

Marnel Park – Accommodating Great Crested Newts within a Residential Development

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Summary

Marnel Park, Basingstoke, is a large residential development, promoted by David Wilson Homes (DWH), which lies adjacent to a great crested newt *Triturus cristatus* breeding pond. Extensive surveys were undertaken to inform an Environmental Statement (ES). The mitigation strategy currently being implemented includes phased relocation of newts, terrestrial habitat creation including two habitat corridors with novel road underpasses, creation of additional breeding ponds, amphibian-friendly road drainage systems and a Sustainable Urban Drainage Strategy (SUDS). Higher numbers of newts were encountered during the relocation process than expected from the surveys undertaken and habitat present. The findings also contradict recent research that relocation operations beyond 250 m of a breeding pond are hardly ever appropriate. Monitoring to date has shown no detrimental effect on the newt population, which may also be expanding, and that the habitat created is proving successful.

Introduction

The Marnel Park development site extends to some 32.2 hectares on the northern edge of Basingstoke. The site lies adjacent to Popley Ponds Site of Importance for Nature Conservation (SINC) which supports a breeding population of the protected great crested newt. Land on three sides of the pond has already been developed as residential housing. The Marnel Park site is allocated for residential development in the adopted Basingstoke and Deane Borough Local Plan 1996-2011 (July 2006). Land to the south-west of the site is also allocated for residential development and is currently being developed.

Prior to development, the site comprised predominantly arable land, with mature hedgerows on the eastern and northern boundaries of the site. Marnel Dell, a mature beech woodland, lies at the western corner of the site. Other than the hedgerows, the site did not appear to provide high potential as terrestrial habitat for great crested newts.

Planning Background

The Landmark Practice was commissioned by DWH in 2000 (prior to the publication of English Nature's Great Crested Newt Mitigation Guidelines in August 2001). A planning application and ES for the Marnel Park development, was submitted in October 2001. Following a Regulation 19 request, a Supplementary ES was submitted, giving additional information about the great



Great crested newt mitigation strategy providing high quality habitat and connectivity to open countryside

crested newt population of Popley Ponds and an assessment of the impact of the development on their habitat. Further work undertaken in consultation with English Nature to address the Regulation 19 request included:

- terrestrial, night time torchlight surveys during spring migration;
- bottle trapping of Popley Ponds and Kiln Farm Pond, approximately 2 km west of Popley Ponds;
- a terrestrial habitat suitability survey within a 1 km radius of Popley Ponds;
- suitability surveys of ponds in Carpenters Down Woods and to the north-west of Kiln Farm for their potential to support great crested newts (a few of these being further surveyed to assess whether or not they supported breeding populations of great crested newts);
- preparation of a newt mitigation strategy; and
- an assessment of the hydrogeology of the site, with particular reference to the potential impact on the hydrology of Popley Ponds.

A Flood Risk Assessment was undertaken in parallel to this, detailing the proposed SUDS for Marnel Park.

An ES Addendum was subsequently prepared in February 2004. This followed a second Regulation 19 request for additional information about great crested newt mitigation, a revised Master Plan following alterations to the development and submission of a great crested newt management plan.

Basingstoke and Deane Borough Council resolved to approve the outline planning application on 10 March 2004, subject to the completion of a S106 Agreement to include a Protected



Raising public awareness at Marnel Park

Species Management Plan. Outline planning permission was granted on 10 June 2004.

Survey Findings

The terrestrial habitat surveys found 34 adult and 54 juvenile great crested newts over 15 visits. Numbers varied between zero and 18 individuals (maximum of seven adults) and averaged approximately six newts (two adults) per visit. The surveys focussed on the hedgerows as likely dispersal corridors for the newts and the majority of the records were within 12 m of the hedgerows, mostly within 2 m. A few individuals were recorded up to 20 m from the hedgerow and up to 400 m from the breeding pond.

Bottle trapping at Popley Ponds produced a maximum of 29 adult great crested newts, equating to a medium sized population (English Nature 2001). It was acknowledged, however, that because potential egg-laying material was present throughout the pond and not concentrated around the margins, the standard survey method may underestimate the population size present. Accessibility problems also resulted in up to a fifth of the pond margin not being trapped. Poor environmental conditions during the spring migration, with barely any rain during April, may also have resulted in low numbers of newts reaching the breeding pond.

A count of 82 adult newts was recorded in 2003 by the Hampshire Amphibian and Reptile Group but using a higher density of traps throughout the pond, although still within the medium population size class. Surveys of Kiln Farm pond recorded a maximum of 16 adult newts, also representing a medium sized population.

The terrestrial habitat suitability survey revealed that, other than Popley Ponds SINC and its associated dense scrub habitat (approximately 1 ha), the surrounding habitat within 500 m is predominantly residential (approximately 74%), the remainder being arable. Just beyond the 500 m radius lie Basing Forest to the north, connected to Popley Ponds by a strong hedgerow and Marnel Dell woodland to the west.

The pond survey of the wider landscape identified two ponds with potential to support breeding great crested newts, and breeding was confirmed at both. Both ponds were at least 1 km from Popley Ponds and considered unlikely to form part of a metapopulation.

The hydrological studies concluded that the development of the Marnel Park site would not have a significant impact on the quality of the water source of Popley Ponds, the ponds being primarily fed by the underlying chalk aquifer.

Mitigation Strategy

The mitigation strategy, developed in consultation with English Nature, includes the creation of high quality terrestrial habitat

(species-rich grassland and scrub) with hibernacula and incorporates two 40 m wide habitat corridors through the site linking to open countryside beyond. To accommodate required site access, the corridors include novel underpasses beneath roads, two within the eastern corridor and one in the central corridor. These comprise a series of four, two metre by one metre deep box culverts, base dressed with loose earth, rubble and logs, and set at different heights relative to each other to provide differing moisture levels. The culvert system was designed due to the lack of evidence that great crested newts use standard amphibian tunnels, and their effectiveness is being closely monitored. The newt habitat is being created on a phased programme in advance of each phase of development, following Reserved Matters approval and under European Protected Species licences, so that the habitat is established prior to each phase of relocation and development.

The required road accesses were designed to minimise the breach of the eastern hedgerow, the access nearest the pond being modified from a roundabout to a simple T-junction. Amphibian friendly road drainage systems have been employed (channel drainage) with dropped kerbs to avoid trapping any newts within the road network. The scheme also incorporates SUDS to minimise any hydrological impact on the breeding pond.

Two new breeding ponds will also be created as enhancement measures, with the aim of establishing a link to the known breeding colony approximately 2 km west of Popley Ponds. The two balancing ponds will also be enhanced to provide further aquatic habitat.

Information regarding the importance of the great crested newt population, mitigation strategy and responsibility for management of the newt habitat is being provided to residents in Home Buyers' packs. Interpretation boards are also being provided at strategic points within the newt habitat. The development features a great crested newt mosaic, designed by local school children and the internationally-acclaimed artist Julieann Worrall Hood in a project sponsored by DWH.

Implementation

Development at Marnel Park commenced in August 2004. The eastern habitat corridor, including the two access points into the site, was created in advance of development commencing. The Phase II development area was left set-aside as interim newt habitat, and the Phase III/IV area remained under arable cultivation until 2006, the year prior to commencement of development there.

The eastern corridor was scheduled to have been completed in time for the 2005 spring migration. Due to the longer than expected relocation resulting from the unprecedented number of great crested newts encountered, and to delays in approval of the public highway works, the corridor works were not completed until April 2006. In the interim, an assisted migration



One of the three novel newt underpasses at Marnel Park

of great crested newts was undertaken during the 2005 and 2006 spring migration periods by pitfall trapping newts along the northern boundary of the development and releasing them to the south. The area of newt habitat immediately to the north of Popley Ponds (the breeding pond) was made available to the newts in July 2005, thereby providing additional terrestrial habitat.

Relocation of great crested newts from the central corridor and associated access corridor commenced in July 2006, to enable construction of the second habitat corridor. The central corridor was due to have been completed by the end of March 2007, but delays in ordering the culverts and consequent delays in undergrounding the electricity cables meant that this was not achieved. In order to speed up the establishment of the corridor and keep the development on track, a species-rich turf was sourced and approved for use by Natural England. The corridor was completed and made available to great crested newts in July 2007.

Relocation of newts within the Phase II and III/IV development areas commenced following completion of the central habitat corridor.

The results of each phase of relocation are tabulated below.

Phase	Timing ¹	Duration (days) ²	Adults relocated	Juveniles relocated
Phase I	Aug-Nov 2004 Mar-May 2005 ³	93	1,199 / 137 per ha	2,568 / 293 per ha
Central corridor	July-Sept 2006	53	14 / 3 per ha	1
Phase II	July-Nov 2007	86	259 / 96 per ha	2,380 / 881 per ha
Phase III/IV(pt)	Aug-Nov 2007	86	8	301 / 91 per ha
Phase IV(rem)	Feb-May 2008	69	12 / 3.2 per ha	39 / 10.5 per ha

¹ Relocation was only undertaken when conditions were deemed suitable according to English Nature (2001).

² Excluding 'unsuitable' days, Phase II took a total of 116 days, Phase IV (pt), 97 days and Phase IV (rem) 74 days.

³ Translocation in one compartment continued in spring 2005.

Each relocation phase took much longer than anticipated. English Nature (2001) advised a minimum of 60 days for a medium population size, as identified at Popley Ponds, rising to a minimum of 90 days for a high population.

The numbers of newts encountered during the relocations were also higher than anticipated. The baseline maximum adult count recorded of 29, would suggest an actual population size of between 96 and 1,450 adults (the adult count representing between 2 and 30% of the population, English Nature, 2001). 1,199 adults were captured from the Phase I area alone, which represents 11% of the terrestrial habitat available to the newts within 500 m (approximately 20.15 ha arable, the remaining 58.4 ha being residential). It is noted above, however, that it is considered that the baseline population size class may have been underestimated.

The density of newts encountered was also high. Published data for a site in Leicestershire (Oldham, 1994) gave the following densities of adult newts from different habitats: hedgerow, 250 per ha; garden, 175 per ha; pasture, 95 per ha; and arable, 20 per ha. The density of adult newts captured from the phases nearest the breeding pond (Phases I and II) were 137 and 96 per ha respectively. Newts were encountered throughout the field, well away from any hedgerows.

The above findings contradict popular opinion that arable fields are of low value to great crested newts. Analysis of National Amphibian Survey data (Oldham et. al. 2000) showed that newts occurred more frequently on land with low intensity use (e.g. scrub and woodland) than on pasture and arable. The use of pesticides on arable land can reduce terrestrial prey densities and ploughing, harrowing, etc. may inhibit dispersal, although hedgerows and woodland can provide dispersal, foraging and hibernation opportunities (Langton et. al. 2001). Recent analysis of mitigation projects involving trapping away from ponds (Cresswell and Whitworth 2004) showed that captures from woodland and to a lesser extent, boundary features (hedges, woodland/scrub edges, ditches, etc.), were consistently greater than other habitats with the effect magnified nearer to ponds. These data also indicated, however, that arable farmland with a high density of ponds can support substantial great crested newt populations.

Significant numbers of great crested newts were encountered between 250 and 500 m from the breeding pond - a total of 538 newts (163 newts per ha) for the Phase I area; 309 newts (predominantly juveniles) in the Phase III/IV (part) (92.5 per ha); and 51 newts (13.7 newts per ha per ha) in Phase IV (rem). This is contrary to the findings of Cresswell and Whitworth (2004), where analysis showed only small numbers of newts captured using drift fencing away from breeding ponds. Analysis of recorded captures were greatest within 50 m of a breeding pond with few captures made beyond 100 m, although a small number of projects recorded some captures on drift fences across linear features 150-200 m from breeding ponds. It should be noted, however, that very few of the projects analysed fully compartmentalised exclusion areas as described in English Nature (2001). The report concluded that at distances greater than 100 m from breeding ponds, there should be careful consideration as to whether attempts to capture newts are necessary, or the most effective option, to avoid incidental mortality and that, at distances greater than 200-250 m, capture operations will hardly ever be appropriate.

Monitoring

The peak counts of great crested newts recorded during population size class assessment surveys since 2003 is given in the table below. The highest count of 59 was recorded during the year following the commencement of development. The data in subsequent years would appear to show a decline, until 2008 when a maximum of 51 newts was recorded. From 2007, great crested newts have also been recorded in the balancing pond, with a peak count of 90 in 2008. It would appear that the development is not having a detrimental effect on the population, which may even be increasing. The combined data from Popley Ponds and the balancing lagoon represents a large population (English Nature 2001) as reflected by the relocation data.

Maximum Annual Counts of Great Crested Newts from Popley Ponds and the Balancing Lagoon.

Year	Popley Ponds	Balancing Lagoon
2003	29	-
2005	59	-
2006	30	-
2007	20	26
2008	51	90

Success of the road crossings, road drainage features within the vicinity of the road crossings, and use of the corridors are being monitored by a combination of direct observation on suitable nights during spring migration, pitfall trapping and deployment of artificial refugia. Twice-weekly evening visits



Belly patterns are recorded to track movement of newts

are undertaken after sunset during February-April, dependent on suitable weather conditions. The length of the corridors, the underpasses and the road drainage features within the immediate vicinity of the underpasses are systematically searched by torchlight. The belly patterns of individual newts encountered are recorded by flash digital photography, together with their location to enable tracking of the movement of individual newts. Drift fencing and pitfall traps are also placed at the southern ends of each underpass (the direction of Popley Ponds) and checked at least once daily in accordance with English Nature (2001). Any newts captured in pitfalls are released into dense vegetation within the newt corridors on the opposite side of the fencing. Great crested newts captured during the annual population size class assessment are also photographed for belly pattern analysis to boost capture rates and to confirm movement between the corridors and breeding pond.

Monitoring of the eastern corridor has shown that great crested newts are utilising the entire length of the corridor and newts have been shown to pass through the culverts in both directions. In 2008 the first newt passing through both the northern and southern culverts was recorded.

Greater numbers of great crested newts were recorded from the eastern corridor in 2008 compared with previous years and increased numbers were also recorded passing through the northern and southern culverts. The eastern corridor is also proving attractive to other amphibian species with both smooth and palmate newts being recorded. Numbers of common frogs encountered have increased as has breeding activity. The first evidence of toads attempting to breed was recorded in 2008 although no spawn was found.

Monitoring is due to continue for a minimum of 10 years following establishment of the newt habitat, balancing pools and new ponds.

Conclusions

- Caution should be exercised when interpreting population size class assessment data (survey data from the breeding pond indicated a medium population size. However, the relocation data and subsequent monitoring suggests a high population).
- The Marnel Park relocation data has shown that arable sites can support high populations of great crested newts.
- A significant number of newts were captured between 250 and 500 m of the breeding pond, even well out into the open field and caution should be exercised in interpreting the findings of Cresswell and Whitworth (2004).

- Four years of post commencement monitoring data has shown that the development is not having a detrimental effect on the great crested newt population and the population may even be increasing.
- Great crested newts are using the entire length of the corridor, have been shown to pass through the culverts in both directions and to pass through both culverts in the eastern corridor towards Popley Ponds. The population has also quickly exploited new breeding habitat, within one year of it being available. Greater numbers of newts were recorded within the eastern corridor in 2008 compared with the previous year and it is also proving attractive to other amphibian species suggesting that the mitigation has been successful.

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