

Leicester, Leicestershire and Rutland
Great Crested Newt Survey Protocol

Leicestershire County Council Planning Ecology Service
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1. Background

1.1 International, national and local conservation status

The great crested newt has suffered a major decline across Britain over the last century, probably due to agricultural intensification and development causing the loss of field ponds and other habitats that support newts. A similar decline has occurred throughout Europe.

Despite the decline, great crested newts are still fairly widespread in England, and we are still considered to support a significant number of all the great crested newt ponds within Europe. Great crested newts may have found respite by colonising the new ponds that frequently develop on post-industrial land and 'brownfield' sites, many of which are known to support healthy populations of great crested newts. However these colonies are particularly vulnerable to harm as a result of re-development of these sites.

Given the great losses of ponds in the counties, it is not surprising that great crested newts, although still widely distributed across Leicestershire and Rutland, are nowhere near common and are declining significantly.

1.2 The law and licensing

Because of its decline in Europe, the great crested newt is listed in Annex IV of the European Habitats and Species Directive, and both the individual newts and their habitats are fully protected by international and UK law.

In brief, it is illegal to

- intentionally kill or injure a great crested newt, at any life stage (including eggs)
- intentionally or recklessly damage, destroy or obstruct access to its habitat
- intentionally or recklessly disturb a great crested newt

Offences can carry unlimited fines and imprisonment up to six months, for each offence.

In some circumstances, a licence allowing exceptions to the above can be obtained from Natural England. Natural England can grant licences for the purpose of '*preserving health or public safety or other imperative reason of over-riding public interest including those of a social or economic nature and beneficial consequences of primary importance in the environment*'. A licence cannot be granted unless there is no satisfactory alternative, and the action authorised must not be detrimental to the maintenance of the population of great crested newts at a favourable conservation status in their natural range.

If disturbance or harm to great crested newts is unavoidable – i.e. there is no satisfactory alternative - mitigation must be made to ensure that the population retains its conservation status.

<https://www.gov.uk/government/collections/great-crested-newt-licences>

1.3 Great crested newts and the planning process

When making decisions on planning applications, the impact of the development on European protected species is a material consideration. Planning authorities are therefore required by law to check that a development doesn't harm or disturb great crested newts or their habitats (see ODPM Circular 06/05, paragraph 99).

For developments that could impact on great crested newts, planning authorities need information on the impacts of the development on great crested newts to be submitted **up-front** with the planning application.

Please note that a great crested newt assessment cannot be covered by a planning condition. This is in accordance with paragraph 99 of ODPM Circular 06/2005: Biodiversity and Geological Conservation – Statutory Obligations and their Impact within the Planning System.

The information required is either a survey report and mitigation recommendations, carried out by a suitably qualified, licensed and experienced ecologist, or entry into a District Level Licensing (DLL) scheme for great crested newt. Information about DLL schemes is provided in section 2 of this protocol. The situations for when a report is needed are covered in section 3, and the required content of the report is covered in detail in sections 4, 5 and 8 of this protocol.

Great crested newt action flowchart

The flowchart below offers a summary of what information and actions may be required regarding great crested newt in support of a planning application. This is for guidance only and we reserve the right to ask for a great crested newt survey and/or mitigation if we consider this is required. The flowchart is summarised on the following page for users of screen reader technology.

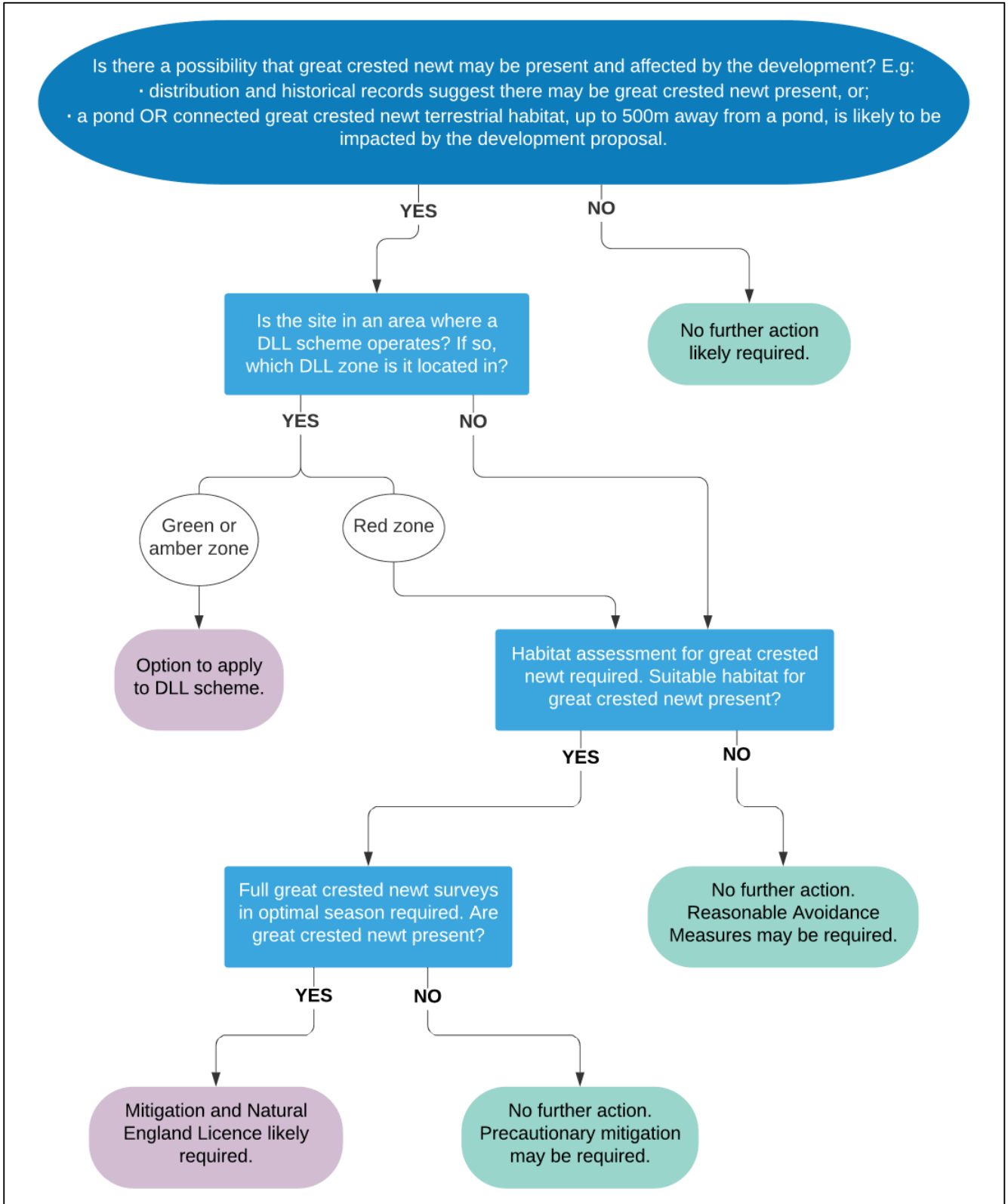


Figure 1: Great crested newt action flowchart.

Text summary of 'great crested newt action flowchart':

If there is no possibility that great crested newt may be present and affected by the development, then no further action is likely required. Examples of factors that may suggest great crested newt are present include the following: distribution and historical records suggest there may be great crested newt present, or; a pond or connected great crested newt terrestrial habitat, up to 500 metres away from a pond, is likely to be impacted by the development proposal.

If the site is in an area where a DLL scheme operates, and within a green or amber risk zone, then there is the option to apply to a DLL scheme.

If the site is not in an area where a DLL scheme operates, or is within a DLL red risk zone, then a habitat assessment for great crested newt required. If suitable habitat for great crested newt is not present, then no further action is likely required, although in some cases Reasonable Avoidance Measures may be required.

If suitable habitat for great crested newt is present, then full great crested newt surveys in the optimal season are required.

If great crested newt are found to be present, then mitigation and a Natural England licence is likely required.

If great crested newt are found to be absent, then no further action is likely required, although in some cases precautionary mitigation may be required.

2. District Level Licensing (DLL) schemes for great crested newt

2.1 About the Scheme

If you are a developer proposing to develop land, you can pay to join a DLL scheme for great crested newt. If you join a scheme, you do not need to:

- carry out your own surveys for great crested newt
- plan and carry out mitigation work for great crested newt

DLL schemes are mitigation licensing schemes for great crested newt granted at a local authority level or wider scale across parts of England. You can apply to join a Natural England-led scheme if you have a development proposal in Leicestershire (all districts except Blaby) or Rutland.

If a district level licensing scheme does not operate in your area or your development does not qualify, you must apply for an individual licence to carry out work that affects a great crested newt.

Natural England have mapped 'risk zones', to assess the likely impact of proposed development and to predict suitable habitat in which compensation can be targeted. There are three risk zone categories:

- Red zones – These zones contain key populations of great crested newt, which are important on a regional, national or even international scale. **DLL is not available in red zones and site survey and a mitigation licence would be required for any development within this zone.**
- Amber zones – These contain main population centres, habitats and dispersal routes for great crested newt. Development with a significant land take in these zones would be expected to have a high impact on great crested newt.
- Green zones – great crested newt are sparsely distributed in this zone and development would be expected to have a low impact here, though may still pose a risk to great crested newt.

2.2 How much does it cost?

You will pay:

- Enquiry fee of £684 (£570 + VAT)
- Conservation Payment set out in your scheme agreement
- Licence fee of £690 (exempt from VAT)

Instead of carrying out site-specific mitigation and compensation, developers choosing DLL will make a 'Conservation Payment' which will be used to fund a net increase in habitat for great crested newt across the landscape. The level of payment required will depend on:

- The number of ponds impacted;
- The risk zone in which the site is located; and/or,
- Whether great crested newt presence has already been determined through site specific survey.

2.3 How to apply?

Developers can choose to make a financial contribution towards the scheme instead of applying for a separate licence or carrying out detailed surveys of their own, unless the site is within a red zone. For detailed information and to apply for the scheme go to:

<https://www.gov.uk/government/publications/great-crested-newts-district-level-licensing-schemes>

Once you have submitted your enquiry form and paid the enquiry fee, Natural England will send you an Impact Assessment and Conservation Payment Certificate document. This is your agreement to join the

scheme. If you accept the terms and conditions, sign the agreement and return it to Natural England. Natural England will countersign the agreement and return it to you. **You must include a copy of the countersigned agreement with your application for planning permission to show you have agreed to join the scheme.**

You will then apply for your great crested newt district level licence and pay your conservation payment. You can start work as soon as you receive your licence. Natural England will invoice you for the licence fee.

You must not start development work until you receive your licence from Natural England.

You may need to apply for a licence to carry out mitigation works that affect other protected species if they're present on your site.

3. When is a survey needed?

3.1 If a developer cannot or has chosen not to use the DLL scheme, a **great crested newt survey** is required when:

- distribution and historical records suggest there may be great crested newt present, or;
- a pond OR connected great crested newt terrestrial habitat, up to 500m away from a pond, is likely to be impacted by the development proposal.

This is because great crested newts live in ponds mainly in their springtime breeding season. For most of the rest of the year they live on land, and will disperse over a 500m radius of land around their breeding pond, if suitable habitat exists.

3.2 Survey work can include:

- terrestrial and aquatic habitat surveys
- presence or absence surveys, which can utilise eDNA sampling
- population size surveys of water bodies

Usually a survey should start with an assessment of the habitats on site and in the surrounding area. This includes assessment of both terrestrial habitats and ponds. Assessment of ponds may utilise the Habitat Suitability Index (HSI) as an aid to determine how suitable ponds are for great crested newt and whether further surveys may be required. It should be noted that HSI should not be relied upon fully for determining whether further surveys are required. See **Section 4** for guidance on HSI assessments.

3.3 Survey data provided by the developer should be less than 2 survey seasons old, otherwise repeat surveys may be required.

3.4 “**Flexible approach**”: Surveys should meet industry standards, unless there is sufficient information to assess the application without this data in line Natural England’s ‘flexible’ policies (2016):

<https://www.gov.uk/government/consultations/wildlife-licensing-comment-on-new-policies-for-european-protected-species-licences>

Policy 4 - Appropriate and relevant surveys where the impacts of development can be confidently predicted
Natural England will be expected to ensure that licensing decisions are properly supported by survey information, taking into account industry standards and guidelines. It may, however, accept a lower than standard survey effort where: the costs or delays associated with carrying out standard survey requirements would be disproportionate to the additional certainty that it would bring; the ecological impacts of development can be predicted with sufficient certainty; and mitigation or compensation will ensure that the licensed activity does not detrimentally affect the conservation status of the local population of any EPS.

3.5 **Impacts that could affect great crested newts include:**

- Infilling, draining, dredging or alterations to pond
- Changes in local hydrology or water quality that could affect water levels or water chemistry in ponds
- Changes in land management up to 500m around ponds
- Removal of or damage to good newt habitats within 500m of pond – e.g. hedges, rough grassland, mature gardens, woodland, ditches (see 3.5 below)
- Creation of barriers to newt dispersal within 500m of a pond, or loss of habitat connectivity around a pond (see 2.4 below)
- Temporary disturbance during construction

- Long-term post-development disturbance due to change in land-use
- Disturbance by people (including their dogs etc) in/near new housing developments
- . . . and anything else that could harm or disturb a newt or change the aquatic or terrestrial habitat in and within 500m of a pond.

3.6 How far from the pond does the potential impact have to be?

- Minor developments: all ponds within the site or a 100m zone around the proposal site boundary, unless separated from the application site by a barrier that amphibians cannot cross (see below).
- Major developments: all ponds within the site or a 500m zone around the proposal site boundary, unless separated from the application site by a barrier that amphibians cannot cross (see below).

(Note: A major development is one that is more than 10 dwellings or more than 0.5 hectares or for non-residential development is more than 1000m² floor area or more than 1 hectare)

3.7 What are barriers to newt movements?

- Main roads – i.e. Motorways, trunk roads, dual carriageways, and busy A roads and B roads. Lanes and smaller roads are not a barrier to dispersal, as amphibians will cross them in wet weather. Note that heavy rush-hour and daylight traffic is probably not relevant, as amphibia usually disperse after dark, but heavy night-time traffic would be a problem. Note that amphibians may use culverts to cross under wide roads, as long as the culvert has shallow slow-flowing water, or a muddy margin to the flowing water.
- Rivers and larger brooks. Amphibians generally do not like running water. However, they will inhabit slow-flowing watercourses such as backwaters and canals.
- An expanse of bare ground or hard surface, such as compacted soil, concrete or tarmac. Note that amphibia like the loose rubble substrates and tips found on many post-industrial sites - such as broken brick, broken concrete, hardcore, etc. Amphibia will also be found under slabs.
- Arable land. Amphibians do not like open dry substrates, such as recently ploughed land. However, arable land can be used by amphibia if damp, vegetated or fallow; and amphibians will use boundary hedges, other boundary features and headlands.
- Regularly close-mown amenity grassland. However, amphibians may disperse across this habitat in damp conditions after dusk.

3.8 What are good terrestrial habitats for newts?

- Hedges
- Dry stone walls with well vegetated bases
- Ditches and culverts - dry, damp or slow-flowing. Amphibians do not like ditches with strongly flowing water.
- Rough grassland, wet grasslands, tall grass and herbs, hayfields except after cutting, grazing land unless overgrazed
- Scrub and woodland, deciduous and coniferous
- Gardens and allotments. Many of the features found in these cultivated areas are good for amphibians – rubbish heaps, compost bins, dilapidated sheds, woodpiles, slabbed areas, shrubberies, garden ponds, damp areas around water butts, etc.
- Ruderal habitats, post industrial land and rubble banks, etc.
- Railway lines. Amphibia may find heavily-used mainlines with multiple tracks to be a barrier, but most other railways have ideal bank side habitats, often with damp ditches, and the permanent way is good foraging habitat.

4. Pond surveys in the Great Crested Newt breeding season

4.1 General points:

- If it is considered possible that great crested newts are present in a pond that will be impacted directly by the development, or associated terrestrial habitat will be affected, then full surveys of the pond are required in order to determine presence/absence, and population size if present.
- Pond surveys, to determine GCN presence/absence and population size, should be carried out between mid-March and June. Multiple survey visits are required (a minimum of four and a maximum of six), with at least half of these visits during the period between mid-April and mid-May.
- At least three different approved survey methods should be deployed, e.g. egg search, torching and bottle-trapping.
- Once great crested newt eggs are recorded in a pond, breeding is confirmed and egg searches should be terminated for that pond, to prevent further eggs being exposed to environmental effects unnecessarily.
- Seasonal variation (dry spring/wet summer, cold spring etc.) needs to be taken into account.
- The methodology approved by Natural England should be used.
- If survey methods that involve potentially trapping, handling or disturbing great crested newts are used, the surveyor MUST hold an appropriate licence from Natural England. Carrying out a survey without the licence could result in a criminal offence.
- Other species of note (e.g. Water Shrew) and other amphibians found whilst surveying should be noted as well as great crested newts.
- Surrounding habitat should be assessed when the survey is carried out.
- A clear plan showing locations of ponds surveyed should always be provided; the ponds should have names or reference numbers that are clearly linked to the survey results. To ensure that the right pond is identified, 8-figure grid references (e.g. in the format 'SK12345678') should be given for each pond surveyed. The plan should overlay an aerial photo or OS map base.
- An example table showing how survey data should be presented in the report is shown at Appendix A.

Table 1: Great Crested Newt survey times

Survey method	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Bottle-trap		+	●	●	●	+						
Egg search			+	●	●	●	+					
Torching		+	●	●	●	●	+	+	+			
Netting		+	●	●	●	+	+	+	+			
Pitfall		+	●	●	●	+	+	+				
Refuge search			+	●	●	●	●	●	●	+		

● = optimal survey time

+ = sub-optimal survey time/depends on seasonal variation

(ref: Great Crested Newt mitigation guidelines)

4.2 Environmental DNA (eDNA)

DNA from great crested newts can persist in their pond for up to 3 weeks, and specialist laboratories are now able to test for its presence, as long as water samples are taken according to strict methodology. Samples must be collected between mid-April and late June. This may be a useful way of scoping out large numbers of ponds, or doing a simple presence/absence survey late in the season. eDNA can only be done in the great crested newt breeding season, and it cannot be used to assess population size, so if great crested

newts are found to be present using this method and mitigation is required to allow the development, you are likely to need to do further surveys using other methods, such as torch surveys or bottle-trapping.
<http://www.freshwaterhabitats.org.uk/projects/edna/>

5. Habitat Suitability Index assessment (HSI)

5.1 General points:

- The only methodology LRERC accept for assessing the suitability of ponds for great crested newt is the **Habitat Suitability Index** assessment or **HSI** (Oldham *et al*, 2000). We recommend that you obtain a copy of the full paper, rather than just the appendices or a summary, as the text provides much useful guidance on assessment of the factors. This can be found at this link: <https://www.arguk.org/info-advice/advice-notes/9-great-crested-newt-habitat-suitability-index-arg-advice-note-5/file>
- The HSI methodology involves mathematically combining 10 values derived from an assessment of 10 factors of the pond's physical environment, to produce a score.
- Some of the HSI factors are absolute values, but most involve a degree of subjectivity, and it is possible to obtain a significantly different final score by a relatively slight difference in the assessment of one or more of the factors. The method should therefore be used with caution, and a precautionary approach should always be taken. Further guidance on this is given in 4.2 below.
- The assessment should only be done by a skilled and experienced ecologist, with a good understanding of great crested newt behaviour and habitat preferences.
- It is not necessary for the surveyor to hold a Natural England licence.
- On the basis of the HSI score, the pond is assessed as having 'poor', 'below average', 'average', 'good', or 'excellent' suitability for supporting Great Crested Newts, according to the scale of categories developed by Lee Brady (see ARG advice note 5 and Table 5 below).
- An assessment of '**average**' or **above** prompts the need for further surveys during the breeding season, in order to ascertain without reasonable doubt whether a great crested newt population is present, and if so of what size and significance. See section 3 above.
- An assessment of '**below average**' may prompt the need for precautionary working methods to be used when implementing the development (see 7 below)
- An explanation for the assessment of a factor should be given if the assessment has been made subjectively or on the basis of judgement rather than evidence.
- C. Sellars, 2010 provides further research on the reliability of the HSI methodology for predicting great crested newt presence.
- Guidance on assessing some of the factors is given at Appendix B.
- An example table showing how HSI data should be presented in the report is shown at Appendix C.

Please note that LRERC will not accept HSI assessments without explanatory notes/rationale for subjective factors.

6. When is follow-up survey work needed after an HSI assessment?

- 6.1 If the pond scores ‘average’, ‘good’ or ‘excellent’ on the HSI assessment, in most circumstances a suite of follow-up surveys for GCN in their breeding season, in accordance with national guidelines and Section 3 above, will be needed.

Table 5: Categorising HSI Scores (the Lee Brady system)

HSI score	Pond suitability for great crested newts
Less than 0.5	Poor
0.5 – 0.59	Below average
0.6 – 0.69	Average
0/7- 0.79	Good
More than 0.8	excellent

Ref: ARG-UK Advice note 5

- 6.2 If the score is ‘**below average**’ or ‘**poor**’ the Ecology unit of LCC will scrutinise the HSI assessment, and may seek clarifications on some points.
- 6.3 If the agreed score is ‘**below average**’ you may be required to carry out precautionary methods of working when implementing your development (this depends on the nature, scale, location, relationship to pond and possible impacts of your development). This is just in case great crested newts are present. These may be the subject of a planning condition (see 7 below). We are aware that great crested newts have been recorded from ‘**below average**’ ponds in Leicestershire and Rutland, although this is infrequent (also see Oldham 2000 and Sellars 2010 on this issue). You may therefore still be asked to do further surveys in the great crested newt season if it is felt that the location of the pond, the nature of the development, the nearby presence of a known great crested newt pond or some other factor creates a greater risk to newts should they be present, and which cannot be mitigated by a precautionary working method.
- 6.4 If the agreed score is ‘**poor**’ it is likely that no further survey will be required.

6.5 Submission of follow-up surveys up-front with planning applications

A suite of follow-up surveys will only be possible beginning in February of the following breeding season. As survey results must be submitted up-front with the planning application, it may be necessary to withdraw the application until the follow-up surveys have been done. Failure to do this might result in refusal of the application on the grounds that insufficient evidence has been submitted regarding the impact on protected species.

If, in the opinion of LCC Ecology, the impacts of an **outline** planning application can be completely mitigated through ‘Reasonable Avoidance Methods’ (RAM – see 7.1 below), without the need for a EPS licence, the great crested newt surveys can be deferred, but **MUST** be submitted upfront with the detailed or reserved matters application.

7. How long is survey information valid for?

Pond surveys that find evidence of great crested newts are only valid for two survey seasons, or until another different application is made, whichever is the shorter period.

However, please note that Natural England may require additional surveys if the development needs a European Protected Species licence (see 1.2 above).

A survey season is during the great crested newt breeding season (see Table 1 above). If an application is unchanged, a pond survey carried in April 2014 should be updated with pond surveys during the breeding season in 2016. This is to see whether the newts are still present in similar numbers as before.

Changed circumstances could require changes to mitigation or to precautionary methods of working. If the agreed Mitigation Plan is subject to a planning condition, changes must be approved in writing by the Planning Authority, backed up with a supporting survey report.

If the type or scale of the proposed development changes, the mitigation needed might also change, therefore the agreed Mitigation Plan may need to be revised and re-submitted.

Negative pond surveys or HSI assessments scoring 'poor' carried out up to 2 years previously are valid in support of a planning application, and will last for the duration of the planning permission.

8. Avoidance of harm, mitigation and compensation

8.1 What kind of mitigation operations could be required?

The aim of avoidance, mitigation and compensation is to maintain the population of great crested newts at its existing conservation status. Mitigation and compensation plans are unique to a particular situation, and it is not possible to standardise or to design mitigation in the absence of survey data. Please refer to section **7.2 Key Principles of Mitigation** in the NE Great Crested Newt Mitigation guidelines – the third paragraph on p37 covers ‘precautionary’ mitigation.

Generic or ‘worst case scenario’ mitigation plans submitted instead of a survey report are not acceptable

Avoidance of harm should be investigated first. This will maintain the newts in their existing terrestrial and pond habitat, with minimal temporary disturbance only. **‘Reasonable Avoidance Measures’ (RAMs)** include:

- Agreeing working methods and timing of phases to protect newts from harm at various life-cycle stages.
- Adjusting the siting of development to create buffer zones around habitats and connecting features such as hedges.
- Retention of habitats within the development, with protective fencing during construction.
- Reinstatement of habitats after disturbance.
- Storage of material off the ground.
- Specifying the long-term use and management of open space.
- Preventing access permanently to hazardous area such as main roads.
- Careful design of drainage system to prevent newts being trapped in gully-pots, etc.
- Ensuring all site workers are aware of newts and the law.
- Agreeing a procedure for action if a newt is discovered on site.

Note that the use of **Temporary Amphibian Fencing (TAF)** without a licence from Natural England may constitute an offence, unless there is no habitat suitable for shelter or protection in the area subject to potentially harmful activities, or the layout of the TAF would not result in substantial interference to the dispersal routes of great crested newts.

Mitigation should be considered if avoidance of harm isn’t possible – for example if the development will result in the loss of terrestrial habitat. Mitigation aims to reduce these impacts to insignificance, and to maintain the newts in their existing location and ponds. Measures include:

- Improvements to habitat quality and connectivity through creation, enhancement or management – e.g. conversion of arable land/amenity grassland to scrub /rough grassland; planting hedges; creating ditches; restoring dried up ponds; removing fish from ponds.
- Providing additional habitat features such as artificial hibernacula
- Exclusion or one-way fencing to prevent newts getting on to construction site
- Capturing and removing newts from the construction area to an existing agreed receptor pond within the development site
- Long-term maintenance and management of newt habitats
- Ensuring all site workers are aware of newts and the law
- Agreeing a procedure for action if a newt is discovered on site

Compensation is the last resort if it is unavoidable that newt habitat (terrestrial and pond) will be destroyed so that newts can no longer live in their existing habitats. Measures include:

- Creation of new ponds and surrounding terrestrial habitats for translocated newts. In general (to allow for failures) the area of habitat created should double that lost. Pond creation may need to happen 2 years before translocation to increase chances of success.

8.2 Mitigation plans

A great crested newt survey report should include a section on mitigation, avoidance and compensation measures. Usually, these operations are grouped together into a 'Mitigation Plan'. It should recommend operations that will avoid harm, mitigate or compensate for the impacts of the development. The purpose of this section is to demonstrate to the planning authority that these measures are feasible and achievable.

The report should show sites for pond and other habitat creation/enhancement, the locations of newt exclusion fencing, the location of receptor sites for translocated newts, etc. It should be clear about timing and working methods.

The mitigation plan MUST be agreed between the ecological consultant and the applicant

The planning authority may make the recommended Mitigation Plan into a planning condition.

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December 2021*

9. References and weblinks

Legislation and policy

Wildlife and Countryside Act 1981

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

The Countryside and Rights of Way Act 2000

http://www.opsi.gov.uk/acts/acts2000/ukpga_20000037_en_7#pt3-pb8-l1g81

The Conservation of Habitats and Species Regulations 2010 http://www.opsi.gov.uk/si/si2010/uksi_20100490_en_1

Circular 06/05: Biodiversity and Geological conservation – Statutory Obligations and their impact within the planning system (2005) ODPM/DEFRA

<http://www.communities.gov.uk/publications/planningandbuilding/circularbiodiversity>

Great Crested Newt survey and pond assessment

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Sellers C. (2010) Habitat Suitability Index scores as an Indicator of the Presence of Great Crested Newts. In Practice, September 2010

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The Great Crested Newt Conservation Handbook. Froglife 2001

<http://www.froglife.org/info-advice/great-crested-newt-conservation-handbook/>

ARG UK Advice Note 5: Great Crested Newt Habitat Suitability Index (2010) ARG

<https://www.arguk.org/info-advice/advice-notes/9-great-crested-newt-habitat-suitability-index-arg-advice-note-5/file>

Pond survey and identification of invertebrates: general.

A guide to monitoring the ecological quality of ponds and canals using PSYM. EA/Pond Conservation Trust, 2002

<https://freshwaterhabitats.org.uk/projects/surveys/psym-method/>

The development of the Big Pond Dip invertebrate survey method. Pond Conservation Trust, 2010

<https://freshwaterhabitats.org.uk/projects/surveys/rapid-assessment-ponds/>

A key to the major groups of British freshwater invertebrates (AIDGAP). P. S. Croft FSC, 1986

<https://www.field-studies-council.org/shop/publications/freshwater-invertebrates-aidgap/>

<http://www.field-studies-council.org/publications/pubs/a-key-to-the-major-groups-of-british-freshwater-invertebrates.aspx>

Appendix A. Submit survey data in this format, or similar:

Provide a clear key plan showing pond locations and group data for each pond.

Table 2: EXAMPLE DATA ONLY

<i>Pond name/ref</i>	<i>Survey visit</i>	<i>Date of survey</i>	<i>Weather</i>	<i>Pond central grid ref (8-fig)</i>	<i>Surveyors</i>	<i>Survey technique used</i>	<i>Result (No. of individual GCN)</i>	<i>Notes (incl. other species)</i>
Pond A								
Pond A	1	07/04/21	13-9°C, wind 0 (Beaufort), no rain.	SK12345678	Sue Timms Kirsty Gamble	Bottle trapping	4F, 3M	
Pond A	1	07/04/21	13-9°C, wind 0 (Beaufort), no rain.	SK12345678	Sue Timms Kirsty Gamble	Torching	2F, 5M	Common Frog 12 J
Pond A	1	07/04/21	13-9°C, wind 0 (Beaufort), no rain.	SK12345678	Sue Timms Kirsty Gamble	Egg Search	Eggs recorded	GCN confirmed breeding
Pond A	2	02/05/21	14-10°C, wind 1 (Beaufort), no rain.	SK23456789	Sue Timms Kirsty Gamble	Bottle trapping	4M, 3F	
Pond A	2	02/05/21	14-10°C, wind 1 (Beaufort), no rain.	SK12345678	Sue Timms Kirsty Gamble	Torching	2M, 2F	
Pond A	3	09/05/21	14-12°C, wind 0 (Beaufort), no rain.	SK12345678	Sue Timms Kirsty Gamble	Bottle trapping	5M, 2F	
Pond B								
Pond B	1	07/04/21	13-9°C, wind 0 (Beaufort), no rain.	SK23456789	Sue Timms Kirsty Gamble	Bottle trapping	None	Common Toad 1M
Pond B	1	07/04/21	13-9°C, wind 0 (Beaufort), no rain.	SK23456789	Sue Timms Kirsty Gamble	Torching	None	Smooth Newt 2M, 2F
Pond B	1	07/04/21	13-9°C, wind 0 (Beaufort), no rain.	SK23456789	Sue Timms Kirsty Gamble	Egg Search	None	

Appendix B. Guidance on assessing HSI factors

Some of the factors can be difficult to assess at certain times of year. It is important to 'mark up' rather than down, and **take a precautionary approach** – if you cannot assess a factor with confidence, take the highest value in the range than seems to you to be possible.

If your assessment produces **a score between 0.49 and 0.6**, minor changes in the scoring of each factor could change your assessment from 'poor' to 'below average' or 'average', which affects the conclusions from your survey. Therefore, assessments that produce this range of scores need careful checking and justification by the surveyor – the Ecology unit at LCC will also scrutinise these assessments.

Take a pond-net with you when you go to survey a pond – you will need to do some pond sampling to assess water quality.

Useful guidance and explanation of the science behind individual factors is given in the text of Oldham *et al* (2000).

- S1: Location** - all of Leicestershire and Rutland is in Zone A.
- *S2: Pond area** (m²) - round area up to nearest 50m², then read HSI score off graph.
***if the pond is more than 2000m², this factor should be omitted from the HSI calculation**
- S3: Years out of ten that pond dries out** - use local knowledge (e.g. owner) and personal judgement; take a precautionary approach on assessments made after untypical rain shortages. Ponds that occasionally dry out are more likely to support great crested newts.
- S4: Water quality.** This is one of the hardest to estimate with confidence. Turbid water does not necessarily mean poor water quality; good ponds can be clouded after heavy rain, for example. Newts are relatively tolerant of eutrophic conditions. Where access to the pond is possible, some invertebrate sampling with a pond-net should be done. Be aware than invertebrate levels vary with seasons. The assessment of 'Bad' water quality should only be made where there is clear evidence on continuous and long-term pollution (e.g. large scale tipping of refuse, or spillage of hydrocarbons) and the presence of certain invertebrates. Fish are unlikely to be present in ponds with bad water quality. If the pond is dry at time of survey, this factor is very difficult to assess. If in doubt or unable to gather evidence, take a precautionary approach and mark up, not down.
- S5: Shade.** This should be assessed for the first metre from the shore, around the pond perimeter, and not over the whole pond. Shade is from trees, scrub or buildings, but not emergent vegetation. If assessing the pond in the winter months, make an adjustment to allow for leaf growth on trees. Whilst aerial photos may help, they must be very recent ones. The HSI score is read off a graph provided.
- S6: Waterfowl.** An assessment of 'Major' is only made if the bank is denuded of vegetation and there is no submerged vegetation. Make an adjustment for seasonality; banks are less vegetated in winter, for example. Ignore moorhens (see Oldham *et al*, 2000).
- S7: Fish.** Use local knowledge (the owner or site users). Pond-netting may help to assess small fish numbers. Ponds that occasionally dry out are unlikely to have more than minor fish populations. Presence of fishing platforms or pegs, formal or informal, will suggest level of usage from occasional to heavy use, which in turn is evidence of fish numbers. Only assess as 'Major' if you know that recent fish-stocking has taken place, or there is evidence of heavy use by anglers.
- S8: Pond count** (No. ponds/km in 1km radius). Count the number of ponds in a 1km radius of the pond, excluding those on the far side of barriers to dispersal. Note which map/aerial photo/GIS system used to count, with date if relevant. See notes above (2.4) re barriers – note that most country lanes (even if apparently busy) are not barriers. The number is divided by π (3.14) to obtain the no. ponds/km², then read off graph.

- S9: Terrestrial habitat.** Refer to notes above (2.5). Assess the habitat for 500m radius with connectivity to the pond. 'Poor' would mean that the pond was surrounded for some distance by arable land or amenity grassland, for example, with little other habitats. 'None' should only be given for ponds completely surrounded by an expanse of bare surfaces such as concrete, tarmac or compacted soil.
- S10: % of macrophyte cover** of the pond surface. This includes floating plants, both free-floating and rooted (e.g. Flote-grass and Water-lily), submerged plants if they are at the surface, and emergent plants (e.g. Reedmace), but not filamentous algae or Duckweed (*Lemna* sp.). It is impossible to assess this with confidence in winter, when many plants have died back completely. At these times, a precautionary approach should always be taken and the best possible assessment made, given other environmental factors. For example, a heavily shaded pond usually does not support many surface macrophytes. Aerial photos are usually taken in summer, and may be of use for ponds in open situations. In the spring/summer/autumn months, diagrams in the methodology will assist in making this assessment, and the HSI value is then read off a graph.

Appendix C. Submit HSI data in this format, or similar:

Provide a clear key plan showing pond locations for each pond.

A: For each pond assessed:

Pond name/pond ref to key plan: Pond A (Manor Farm)
 Date: 25/08/21
 8-fig grid ref, centre of pond: SK12345678
 Surveyor: Sue Timms

Table 3: EXAMPLE DATA ONLY

	<i>HSI factor</i>	<i>Site Assessment</i>	<i>HSI Value - from Oldham (2000)</i>	<i>Explanatory notes/rationale</i>
S1	Location (see map in methodology)	Zone A	1	
S2	Pond area (m ²)	1350m ²	0.9	
S3	Years out of ten that pond dries out	Rarely – c. 2 yrs in 10	1.0	Information provided by owner.
S4	Water quality	Moderate?	0.67	Marked up, as could not be adequately assessed - pond was low and stagnant due to late summer survey. Very few invertebrates – midge larvae, water beetles, <i>Lymnaea</i> pond snails. Some litter/rubbish around edges, but nothing to indicate pollution.
S5	Shade - % of 1m belt of pond within perimeter	65%	0.9	Shaded by willow scrub on western edge and large Ash tree to south.
S6	Waterfowl	Minor	0.67	One moorhen and pair of mallard seen.
S7	Presence of fish	Minor	0.33	1 stickleback caught in net. Owner has introduced goldfish in the past.
S8	No. ponds/km within 1km radius	4 ponds/π = 1.274	0.9	Area west of A1 excluded. 3 field ponds shown on 1:25,000 OS Explorer. Additional fishing lake identified from Google Earth aerial photos [?date].
S9	Quality of terrestrial habitat	Moderate	0.67	Good to west – willow scrub, rough grassland and neglected garden. Poor to south-east – mainly arable – but with good hedges and ditches connected to pond. Improved grassland to south-west, and small young conifer plantation.
S10	% macrophyte cover	40%	0.7	Mainly duckweed which is discounted, but with clump of Reedmace to S and Flote-grass to E.

$$\text{Score} = (S1 \times S2 \times S3 \times S4 \times S5 \times S6 \times S7 \times S8 \times S9 \times S10)^{1/10} = (0.05068188437)^{1/10} = 0.74$$

*omit this factor if pond is over 2000m², and calculate the 9th root

Note: If you haven't got a calculator that works out roots - to find the tenth root of the figure obtained by multiplying all the S values together, try googling 'nth root' and using one of the many free internet maths sites – e.g. <http://www.basic-mathematics.com/nth-root-calculator.html>)

B: Summarise data as follows

Table 4: EXAMPLE DATA ONLY

<i>Pond name/ref to key plan</i>	<i>Date</i>	<i>8 fig Grid ref:</i>	<i>Surveyor</i>	<i>HSI score</i>	<i>HSI assessment</i>	<i>Further survey required</i>
Pond A (Manor farm)	05/08/21	SK12345678	Sue Timms	0.74	Good	Y
Pond B	05/08/21	SK23456789	Sue Timms	0.63	Average	Y
Pond C	05/08/21	SK22345567	Sue Timms	0.47	Poor	
Pond D (Pool Farm fishing lake)	05/08/21	SK11114444	Sue Timms	0.55	Below average	
<i>Etc...</i>						