 1 licences to survey great crested newt. A total of seven water bodies located outside the Site boundary and the network of drainage ditches within the Site boundary were subject to the HSI assessment. Two other small water bodies were recorded within 500m (a garden pond and a small water tank/reservoir), but access to these was not granted upon request.

Water bodies 1 and 2 appear to be relatively newly constructed in relation to the new substation and likely act as drainage/balancing ponds for it. The substation land contains a lot of hardstanding and mown grass areas surrounded by security fencing.

The calculation of the HSI for a water body requires that the following ten key variables are recorded and assigned a numerical value. These ten variables are:

- location within Britain;
- pond area;
- pond drying (based on both local knowledge and field evidence);
- water quality;
- percentage perimeter shaded;
- presence or absence of waterfowl;
- presence or absence of fish;
- number of ponds situated within 1km;
- suitability of terrestrial habitat; and
- percentage of macrophyte cover.

The results of the HSI assessment are scored in accordance with the criteria specified in Table 1.

**Table 1. HSI score and interpretation**

HSI Score	Pond Suitability for Great crested newts
< 0.5	Poor
0.5	Below average
0.6	Average
0.7	Good
>0.8	Excellent

### 4.1.2 Great crested newt population size class survey

Four off-site water bodies (water bodies 1-4) and drainage ditches within the Site boundary were surveyed (see Figure 1) on six separate visits. Four initial survey visits were undertaken, with at least three surveys undertaken during the period of mid-April to mid-May, in accordance with Natural England's Great Crested Newt Mitigation Guidelines (English Nature, 2001).

As great crested newts were found within close proximity to the Site during the first four visits, an additional two visits were undertaken in accordance with Natural England guidelines. These visits were required in order to produce an estimate of the size class of the population of great crested newt present.

All survey visits were undertaken during suitable weather conditions between 29<sup>th</sup> April and 16<sup>th</sup> June 2015. The environmental survey conditions for the completed great crested newt surveys are presented in Table 2.

A minimum of three survey methods were employed during each visit to the four off-site water bodies namely:

- 1- Torchlight surveying was carried out during the hours of dark using a high-powered torch (one million candle power 'Cluson Clulite'). The perimeter and shallows of each water body were walked slowly using the torch to search for amphibians within the water body and on the margins.
- 2- In order not to disturb sediment and adversely affect water clarity for torchlight surveys, netting was conducted after torchlight surveys. Netting with a 2mm mesh Environment Agency approved professional dipping net, was targeted at both open water and areas of suitable egg laying vegetation. Time spent netting per water body was dependent on size, but averaged 10-15 minutes in total.
- 3- Egg searches were conducted in daylight when the bottle traps were removed. Egg searching was targeted at all areas of accessible, submerged vegetation suitable for egg laying such as water mint (*Mentha aquatica*) and bittersweet (*Solanum dulcamara*).
- 4- Bottle traps were set at the targeted locations. Bottle traps, constructed from 2L plastic bottles supported on bamboo canes, were located at approximately 1 to 2m intervals around perimeter of each pond. On each survey visit, traps were set out 1 to 2 hours before dusk and were checked, emptied and removed the next day between 6am and 9am. Traps were always  $\frac{3}{4}$  submerged so that they contained at least  $\frac{1}{4}$  air and contained air holes punched in the exposed end.

Presence, sex, life stage and numbers were recorded for great crested newt and also common frog, common toad and smooth newt.

**Table 2. Amphibian survey - weather conditions**

Visit Number	Date	Minimum Overnight Temperatures (°C)	Conditions
1	29 <sup>th</sup> & 30 <sup>th</sup> April 2015	10 / 11	Cool, slight breeze, light rain showers during the day
2	07 <sup>th</sup> & 08 <sup>th</sup> May 2015	12 / 12	Windy and cloudy
3	13 <sup>th</sup> & 14 <sup>th</sup> May 2015	11 / 10	Cool and calm on 13 <sup>th</sup> , very windy and light rain on 14 <sup>th</sup>
4	18 <sup>th</sup> & 19 <sup>th</sup> May 2015	11 / 8	Dry, mild with strong breeze. Rain during the day.
5	03 <sup>rd</sup> & 04 <sup>th</sup> June 2015	14 / 14	Warm, still, partly cloudy
6	15 <sup>th</sup> & 16 <sup>th</sup> June 2015	13 / 12	Calm and dry

### 4.1.3 Constraints

Large sections of the ditch networks were inaccessible due to very steep bank slope and/or dense reed cover, therefore torchlight surveying only was conducted here, where possible. As the HSI of the drainage ditches produced a "poor" result, and therefore the reduced survey input of torching only is not considered to be a significant constraint to the results of the surveys.

## 5 Results

### 5.1.1 HSI

Seven water bodies were recorded within 500m of the boundary of the Site, additionally the field drainage ditches within the Site boundary are also considered potentially suitable to support great crested newt. The location of these water bodies is shown in Figure 1. A HSI assessment for water bodies is presented in Appendix A and a summary of their suitability is shown in Table 3. Full descriptions and photos of the water bodies are presented within Appendix C.

**Table 3. Summary of habitat suitability scores of all water bodies within 500m of the Site boundary.**

Water body reference	Water body Type	Field score	Habitat suitability summary
Water body 1	Balancing pond	0.87	Excellent
Water body 2	Balancing pond	0.87	Excellent
Water body 3	Farm pond	0.91	Excellent
Water body 4	Scrapes and hollows created for wildfowl shooting	0.75	Good
Ditch network	Field drainage ditches which flood in winter and almost dry out in summer.	0.41	Poor
Water body 5	Large Recently constructed reservoir	0.27	Poor
Water body 6	Historic overgrown reservoir	0.19	Poor
Water body 7	Dry farm pond	0.43	Poor

Water bodies 5-7 presented a poor HSI and were deemed unsuitable for gcn presence. As such, these ponds were not included in further field surveys.

The drainage ditches and field margins within the Site boundary are potentially suitable to act as terrestrial foraging habitat for great crested newt. The linear features created by the ditch network could also be important for great crested newt navigation between ponds in the local area. However, there are no ponds located both northward and westward of the farm breeding pond in which they were recorded.

### 5.1.2 Amphibian and great crested newt population size class survey

Great crested newts were recorded from three of the water bodies located outside of, but close to the Site, namely water body 1, water body 3 and water body 4 (see Figure 2.). No great crested newts were recorded from water body 2 or the network of ditches within the Site boundary.

The largest population recorded was a peak count of 10 adult great crested newts recorded from within water body 3 during the third visit on the 13<sup>th</sup> May 2015. Great crested newts were recorded from this water body on all survey visits and all life stages were recorded including eggs, larvae, efts (previous year's young) and adults. The full results of the survey are contained within Appendix B. Table 4 presents the number of great crested newts observed throughout the surveys.

**Table 4. Number of great crested newts recorded during the surveys**

Water body reference	Survey method	Visit 1 – 29/04/15	Visit 2 – 07/05/15	Visit 3 – 13/05/15	Visit 4 – 18/05/15	Visit 5 – 03/06/15	Visit 6 – 15/06/15
Water body 1	Torch	0	0	0	0	2	0

	Bottle	0	0	0	0	0	0
	Net	-	-	-	-	-	-
	Egg search	No	No	No	No	No	No
Water body 3	Torch	1	4	10	0	4	3
	Bottle	0	3	1	5	1	4
	Net	-	-	-	-	-	-
	Egg search	No	No	Yes	No	No	No
Water body 4	Torch	0	0	1	0	0	0
	Bottle	0	0	0	0	0	0
	Net	-	0	-	0	-	-
	Egg search	No	No	No	No	No	No

Based on the maximum count of great crested newts recorded per water body, an assessment of population size class can be estimated using Natural England Guidance criteria (see Table 5). Following this criteria water body 1, water body 3 and water body 4 were found to support a 'small' population of great crested newt (maximum count of 1-10 individuals).

**Table 5. Great crested newt population peak count and size class**

Water body reference	Peak Count	Population class size
Water body 1	2	Small
Water body 2	N/A	N/A
Water body 3	10	Small
Water body 4	1	Small
Drainage Ditches	N/A	N/A

During the course of the surveys, smooth newt, common frog, common toad and marsh frog were also recorded (the number and location of other amphibians recorded during the surveys is provided in Appendix B).

## 6 Discussion

Great crested newt was found to be present within water body 1, water body 3 and water body 4: a balancing pond, a farm pond and scrapes and hollows created for wildfowl shooting. Breeding activity was recorded from within water body 3 only. This farm pond had plentiful terrestrial habitat surrounding it within the immediate area, such as the farm house, outbuildings, garden, rough grassland meadows, hedgerows and scrub areas. Although no evidence of breeding activity was recorded from within water body 1 and water body 4, this cannot be ruled out.

No great crested newts were recorded from the network of drainage ditches within the Site boundary and it is likely that the deep sided banks may act as a barrier to movement for any great crested newts attempting to navigate into the fields. Additionally the water within the ditches appears to have a degree of flow, is likely to contain predatory fish and is regularly used by wildfowl, all of which decreases the likelihood of great newt utilising the drain network. In winter with heavy rain, the ditches have been observed to over-top and flood into the fields with extreme heavy flow northwards towards the Swale. In the dry of the summer months, the ditches dry out and some contain very little water.

## 7 References

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

Gent A. H, & Gibson S.D, eds (1998) *Herpetofauna Workers' Manual*. Joint Nature Conservation Committee, Peterborough.

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

Langton, T.E.S., Beckett, C.L. & Foster, J.P. (2001), *Great Crested Newt Conservation Handbook*, Froglife, Halesworth.



## Appendix A. HSI survey results for water bodies

HSI criteria	Water body 1		Water body 2		Water body 3		Water body 4		Ditch network	
	Field score	SI score	Field score	SI score	Field score	SI score	Field score	SI score	Field score	SI score
SI1 - Location	A	1.00	A	1.00	A	1.00	A	1.00	A	1.00
SI2 - Pond area	470 m <sup>2</sup>	0.94	470 m <sup>2</sup>	0.94	1500 m <sup>2</sup>	0.86	2000 m <sup>2</sup>	0.79	7557 m <sup>2</sup>	0.10
SI3 - Pond drying	Never	0.90	Never	0.90	Rarely	1.00	Sometimes	0.50	Sometimes	0.50
SI4 - Water quality	Good	1.00	Good	1.00	Moderate	0.67	Good	1.00	Poor	0.33
SI4 - Shade	0%	1.00	0%	1.00	70%	0.80	0%	1.00	0%	1.0
SI6 - Fowl	Absent	1.00	Absent	1.00	Absent	1.0	Minor	0.67	Minor	0.67
SI7 - Fish	Absent	1.00	Absent	1.00	Absent	1.0	Minor	0.33	Possible	0.67
SI8 - Ponds	10+	1.00	10+	1.00	10+	1.0	10+	1.00	10+	1.00
SI9 - Terrestrial habitat	Poor	0.33	Poor	0.33	Good	1.0	Moderate	0.67	Poor	0.33
SI10 - Macrophytes	90%	0.90	90%	0.90	50%	0.81	70%	1.00	20%	0.51
HIS Score	Excellent	0.87	Excellent	0.87	Excellent	0.91	Good	0.75	Poor	0.41

## Appendix A.(cont.) HSI survey results for water bodies

HSI criteria	Water body 5		Water body 6		Water body 7	
	Field score	SI score	Field score	SI score	Field score	SI score
SI1 - Location	A	1.00	A	1.00	A	1.00
SI2 - Pond area	13972 m <sup>2</sup>	0.9	10091 m <sup>2</sup>	0.8	48 m <sup>2</sup>	0.05
SI3 - Pond drying	Never	0.90	Never	0.90	Annually	0.01
SI4 - Water quality	Poor	0.33	Good	1.00	Poor	0.33
SI4 - Shade	0%	1.00	100%	0.2	100%	0.2
SI6 - Fowl	Major	0.01	Major	0.01	Absent	1.0
SI7 - Fish	Possible	0.67	Major	0.01	Absent	1.0
SI8 - Ponds	10+	1.00	10+	1.00	10+	1.0
SI9 - Terrestrial habitat	Poor	0.33	Good	1.00	Good	1.0
SI10 - Macrophytes	1%	0.3	10%	0.40	0%	0.3
HIS Score	Poor	0.27	Poor	0.19	Poor	0.43

## Appendix B. Amphibian survey results 2015

## Amphibian Survey Results – Water body 1

Date of Survey	Survey Method			
	Torch	Bottle traps	Netting	Egg search
29/04/2015	1 female smooth newt, 1 adult common frog	2 female smooth newt	-	Smooth newt eggs
07/05/2015	3 male smooth newt, 1 female smooth newt	2 male smooth newt, 2 female smooth newt	-	N/A
13/05/2015	1 male smooth newt, 1 female smooth newt	1 male smooth newt, 1 female smooth newt	-	N/A
18/05/2015	1 male smooth newt, 4 female smooth newt	3 female smooth newt	-	N/A
03/06/2015	<b>1 male great crested newt, 1 female great crested newt</b> , 1 male smooth newt, 2 female smooth newt, 1 adult common toad, 10's of toad tadpoles	0	-	N/A
15/06/2015	0	0	-	N/A

## Amphibian Survey Results – Water body 2

Date of Survey	Survey Method			
	Torch	Bottle traps	Netting	Egg search
29/04/2015	1 male smooth newt, 1 female smooth newt	5 female smooth newt	-	None
07/05/2015	1 female smooth newt	2 male smooth newt, 3 female smooth newt	-	None
13/05/2015	3 female smooth newt, 1 female smooth	7 male smooth newt, 2 female smooth newt	-	None
18/05/2015	0	0	-	None
03/06/2015	2 female smooth newt	3 male smooth newt, 5 female smooth newt	-	None
15/06/2015	10 male smooth newt, 14 female smooth newt	3 male smooth newt	-	None

### Amphibian Survey Results – Water body 3

Date of Survey	Survey Method			
	Torch	Bottle traps	Netting	Egg search
29/04/2015	1 male great crested newt	0	-	None
07/05/2015	2 male great crested newt, 2 female great crested newt, 1 female smooth newt	1 male great crested newt, 2 female great crested newt	-	None
13/05/2015	3 male great crested newt, 7 female great crested newt, 1 juvenile great crested newt, 2 female smooth newt	1 female great crested newt, 1 smooth newt	-	Great crested newt eggs
18/05/2015	0	2 male great crest newt, 3 female great crested newt	-	None
03/06/2015	1 male great crested newt, 3 female great crested newt	1 male great crested newt, great crested newt larvae	-	None
15/06/2015	3 female great crested newt	4 female great crested newt, great crested newt larvae	-	None

### Amphibian Survey Results – Water body 4

Date of Survey	Survey Method			
	Torch	Bottle traps	Netting	Egg search
30/04/2015	2 male smooth newt, 4 female smooth newt	1 male smooth newt, 2 female smooth newt	-	None
08/05/2015	-	6 male smooth newt, 4 female smooth newt	-	None
14/05/2015	1 female great crested newt, 1 male smooth newt, 5 female smooth newt	3 male smooth newt, 3 female smooth newt	-	Smooth newt eggs
19/05/2015	-	3 male smooth newt, 1 female smooth newt	0	N/A
04/06/2015	5 male smooth newt, 6 female smooth newt	1 male smooth newt	-	N/A
16/06/2015	0	1 juvenile marsh frog	-	N/A

**Amphibian Survey results – Drainage Ditch Network**

Date of Survey	Survey Method			
	Torch	Bottle traps	Netting	Egg search
30/04/2015	1 female smooth newt	-	-	-
08/05/2015	0	-	-	-
14/05/2015	2 adult common frog, 1 adult marsh frog, frog tadpoles	-	-	-
19/05/2015	0	-	-	-
04/06/2015	0	-	-	-
16/06/2015	0	-	-	-

**Appendix C. Pond Habitat Descriptions**



**Plate 1.** Water body 1 choked with common reed (*Phragmites australis*), with occasional willow (*Salix* sp.) species bordering the edge. Plate shows one of the two open water areas with a pile of cut reeds to the left of the drain outlet.



**Plate 2.** Water body 2 choked with common reed, with occasional willowherb (*Epilobium* sp.) species and some open water.





**Plate 3.** Water body 3 dominated by reed-mace (*Typha angustifolia*) with occasional yellow iris (*Iris pseudacorus*) and over-shaded by a variety of broad leaved trees surrounding its perimeter.



**Plate 4.** Water body 4 consisting of numerous shallow scrapes and hollows and fringed with various rushes (*Juncus* sp.) and sedges (*Carex* sp.). Plentiful cattle trampling damage on occasion.



**Plate 5.** Typical ditch found within Site boundary with dense stands of common reed and narrow open water zone in this example.



## Appendix D. Smooth Newt population class size results

Water body reference	Peak Count	Population class size
Water body 1	5	Low
Water body 2	24	Good
Water body 3	2	Low
Water body 4	11	Good
Drainage ditch network	1	Low

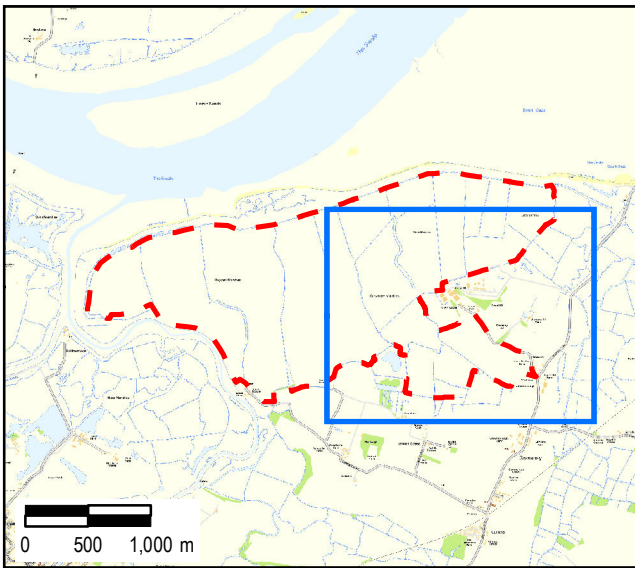
## Figure 1. Waterbodies Surveyed.



THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSE OF ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT

**LEGEND**

- - - Site boundary
- Great crested newt ponds
- Waterbody
- Pond buffers
  - - - 50m
  - - - 250m
  - - - 500m
- Ditches within 500m of ponds
- Substation road



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Purpose of Issue  
**FINAL**

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Project Title  
**CLEVE FARM**

Drawing Title  
**WATERBODIES SURVEYED FOR GCN**

Drawn SJ	Checked BB	Approved GL	Date 26/07/2016
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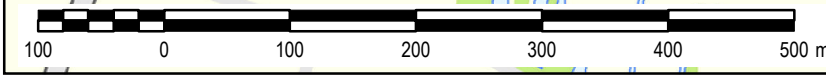
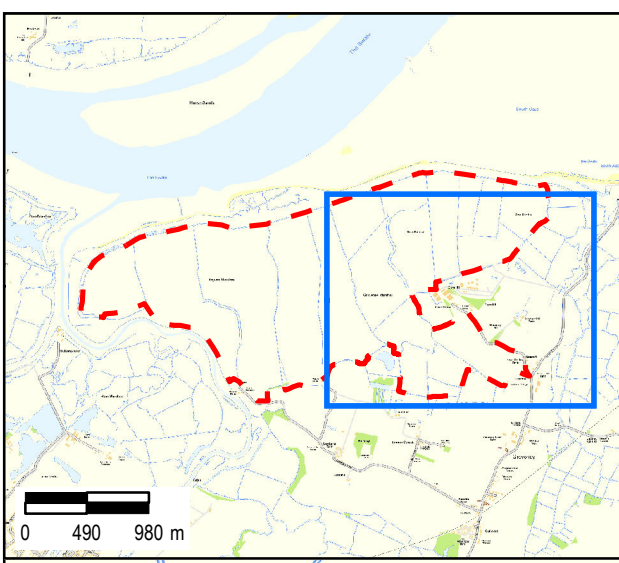
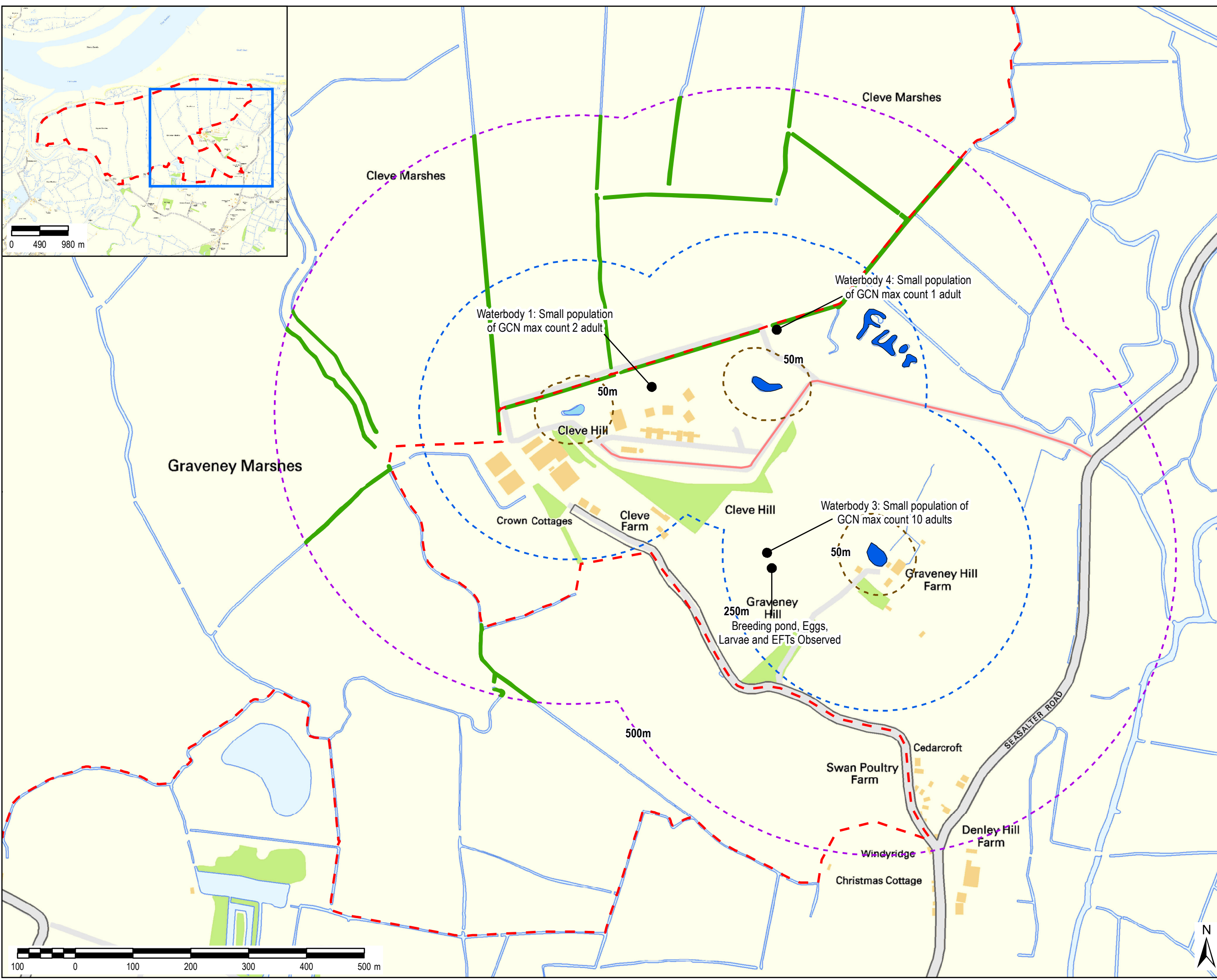


Drawing Number  
**FIGURE 1**

File Name: I:\5004 - Information Systems\47059809\_Cleve\_Farm\_Winter\_Birds\project\_files\GIS\project\_files\GIS\Ecology\GCN\_pond\_maps\Figure 1 - GCN\_PondMaps.mxd

THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSE OF ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT

- LEGEND**
- Site boundary
  - Great crested newt ponds
  - Waterbody
  - Pond buffers**
    - 50m
    - 250m
    - 500m
  - Ditches within 500m of ponds
  - Substation road



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Purpose of Issue  
**FINAL**

Client  
**CLEVE HILL SOLAR PARK LIMITED**

Project Title  
**CLEVE FARM**

Drawing Title  
**WATERBODIES WITH GCN POPULATION**

Drawn SJ	Checked BB	Approved GL	Date 26/07/2016
AECOM Internal Project No. 60485771		Scale @ A3 1:6,000	

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Drawing Number  
**FIGURE 2**

File Name: I:\5004 - Information Systems\7059809\_Cleve\_Farm\_Winter\_Birds\project\_files\MDs\Ecology\GCN\_pond\_maps\Figure 2 - GCN\_PondMaps.mxd