

PROPOSED HOUSING DEVELOPMENT AT MANOR FARM BARN, DENVER



AMPHIBIAN AND REPTILE SURVEY

FINAL

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1.0 INTRODUCTION

- 1.1 As part of a planning application for the development at Manor Farm Barns, Denver, Norfolk an ecological assessment was undertaken by Finnemore Associates on behalf of the site owner, Mr Richard Fletcher (dated April 2103). This included an assessment of the adjacent area which included a pond close to the barns.
- 1.2 The report identified the presence of great crested newts *Triturus cristatus* using this pond. It also identified the presence of reptiles (particularly viviparous lizard *Zootoca vivipara*) using the rough grass field to the south.
- 1.3 Part of this adjacent site has been put forward as a potential development site for the new King's Lynn and West Norfolk Local Plan and is scheduled for review at the local plan inquiry that is planned for November 2015.
- 1.4 In order to assist in further development proposals for this site (centred on Ordnance Survey Grid Reference TF 60964 01298 – see area edged blue below), it was determined that additional detailed surveys (in relation to great crested newts and reptiles) would be advisable.

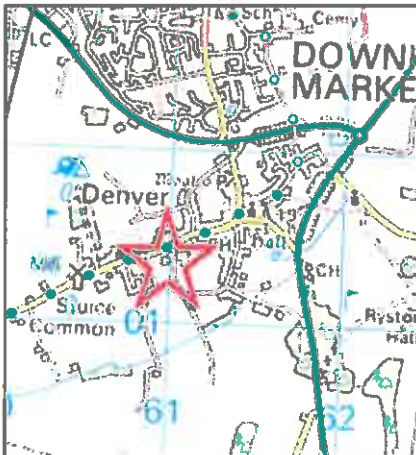


Figure 1 – Location plan
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2015 Ordnance Survey



Figure 2 - Aerial photograph
Imagery © 2015 GeoEye, Getmapping plc,
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- 1.5 Philip Parker Associates have been instructed to undertake these detailed surveys.
- 1.6 The development of the barns (the subject of the original application) already has planning permission. It is not known whether there are any conditions relating to reptiles and great crested newt mitigation associated with this permission.

2.0 LEGISLATION

2.1 Great crested newts

Great crested newts and their habitat (aquatic and terrestrial) are afforded full protection by The Wildlife and Countryside Act 1981 (Section 9, Schedule 5; and as amended) and The Conservation (Natural Habitats & c.) Regulations 1994. It is an offence to:

- 1) Disturb, injure or kill recklessly a great crested newt;
- 2) Disturb or destroy recklessly great crested newt habitat (a breeding site or place of shelter).

2.2 It is important, therefore, to establish the status of great crested newts on or within 500 metres of a development site (*Anon 2001*). If great crested newts are present on a site that has planning permission, a mitigation scheme needs to be developed, in liaison with the local Natural England team. The mitigation scheme needs to ensure the favourable conservation status of great crested newts in the area by minimising direct threats to newts, permitting continued access to breeding ponds and terrestrial habitat, and compensating for any loss of habitat. A European Protected Species Licence (EPS), issued by Natural England, is required for the legal implementation of a mitigation scheme.

2.3 Great crested newt is also listed in the National Biodiversity Action Plan.

2.4 Reptiles

The reptiles occurring in Norfolk, (viviparous lizard, slow worm *Anguis fragilis*, grass snake *Natrix natrix* and adder *Vipera berus*) are all given limited legal protection under part of Section 9 (1) and all of Section 9 (5) of the Wildlife and Countryside Act 1981 (as amended). This means that it is an offence to intentionally kill, injure and offer reptiles for sale.

3.0 SITE DESCRIPTION

- 3.1 The development site as originally proposed covered approximately 0.5ha (shaded area) out of a total field area of c1.5ha (blue line). This is shown on Figure 3 below and illustrated in the photographs.



Figure 3 - An annotated aerial photograph of the proposed development site

- 3.2 The field comprises rough grassland containing a mosaic of tussocky grassland and patches of ruderals (nettle *Urtica dioica* and creeping thistle *Cirsium arvense*) including a pond (Pond P1) at the northern edge of the site. A number of trees are present in the vicinity of the pond. The site is bordered by hedgerows including hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, elm *Ulmus sp*, elder *Sambucus nigra*, ash *Fraxinus excelsior*, dog rose *Rosa canina* and pedunculate oak *Quercus robur*.
- 3.3 An additional pond (P2) was located to the south east of the site in an adjacent garden (although no direct access was possible to this to inspect). The owners were never in during the survey and could not be reached by telephone.
- 3.4 The site is bordered by a housing estate to the west, arable land to the south, a house and garden to the east and common land to the north.



Figure 4 - Pond P1 in mid summer



Figure 5 - A general view of the rough grassland



Figure 6 - A patch of dense ruderals surrounding Pond P1 to the north of the site



Figure 7 - A view of one of the boundary hedgerows bordering the site

4.0 SURVEY METHODOLOGY

4.1 AMPHIBIANS

A combination of survey techniques (bottle trapping, torch lit surveys and egg searches) were used to give a full picture of amphibian activity and to compensate for limitations with any one technique. The use of these techniques on a day-night-day basis, on four occasions, at an appropriate time of year (March to June) should give reasonable evidence of the presence or absence of a particular species of amphibian, with 6 visits required to give a population estimate (necessary for any licence application). It is also possible to undertake a Habitat Suitability Index Assessment (HSI).

4.2 Bottle survey

A two litre bottle trap was used, submerged, with an air bubble and attached to a cane. The number of bottles used on each visit is given in Appendix B.

4.3 It is desirable to place traps in different parts of the water column and to aim for areas of reasonable aquatic vegetation cover. Traps were set in microhabitats considered most likely

to be used by newts – areas of bare pond bottom and amongst aquatic vegetation suitable for egg-laying females. Traps were set in the evening and left overnight, emptying the traps early the following morning, because newts are particularly at risk on warm sunny days in shallow water traps. Traps were checked before 07.00 hours. This is well within the maximum time limits set by appropriate guidelines.

4.4 Torch survey

The torchlight survey involved walking the perimeter of the pond and searching the water with a powerful 1 million candle power lamp. All amphibians seen were identified and counted.

4.5 Egg search

Aquatic vegetation can be searched for newt eggs by walking or wading the shoreline and looking for the characteristic shape of folded leaves on favoured plants for ovipositing. Great crested newts lay their eggs singly on the leaves of submerged vegetation and then the vegetation is folded over the egg to form a protective 'purse'. The eggs of great crested newts can be distinguished from those of the two smaller newt species (smooth *Triturus vulgaris* and palmate newts *T. helveticus*) because they are slightly larger (3 - 4mm) with a pale lemon coloured yolk. The smooth and palmate newt eggs are 2 - 3mm with a white or grey tinged yolk. A female great crested newt can lay 400 + eggs so detection rates for eggs are higher than for adults. The presence of eggs confirms the waterbody as a breeding site. However, it is impossible to obtain any reliable population estimate on the basis of a newt egg count.

4.6 It is desirable for the conservation of the species not to survey for eggs intensively, as the unfolding of vegetation to confirm type of egg will tend to render the egg more vulnerable to predation or to being dislodged.

4.7 Searching for newt eggs is useful between March and July (the peak egg laying period April to June). Not all eggs are viable, so although most eggs will have hatched by June, non-viable eggs will remain on vegetation longer before decaying or becoming predated.

4.8 Habitat suitability Index

The HSI assessment considers 10 habitat factors that could determine the presence of great crested newts. The details of the HSI methodology is given in Appendix A.

4.9 REPTILES

Reptile survey methodology comprises two separate techniques:

- Direct observation and
- The use of artificial refuges ("tins").

4.10 These two methods complement each other and were carried out at the same time.

4.11 Direct observation

Direct observation involved searching favoured habitats for reptiles. They can often be found on sunny, open and disturbed areas or underneath refuges such as logs/rocks/sheets of metal etc.

4.12 Refuges

Artificial refuges were a mixture of corrugated tin and roofing felt, approximately 80cm x 80cm in size. They were placed at a minimum density of 10 refuges per hectare (Gent 1998).

4.13 Search period

The optimum search period is April - May and September although from experience, surveys can be undertaken any time during the summer months as long as weather conditions are appropriate.

4.14 Optimum times for recording reptiles are generally between 8.30am and 11.00am, and between 4.00pm and 6.30pm although this can again vary depending on the weather conditions.

4.15 Air temperature between 9°C and 18°C is thought to be optimal. On cool days, bright sunshine is preferred, whilst on warmer days, hazy sunshine gives the best results. Rainy or windy situations are regarded as unsuitable.

4.16 25 survey mats were placed on the 1st May 2015 in areas of rough grassland within suitable habitat on the site. All the refuges were numbered. These were left in position for 19 days before the surveys commenced. 7 surveys were undertaken in line with the Froglife Guidelines for determining presence and absence. The dates of the survey visits are as follows:

- 19th May 2015
- 22nd May 2015
- 3rd June 2015
- 8th June 2015
- 24th June 2015
- 26th June 2015

5.0 SURVEY RESULTS**5.1 AMPHIBIANS**

A Habitat Suitability Index Assessment of the pond was undertaken. The methodology for the HSI can be found in Appendix A. The results of the HSI can be found in the following table. The HSI for Pond P2 has been taken from the Finnemore Associates report (they did manage to gain access).

TABLE 1 Pond HSI

	Criteria	P1	P2
S1	Location	1.0	1.0
S2	Pond area	0.38	0.2

	Criteria	P1	P2
S3	Pond Drying	0.9	0.9
S4	Water Quality	1.0	0.33
S5	Shade	1.0	1.0
S6	Fowl	0.67	1.0
S7	Fish	1.0	1.0
S8	Pond Count	0.78	0.78
S9	Terrestrial	1.0	0.67
S10	Macrophytes	0.81	1.0
	Total	0.144	0.031
	Tenth Root	0.82	0.70
	HSI Ranking	Excellent	Good

5.2 Ten other ponds were located within 500m of the site, the closest three of which were between 330m and 360m away as shown on Figure 8. The remaining ponds were right on the 500m limit. No access was available to these other ponds to survey or assess their potential for great crested newts to occur but they are all separated from the site by some existing development.

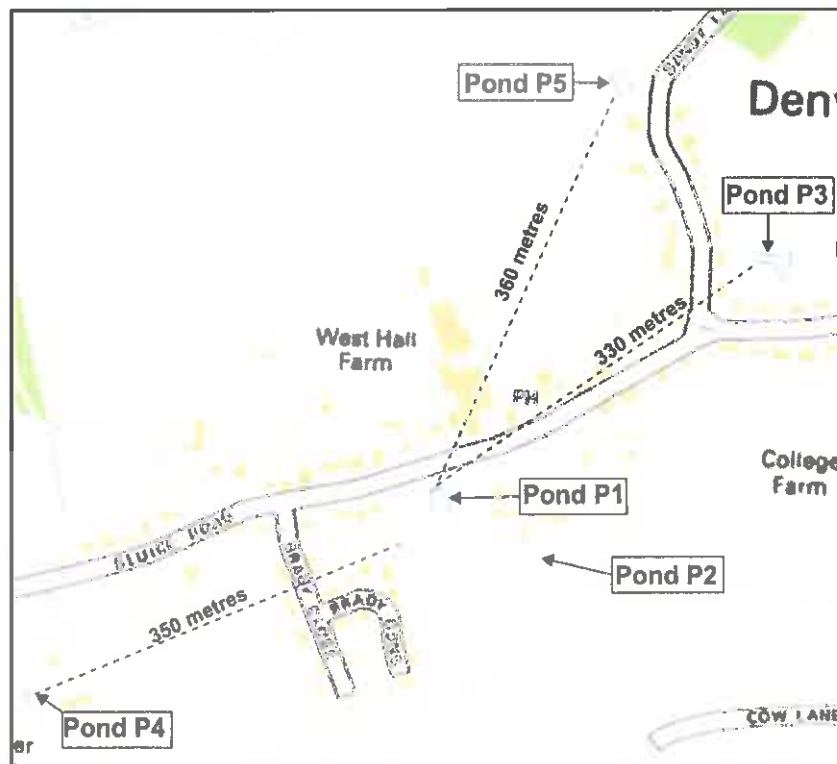


Figure 8 – The location of the closest ponds in the vicinity of the proposed development site

- 5.3 The results of the amphibian survey for Pond P1 can be found in Appendix B and can be summarised as follows. As described earlier, despite attempts, no access could be gained to the garden Pond P2.

TABLE 2

Date	GCN	SN	CF	CT
7/5/15	15	13	0	0
12/5/15	17	12	0	0
18/5/15	66	62	0	0
22/5/15	94	57	0	0
3/6/15	105	55	0	0
8/6/15	126	60	0	0

Key	GCN	Great crested newt
	SN	Smooth newt
	CF	Common frog
	CT	Common toad

- 5.4 The population of great crested newts is large (>100). This is the largest recognised category and is therefore of significant local interest.
- 5.5 Although Philip Parker Associates were unable to gain access to Pond P2, Finnemore Associates did manage a single visit in 2013. No great crested newts were recorded.

5.6 REPTILES

The results of the reptile survey can be found in Appendix C. The results can be summarised in Table 3 below.

TABLE 3

Date	VL	SW	GS	A
19/5/15	1	0	0	0
22/5/15	2	0	0	0
3/6/15	0	0	0	0
8/6/15	3	0	1	0
15/6/15	1	0	1	0
24/6/15	0	0	0	0
26/6/15	0	0	0	0

Key	VL	Viviparous lizard
	SW	Slow worm
	GS	Grass snake
	A	Adder

- 5.7 Given the presence of 2 reptile species, the site is considered to be of moderate local interest for reptile populations.

6.0 IMPACT OF THE PROPOSED DEVELOPMENT

6.1 The original development proposals were shown on Roberts Malloy Associates Drawing 12A which indicated 8 properties on the site. The approximate extent of the area occupied by the development is shown on Figure 9. Of the whole site area of about 1.5ha, the properties would cover about 0.5ha or 33%. The properties were shown to be located in an ark around the pond, with the closest part of the development being only 2m from the pond and a narrow corridor connecting this to the other part of the field.



Figure 9 – An aerial photograph with the approximate development area highlighted in orange (drawing 12A)

6.2 The method statement within the Great Crested Newt Guidelines (Anon 2001) gives a good idea as to the level of development impact that might be acceptable on great crested newts without a licence. The following table is extracted from this method statement:

Table 4 Great Crested Newt Risk Assessment

Component	Likely affect						
Breeding ponds	No effect	Damaged or destroyed					
Land within 100m of any breeding pond	0.001-0.01ha lost or damaged	0.01 – 0.1ha lost or damaged	0.1 – 0.5ha lost or damaged	0.5 – 1.0ha lost or damaged	>1ha lost or damaged		
Land 100m – 250m from any breeding pond	0.001-0.01ha lost or damaged	0.01 – 0.1ha lost or damaged	0.1 – 0.5ha lost or damaged	0.5 – 1.0ha lost or damaged	1-5ha lost or damaged	5-10ha lost or damaged	>10ha lost or damaged
Land 250m – 500m from any breeding pond	0.001-0.01ha lost or damaged	0.01 – 0.1ha lost or damaged	0.1 – 0.5ha lost or damaged	0.5 – 1.0ha lost or damaged	1-5ha lost or damaged	5-10ha lost or damaged	>10ha lost or damaged
Individual great crested newt	Minor disturbance	Significant disturbance	Capture of newts in excavation areas	Obstructing dispersal of newts	Killing or injuring newts		

Green – No offence – No EPS licence required
 Amber – Offence possible – EPS licence might be required
 Red – Offence – EPS licence will be required

6.3 This clearly illustrates that the land closest to a breeding pond (ie less than 100m) is of much greater importance to the newt population than that further away. Anything more than loss of damage of 0.01ha (ie 100m²) of land within 100m would require an EPS licence. To qualify for an EPS licence you would need to achieve the following three tests:

1. It must be in the overriding public interest;
2. There must be no satisfactory alternative
3. There must be no detrimental effect on the local conservation status of the species

6.4 As shown on Drawing 12A, the proposed housing would have had the following negative impacts on the great crested newt population:

- It was within 2m of the pond thus impacting significantly on the pond environment;
- The layout resulted in a considerable hard surfaced area close to the pond used by vehicles. This increased the potential for contaminants to enter the pond having a negative impact on the newts and other aquatic wildlife;
- The layout effectively separated the site into 2, with a narrow 6m corridor connecting the pond and a small strip of vegetation to the larger area to the south. This meant that the pond would effectively be cut off from the terrestrial habitat in which the newts will spend most of the season from the pond in which they breed (the area bordering the site being managed gardens or arable land of less value).

6.5 Assuming that the newts are to be retained on the site (always the best option), the layout as shown on Drawing 12A was almost certainly going to be unacceptable to Natural England as it would have resulted in a detrimental impact on the conservation status of a European Protected Species (one of the three tests it is necessary to satisfy to obtain a licence, see above), It was therefore recommended that the layout of the housing is amended from that shown. A revised layout is shown on Roberts Malloy Associates Drawing 17 and illustrated below which keeps the terrestrial habitat for both reptiles and amphibians in a single block.



Figure 10 – Proposed reptile and amphibian mitigation

6.6 In this design, the original pond would be lost and re-created as a complex of ponds to the south of the housing. The ponds would be lined and take surface run-off from the rising field area to the south. The ponds would be designed to a variety of depths and sinuous margins, and established with locally indigenous wetland plants to ensure appropriate great crested newt breeding conditions.

- 6.7 All of the newt/reptile habitat would be together as a single area which would make it easier to manage and there would be no restriction on the newts moving between the ponds and terrestrial habitat. It would also maintain open access to the agricultural land to the south. This would be a much better solution than splitting the site and is more likely to be acceptable to Natural England.
- 6.8 Translocation of amphibian and reptile populations from the proposed development area will take a full season and the new ponds will require a minimum of 1-2 years to establish to support the invertebrate populations required. Therefore, it may be up to 3 years from planning permission before the development could commence.
- 6.9 The proposed protected great crested newt/reptile protected area provides the chance to enhance the habitat available as follows.

- 6.10 During mid-summer 2015, a survey of the field was undertaken to ascertain how much was optimal foraging habitat (rough grassland) and how much was sub-optimal (dense areas of thistles and nettles). This indicated the majority of the area around the ponds and much of the northern part of the site was now ruderals. It is apparent from the landowner that the area of ruderals has increased significantly since the field ceased to be managed. Given a continued lack of management, it is likely that these will continue to spread across the site reducing the overall value. Ultimately the site could scrub up reducing the value to both amphibians and reptiles further. It is proposed therefore as part of the mitigation plan, a site management plan is prepared to reduce the areas of sub-optimal habitat and maximise the areas of optimal habitat.



Figure 11 - A view of the dense ruderals at the northern edge of the site (around Pond P1)

- 6.11 The existing pond was virtually dry by the end of summer 2015 (see Figure 13). It is understood that the pond used to retain higher levels when water was fed off the adjacent roadside ditch. However, since this practice was prevented in 2013, the levels of the pond have been much lower. This is indicated by the levels of emergent vegetation such as *Typha* present and the retention of only a small area of open water. Given



Figure 12 - Pond P1 virtually dry

a few years at these lower levels, it is almost certain that the pond would dry out annually, meaning that new great crested newts would not be recruited to the population and the population would eventually disappear from the site. The design of the new ponds will ensure that they can be adequately managed, which may require removal of some of the developing vegetation on an occasional basis to maintain the optimum balance of open water and vegetation.

- 6.12 Hibernation opportunities for amphibians are currently limited. Therefore, as part of the development plan, options for creation of new refugia should be instigated. A typical refugia (suitable for both amphibians and reptiles) is shown in the following Figure 14.

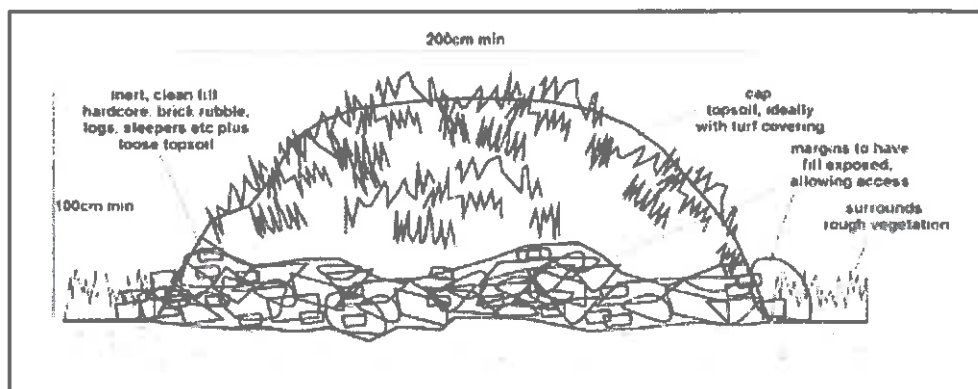


Figure 13 - A typical refugia suitable for both amphibians and reptiles

- 6.13 There will be need to be an agreement for residents of the new housing that the great crested newt area is protected and does not form an extension to their gardens. The protected area will need to be fenced with permanent reptile/great crested newt fencing. This will help to facilitate clearance of the development area (see also section 6.8) and prevent the animals from entering gardens. Any newts caught in the development area will be translocated into the protected area. In addition, appropriate fencing (such as close boarded fencing) will need to be constructed to help deter human encroachment (eg tipping of garden waste and dog walking).
- 6.14 The development could also result in an increase in cats using the site (cats are a significant predator of both reptiles and amphibians). It would be preferable if the sale of the properties prevented cat ownership but it is not certain how enforceable this is.

7.0 SUMMARY

- 7.1 An amphibian and reptile survey of a proposed development site adjacent Manor Farm Barns, Denver has found a large population of great crested newts (centred around an existing on site pond) and a small population of both viviparous lizard and grass snake on the adjacent field. Surveys have identified that the pond appears to be gradually drying out due to a lack of water and management, whilst the field (not grazed in recent years) is becoming courser with development of ruderal vegetation. Without continued management, over a short period of time the field would continue to degenerate, scrubbing up and losing much of the value for both great crested newts and reptiles and ultimately the populations could disappear.
- 7.2 The original proposed development (as shown on Roberts Malloy Associates Ltd Fig 12) would have had a significant impact on the species and in particular the impact on great crested newts (through impact on the pond and separation of the aquatic and terrestrial habitat) and will require an EPS licence. The level of impact is likely to prove unacceptable to Natural England when applying for this licence.
- 7.3 An alternative design has been agreed that results in the loss of the original pond, moving the housing slightly closer to the road, but maximising the block of terrestrial habitat to the south. This would require the creation of new ponds that will maintain water throughout the year and the translocation of the existing amphibian and reptile populations. The ponds would need to be constructed 1-2 years prior to any translocation commencing to allow them to develop invertebrate populations on which the newts would feed.
- 7.4 Other mitigation/enhancement proposals will need to be included within the development proposals.
- Fencing of the retained newt area from the housing;
 - Management of the grassland to remove areas of developing ruderal vegetation and maximize its foraging potential;
 - Creation of refugia at locations within the site.
 - Restrictions to prevent impacts of residents and cats on the protected area.

8.0 REFERENCES

- **Anon, 2001**, *Great Crested Newt Mitigation Guidelines*, English Nature, Peterborough.
- **Froglife 1999**, *Reptile survey: An introduction to planning, conducting and interpreting surveys for snake and lizard conservation*. Froglife Advice Sheet 10, Froglife, Halesworth
- **Gent T and Gibson S 1998** *Herpetofauna Workers Manual* JNCC
- **Herpetofauna Groups of Britain and Ireland (1998)** Evaluating local mitigation/translocation programmes: Maintaining Best practice and lawful standards. HGBI advisory notes for Amphibian and Reptile Groups (ARGs) HGBI c/o Froglife, Halesworth. Unpubl.

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**APPENDIX B
GREAT CRESTED NEWT SURVEY**

Date:	7th May 2015	Temperature:	13 degrees celcius
Visit No.	1	Weather	Dry, 80%cc, still

Pond ID	Eggs	GCN Male		GCN Female		GCN Juvenile		Other Amphibians	Additional Info
		Torching	Bottles	Torching	Bottles	Torching	Bottles		
Pond 1	Y	8	5	7	7			1 Juv GCN under refuge, Torch: 13 Smooth Newt (8 males, 5 females), Bottles: 8 Smooth Newt (3m, 2f)	
Pond 2								NO ACCESS	

Date:	12th May 2015	Temperature:	15 degrees celcius
Visit No.	2	Weather	Dry, 8%cc, F1 W wind

Pond ID	Eggs	GCN Male		GCN Female		GCN Juvenile		Other Amphibians	Additional Info
		Torching	Bottles	Torching	Bottles	Torching	Bottles		
1	Y	7	5	3	9	1		Torching: 12 Smooth Newt (8m, 4f), Bottles: 6 Smooth Newt (3m, 3f)	
2								NO ACCESS	

Date:	19th May 2015	Temperature:	9 degrees celcius
Visit No.	3	Weather	Light rain, 80%cc, F2 SW wind

Pond ID	Eggs	GCN Male		GCN Female		GCN Juvenile		Other Amphibians	Additional Info
		Torching	Bottles	Torching	Bottles	Torching	Bottles		
1	Y	36	6	22	8	6		Torching: 82 Smooth Newt (41m, 21f), Bottles: 9 Smooth Newt (6m, 3f)	
2								NO ACCESS	

Date:	22nd May 2015	Temperature:	12 degrees celcius
Visit No.	4	Weather	Dry, 100% cc, still

Pond ID	Eggs	GCN Male		GCN Female		GCN Juvenile		Other Amphibians	Additional Info
		Torching	Bottles	Torching	Bottles	Torching	Bottles		
1	Y	46		42		6		57 Smooth Newt (34m, 26f)	
2								NO ACCESS	

Date:	3rd June 2015	Temperature:	12 degrees celcius
Visit No.	5	Weather	30%cc, dry, F2 SW wind

Pond ID	Eggs	GCN Male		GCN Female		GCN Juvenile		Other Amphibians	Additional Info
		Torching	Bottles	Torching	Bottles	Torching	Bottles		
1	Y	54		46		5		55 Smooth Newt (38m)	
2								NO ACCESS	

Date:	8th June 2015	Temperature:	10 degrees celcius
Visit No.	6	Weather	90%cc, dry, still

Pond ID	Eggs	GCN Male		GCN Female		GCN Juvenile		Other Amphibians	Additional Info
		Torching	Bottles	Torching	Bottles	Torching	Bottles		
1	Y	58		56		12		60 Smooth Newt (40m)	
2								NO ACCESS	

**APPENDIX B
REPTILE SURVEY**

Survey	Date	Common Lizard	Slow Worm	Grass Snake	Adder	Temperature	Weather	Time
1	19/05/2015	1 (1m)				16	60%cc, F2 W wind	13:00
2	22/05/2015	2 (2f)				15	30%cc, F1 W wind	11:00
3	03/06/2015					18	0%cc, still	10:00
4	08/06/2015	2 (1m, 1f), +1 roaming		1m		17	20%cc, F1 E wind	16:30
5	15/06/2015	1 (1f)		1j		15	0% cc, still	11:00
6	24/06/2015					17	5%cc, still	11:00
7	26/06/2015					18		09:00