



Environmental

Report Type:	Ecological Appraisal and Phase 2 Surveys for Bats and Newts
Client Name:	Huxley
Site Address:	Glebe Farm Horseman's Green Wrexham SY13 3EB
Report Reference:	20-02 040.3R
Date of Issue:	6th August 2021
Author:	Chloe Sheil MZool (Conservation) chloe@greenscape.pm

Report Details	
Classification	Ecological Appraisal
Status	Draft
Reference	20-02 040.3R

Version History	
Report Reference	Date of Revision
20-02 040.1R	1 st April 2020
20-02 040.2R	5 th June 2020
20-02 040.3R	6 th August 2021

Quality Assurance			
	Name	Signature	Date
Author:	C. Sheil MZool (Conservation) Assistant Consultant		23 rd March 2020
Amended by:	C. Sheil MZool (Conservation) Assistant Consultant		6 th August 2021
Reviewed by:	B. Jones BSc(hons) MSc Lead Consultant		6 th August 2021

Greenscape Environmental Ltd.
Registered Office: Long Acres, Lyth Bank, Shrewsbury, Shropshire, SY3 0BW
Company Reg number: 5364283

This report is the copyright of Greenscape Environmental Ltd. Any unauthorised reproduction or usage by any person without the specific authority of Greenscape is prohibited.

The report should be read in its entirety

Questions arising from the survey report should be directed to the author of the report who will be pleased to clarify any technical issues raised.

Whilst the surveyors make every reasonable effort, Greenscape Environmental Ltd cannot guarantee that all protected species have been identified and survey results are definitive. Many species are cryptic and transitional in habit.

Reports are considered valid for one year for planning purposes, after which time further survey information may be required.

Greenscape Environmental Ltd can provide advice and support for recommendations and planning conditions.

Table of Contents

1	EXECUTIVE SUMMARY.....	1
1.1	Purpose of the Report	1
1.2	Methodology	1
1.3	Key Impacts and Mitigation Measures.....	1
1.4	Conclusion	1
2	INTRODUCTION	3
2.1	Project Background.....	3
2.2	Purpose of the Report	3
2.3	Site Context and Location	3
3	METHODOLOGY	4
3.1	Desk Study	4
3.2	Field Survey.....	4
3.3	Species Survey.....	4
3.4	Constraints of the Survey	5
4	BASELINE ECOLOGICAL CONDITIONS.....	6
4.1	Nearby Features of Importance	6
4.2	Habitats on Site.....	7
4.3	Bats	16
4.4	Other Mammals.....	18
4.5	Birds	18
4.6	Amphibians.....	19
4.7	Reptiles.....	29
4.8	Invertebrates	29
4.9	Invasive Species.....	29
5	DESCRIPTION OF PROPOSED DEVELOPMENT.....	30
6	IMPACTS, ENHANCEMENTS AND MITIGATION	31
6.1	Nearby Features of Importance	31
6.2	Habitats on Site.....	31
6.3	Bats	33
6.4	Other Mammals.....	36
6.5	Birds	36
6.6	Amphibians.....	37
6.7	Reptiles	41
6.8	Invertebrates	41
6.9	Invasive Species.....	41
7	CONCLUDING REMARKS.....	42
APPENDIX A	– SURVEYOR DETAILS.....	43
APPENDIX B	– METHODOLOGY	44
APPENDIX C	– POLICY	48
APPENDIX D	– BAT ACTIVITY SURVEY	53
APPENDIX E	– HSI SCORES	55
APPENDIX F	– PHASE 2 NEWT SURVEYS	62
APPENDIX G	– BIBLIOGRAPHY.....	66

Table of Figures

Figure 4.1. Identifying any designated areas near site, a 1km buffer is shown	6
Figure 4.2. A map showing the JNCC phase 1 habitat classification codes for the site	7
Figure 4.3. Building 1 from south	8
Figure 4.4. Internal view of building 1	8
Figure 4.5. Coal shed	9
Figure 4.6. View of building 2 from south	9
Figure 4.7. View of building 3 from northwest.....	10
Figure 4.8. Internal view of building 3	10
Figure 4.9. Access track.....	11
Figure 4.10. Overview of field	11
Figure 4.11. Overview of grassland near building 2	12
Figure 4.12. Underside of tyres.....	12
Figure 4.13. Hedge with trees along northeastern boundary (H1).....	13
Figure 4.14. Wire mesh and line of trees along southeastern boundary (H2)	13
Figure 4.15. Hedgerow with trees along (H3).....	14
Figure 4.16. Defunct hedge with trees along south western boundary (H4)	14
Figure 4.17. Defunct hedge along north western boundary (H5)	15
Figure 4.18. Defunct hedge with trees along north eastern boundary (H6)	15
Figure 4.19. Crack and crevices in walls.....	16
Figure 4.20. Hearth with chimney	16
Figure 4.21. Blocked chimney.....	17
Figure 4.22. Gaps between tiles.....	17
Figure 4.23. Bird's nest in building 1	18
Figure 4.24. OS Map showing a 500m buffer around site.....	19
Figure 4.25. Pond 1.....	21
Figure 4.26. Pond 2.....	21
Figure 4.27. Pond 3.....	22
Figure 4.28. Drain leading to pond 3	22
Figure 4.29. Pond 4.....	23
Figure 4.30. Pond 5 location	23
Figure 4.31. Pond 6.....	24
Figure 4.32. Pond 10	24
Figure 4.33. Pond 11	25
Figure 4.34. Pond 15	25
Figure 4.35. Pond 16 location	26
Figure 4.36. Pond 17 location	26
Figure 4.37. Pond 18	27
Figure 4.38. Pond 20	27
Figure 4.39. Pond 23	28
Figure 4.40. Pond 24	28
Figure 5.1. Proposed site plan	30
Figure 6.1. Proposed locations of enhancements	34
Figure 6.2. Example woodcrete bat box: Schwegler 1FF.....	35
Figure 6.3. Example integral bat box	35
Figure 6.4. Bird boxes	36
Figure 6.5. 50, 100 and 250m buffers from nearest pond containing GCN	37
Figure 6.6. Hibernacula design from Froglife ©	40
Figure 6.7. Invertebrate brick and bug house	41
Figure D.1. Location of surveyors.....	53
Figure D.2. Whiskered/Brandt's bat recorded at 03:09 (F7 compressed)	54
Figure D.3. Common pipistrelle recorded at 03:18 (F7 compressed).....	54

Table of Tables

Table 1.1. Timing of Works.....	2
Table 4.1. Target Notes	7
Table 4.2. Summary of ponds within 500m	20
Table 6.1. Summary of potential impacts on habitats recorded	31
Table 6.2. New hedge planting scheme	32
Table 6.3. Trees proposed for enhancement	32
Table A.1. Details of surveyors' experience and licences held.....	43
Table B.1. Data sources	44
Table B.2. Criteria of ecological values.....	44
Table B.3. Categorisation of trees for bats.....	45
Table F.1. eDNA results for ponds 5, 6, 11 and 24.....	65

1 Executive Summary

1.1 Purpose of the Report

Greenscape Environmental Ltd was commissioned by Dave Parker on behalf of the client, Mr S Huxley, to undertake a preliminary ecological appraisal of Glebe Farm to provide supporting information for a planning application for the demolition of existing buildings and the construction of three new dwellings.

The survey report has three principal aims:

- To provide an initial assessment of the ecological value of the site in local context.
- To identify potential ecological constraints relating to the development, and recommend measures to avoid, reduce or manage negative effects, and to provide a net ecological gain.

1.2 Methodology

The appraisal of the site included a desktop study of the area and a phase 1 ecological appraisal undertaken at the site, OS grid reference SJ44604132 on 12th March 2020 by C Sheil. A precautionary phase 2 bat activity survey were conducted on the 28th May 2020 by C Sheil with the assistance of B Jones, L Maggs and M Hoggs.

1.3 Key Impacts and Mitigation Measures

A desktop data search including a search for nearby designated sites, EPS licences and previously recorded protected species was conducted. Of significant for this site is bats, nesting birds, and great crested newts.

The site extends to 0.2ha and is comprised of three buildings, a field of semi-improved grassland, hedges, trees and an access track.

The buildings on site have low to negligible roost potential for bats. A precautionary activity survey was conducted on buildings 1 and 3. No bats were seen roosting in any of the buildings, and so no further surveys are necessary. These buildings will be demolished under a method statement.

Potential habitat for nesting birds was found in the buildings, trees and hedgerows and evidence was found in building 1. The removal of these is to be done outside the bird nesting season (February to August inclusive) or an ecologist will conduct a check within the 24 hours prior to work commencement to ensure no nesting birds will be affected.

There are seven ponds within 250m of the site and 24 within 500m. Phase 2 newt surveys found peak counts of 11 in pond 12 and 3 in pond 10. eDNA testing returned positive results in ponds 5, 11 and 24. Pond 24 is the closest to site of those proven to support GCN. The site comprises low value habitat to newts in their terrestrial phase. The works are to be done under a method statement outlined in this report and an ecologist is to be employed as the Ecological Clerk of Works. An area of compensation land is to be set aside for terrestrial enhancement.

1.4 Conclusion

It is recommended that the biodiversity value of the site will be enhanced post-construction with the inclusion of bat and bird boxes. The landscaping will also be improved by planting new native species hedgerows and trees in the new gardens. Method statements outlined in this report are to be followed during works.

There are no other ecological constraints to the development as currently proposed.

Table 1.1. Timing of Works

Action	Timing	Justification
Update phase 1 survey	After 1.5 years from survey issue data	Ecological features can change and develop over time
Cut trees and hedges down to stumps ~30cm	September to January inclusive	No birds will be nesting within the hedges or trees at this time. Stumps left to protect any reptiles or amphibians sheltering in the base
Removal of stumps	March/April	Any amphibians sheltering in the roots will have dispersed naturally and will be found in ponds at this time of year
Demolition of buildings	October to January inclusive	To reduce the potential to disturb nesting birds. Timing will also reduce risk to transitory bats
Begin groundworks	December to February	There is no hibernation potential within the field itself. Beginning groundworks when newts are hibernating elsewhere will preclude the chance of damage or destruction of individuals as they will not be mobile.

2 Introduction

This report has been compiled by Chloe Sheil MZool (Conservation) who has 2 years' experience conducting ecological appraisals. It has been reviewed in line with Greenscape's Quality Management System.

For full details of surveyors and licences please see Appendix A.

2.1 Project Background

Greenscape Environmental Ltd was commissioned by Dave Parker to conduct a survey to determine the presence of protected species and potential for the damage or destruction of habitats of value. This forms part of the planning application for the construction of dwellings at Glebe Farm.

The project involves the demolition of the existing buildings and the construction of three new dwellings. Entrance to the site is currently gained from a lane leading to an unnamed road and will not be changed.

2.2 Purpose of the Report

The aim of this survey is to locate and describe, as far as reasonably practicable, evidence of wildlife including all protected and priority species which may be disturbed or lost in the event of development.

The purpose of this report is to:

- Identify the key ecological constraints to the proposed development.
- Inform planning to allow significant ecological effects to be minimised or avoided where possible.
- Allow any necessary mitigation or compensation measures to be development following the mitigation hierarchy.
- Identify any additional surveys that may be required to inform the assessment.
- Identify the opportunities offered by a project to deliver ecological enhancement under NPPF Section 15.

The Local Planning Authority will require further information regarding bats because the site meets one of the trigger points for bat activity surveys. The trigger point in question is the demolition of an agricultural building of traditional brick or stone.

2.3 Site Context and Location

The site is located to the north of Horseman's Green, OS grid reference SJ44604132. It is set in a rural environment surrounded by open fields and residential areas. There is moderate connectivity to the surrounding countryside via hedgerows and trees. The surrounds provide potential foraging, resting, hibernating and commuting opportunities for local wildlife.

3 Methodology

Broad methodologies for data collection and interpretation were informed by guidance outlined in CIEEM (2017) – Guidelines for Preliminary Ecological Appraisals.

3.1 Desk Study

The desk study provides contextual information such as the site's proximity to designated areas and known records of protected or notable species. This assists with the evaluations of the ecological value of the site in the wider landscape. This study was undertaken in February 2020. The data search was purchased from Cofnod and focused on the area within 1km of the site.

This level of desk study is considered adequately proportionate to the development proposals, the complexity of the site, the type of planning permission being sought, and the site's landscape context.

3.2 Field Survey

3.2.1 Date and Survey Conditions

The phase 1 ecological appraisal was undertaken at the site on 12th March 2020 by C Sheil.

A precautionary bat activity survey was conducted at dawn on 28th May 2020 by C Sheil with the assistance of B Jones, L Maggs and M Hoggs.

Phase 2 newts surveys were conducted between 12th May and 2nd June 2021 by C Sheil and B Jones. eDNA surveys were conducted on nearby ponds on 11th June 2021 by B Jones.

On all visits, the conditions were optimal for the type of survey conducted.

3.2.2 Habitats

An assessment of habitats was conducted following the JNCC Handbook for Phase 1 Surveys (2010). Target notes were used where appropriate to identify potential for protected or notable species or habitats, and to give more details site descriptions.

The level of survey is aimed to identify field signs of, or habitats with the potential to support, protected species and therefore assist in the determination for phase 2 surveys.

3.2.3 Hedgerows

The aim of the assessment is to ascertain whether the hedgerow could be classified as important according to the definitions listed in the Hedgerow Regulations (1997).

3.3 Species Survey

Features on site were assessed for potential for bat roosts, foraging and commuting. This was conducted in accordance with Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd Edition, BCT, Collins (ed.) (2016).

Badger surveys were conducted using guidance from Scottish Natural Heritage commissioned Report No. 096 (2003).

Features on site were assessed for potential for nesting birds.

The assessment of aquatic habitat for great crested newts is based on the Habitat Suitability Index.

The terrestrial habitats at the application site were surveyed and assessed with respect to suitability and potential value for great crested newts.

Presence/Absence surveys were conducted for great crested newts. A further two population class assessments were also conducted on those ponds seen to support newts during the first four visits. On those ponds which were not surveyable by traditional methods, water samples were sent for eDNA analysis to determine presence/absence.

3.4 Constraints of the Survey

All areas were accessible for this survey. It was conducted at a suboptimal time of year for the assessment of flora and fauna, but this was not considered a constraint because evidence of bats can be seen year-round. Standard techniques were followed as outlined in Appendix B.

The identification of calls and species using sonogram analyses are dependent on the clarity of the sonogram recording, which may be affected by the distance from the bat and background noise. Species of *Myotis* bats are identified to genus level on the basis of the inherent difficulty in distinguishing between species from their echolocation calls.

Pond 18 could not be surveyed as the landowner could not be contacted. Pond 9 was not accessible and pond 19 could not be surveyed due to the risk of a horse damaging survey equipment or causing itself injury. Permission was not granted to access ponds 13, 14, 21 and 22. Permission to survey pond 12 was only gained after the first nights surveying, and so only five visits were conducted on this pond.

4 Baseline Ecological Conditions

4.1 Nearby Features of Importance

4.1.1 Designated Sites

MAGiC

Glebe Farm

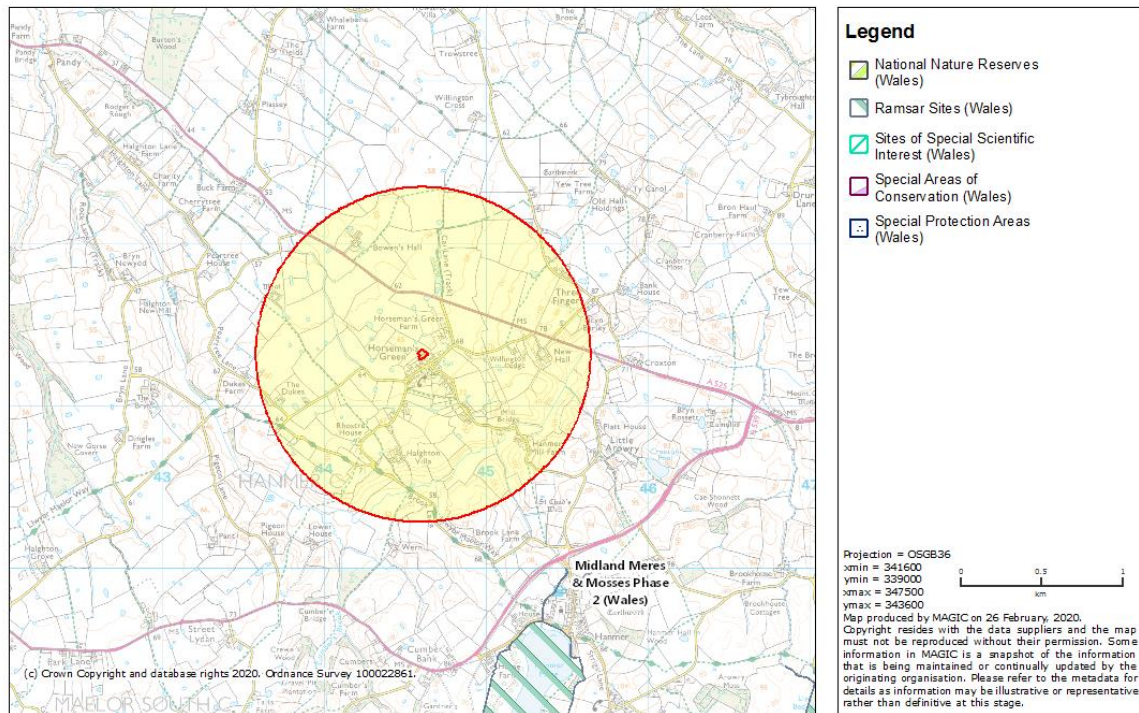


Figure 4.1. Identifying any designated areas near site, a 1km buffer is shown

The map from Natural England presented in Figure 4.1 indicated that the site is not within 1km of any designated area.

The nearest nature reserve is approximately 1.6km to the southeast. This is Midland Meres & Mosses Phase 2 Ramsar and is a series of open water and peatlands designated for biological reasons. This overlaps with the nearest SSSI which is Hanmer Mere, approximately 1.8km away.

4.2 Habitats on Site

The site comprises a field of semi-improved grassland, three farm buildings, bare ground, hedgerows and lines of trees.

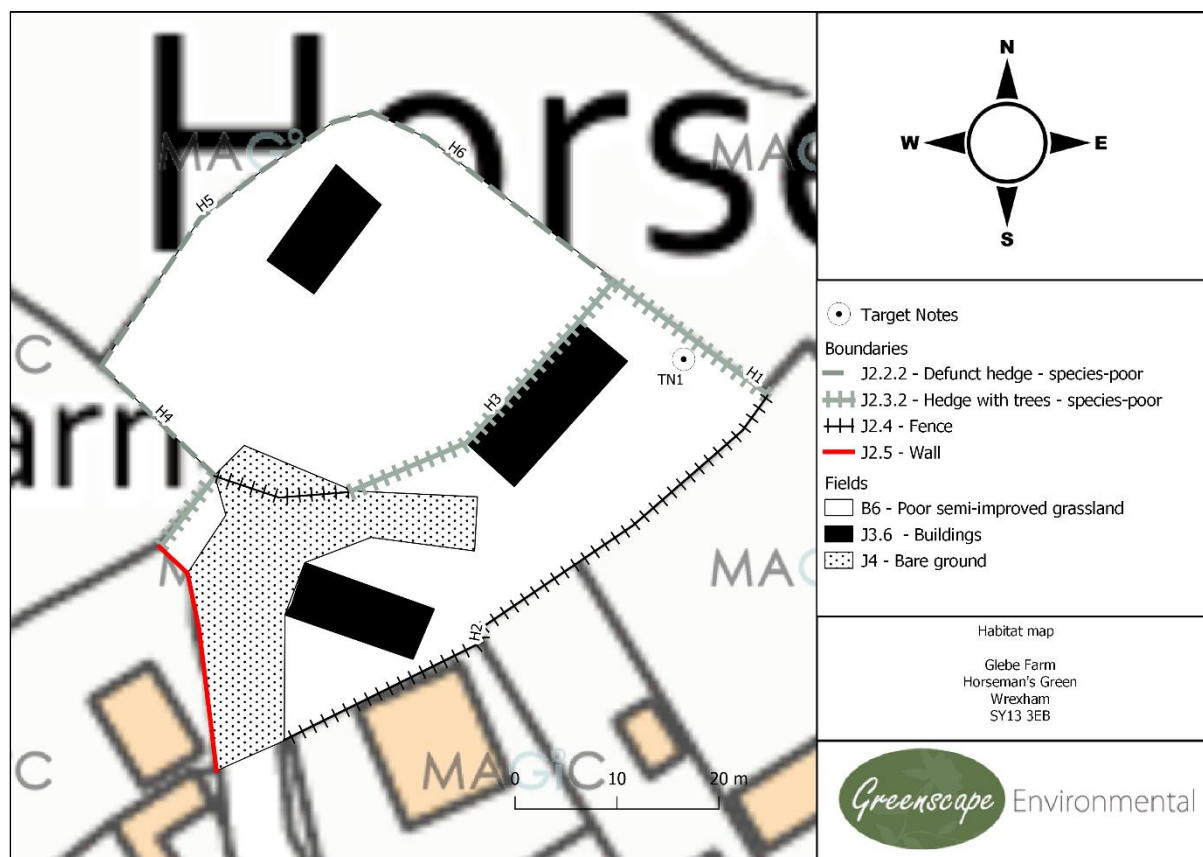


Table 4.1. Target Notes

Target Note	Description
TN1	Tyres

Building 1 is a ruin of a brick barn with a severely damaged slate tile roof. Some of the walls are rendered and the roof was once supported by wooden timbers. Almost all of the roof is now missing, and walls are becoming unstable. A large elder (*Sambucus nigra*) tree and brambles (*Rubus fruticosus*) were found throughout the building.



Figure 4.3. Building 1 from south



Figure 4.4. Internal view of building 1

A small coal shed was found on the northern aspect of the building which has an unlined roof of cement-bonded fibreboard.



Figure 4.5. Coal shed

Building 2 is a Dutch barn constructed of corrugated sheet metal. It is bright and open to the elements.



Figure 4.6. View of building 2 from south

Building 3 is a cowshed of red brick with unlined roofs of slate tile and cement-bonded fibreboard. The roofs are supported by wooden beams. Both areas of the cowshed are open to the elements and are bright.



Figure 4.7. View of building 3 from northwest



Figure 4.8. Internal view of building 3

The site is accessed via a narrow track of gravel and mud.



Figure 4.9. Access track

The field comprises semi-improved grassland which is currently grazed. Species include cow parsley (*Anthriscus sylvestris*), nettle (*Urtica dioica*) and broadleaf dock (*Rumex obtusifolius*).



Figure 4.10. Overview of field

To the southeast of building 2 is an area of semi-improved grassland. Species include meadow buttercup (*Ranunculus acris*), broadleaf dock, nettle, cleavers (*Galium aparine*), cow parsley and thistle (*Cirsium* spp.). Pieces of tarpaulin were found in several places in this area.



Figure 4.11. Overview of grassland near building 2

Spare tyres were found at TN1. The underside of these were checked for any evidence of protected species.



Figure 4.12. Underside of tyres

The site boundaries consist of fences, hedgerows and trees. Some hedgerows have gaps and are defunct.

H1 is a hedgerow with trees and barbed wire fencing. Species include holly (*Ilex aquifolium*), hawthorn (*Crataegus monogyna*) and alder (*Alnus glutinosa*).



Figure 4.13. Hedge with trees along northeastern boundary (H1)

H2 is a post and wire mesh fence with trees. Species include rose (*Rosa canina*) and hawthorn.



Figure 4.14. Wire mesh and line of trees along southeastern boundary (H2)

H3 is a hedgerow with trees. It is approximately 1.5m high and some trees are unidentifiable as they are completely covered in ivy. Species include ash (*Fraxinus excelsior*) and hawthorn.



Figure 4.15. Hedgerow with trees along (H3)

H4 is a defunct hedgerow 1m high with trees and a barbed wire fence. Species include hawthorn and ash.



Figure 4.16. Defunct hedge with trees along south western boundary (H4)

H5 is a defunct hedgerow with large gaps. It is 1m high and consists of holly and hawthorn.



Figure 4.17. Defunct hedge along north western boundary (H5)

H6 is a defunct hedge less than 1m high. Species include blackthorn (*Prunus spinosa*), hawthorn and holly.



Figure 4.18. Defunct hedge with trees along north eastern boundary (H6)

4.3 Bats

4.3.1 Records

No records of bats were found within 2km.

4.3.2 Field Observations

Building 1 has multiple potential roost features found throughout the building, in gaps and cracks between the brickwork. However, these are very exposed reducing their suitability slightly.



Figure 4.19. Crack and crevices in walls

A hearth was found in the building which has a chimney above it. However, this chimney was blocked off by the collapsed brickwork and does not extend further than 2ft upwards.



Figure 4.20. Hearth with chimney



Figure 4.21. Blocked chimney

The northeastern section of building 2 has an unlined slate roof which contains gaps between the tiles. Potential roost features were identified under the ridge beam, and the ivy obscures the view of large portions of the roof.



Figure 4.22. Gaps between tiles

4.3.3 Phase 2 Bat Survey

Four surveyors were used for the dawn survey on 28th May 2020. Details of surveyor location and sonograms can be found in Appendix D.

The first bat seen was a *Myotis* bat at 03:07, approximately 1h 48min before sunrise. The bat call was not recorded on the Echometer Touch detector so the species cannot be identified. The bat was seen flying over the site, towards the southwest. It did not enter any buildings. A *Myotis* bat call was later recorded at 03:09. This was identified by its echolocation calls as a Whiskered/Brandt's bat (*Myotis mystacinus/brandtii*) but could not be seen.

The first pipistrelle was recorded at 03:18. This was a common pipistrelle (*Pipistrellus pipistrellus*) which foraged around the buildings. At 03:39 soprano pipistrelles (*P. pygmaeus*) were recorded. Both species foraged around the buildings throughout the survey.

At 03:54 a noctule was seen flying overhead towards the east.

No bats were seen entering any roost spaces in either of the buildings.

4.4 Other Mammals

4.4.1 Records

Records of other mammals within 2km include badger (*Meles meles*).

The nearest records are within 800m, from 2012.

4.4.2 Field Observations

The site had limited features for terrestrial mammals. Hedgerows provide commuting opportunities. No evidence of any terrestrial mammals was found.

4.5 Birds

4.5.1 Records

Records of birds within 2km include house martin (*Delichon urbicum*), kestrel (*Falco tinnunculus*), swallow (*Hirundo rustica*), house sparrow (*Passer domesticus*) and barn owl (*Tyto alba*).

The nearest records are of house sparrow and swallow approximately 200m to the northwest, from 2009. The nearest records of kestrel and house martin are approximately 1.2km to the north, from 2013. The nearest records of barn owl are within 1.3km, from 2017.

4.5.2 Field Observations

The site had several features for birds. The buildings, trees and hedgerows provide potential nesting habitat. The only bird's nest which was found on site was in building 1.



Figure 4.23. Bird's nest in building 1

Bird species seen on site, but not nesting, are sparrow (*Passer* sp.), pigeon (*Columba palumbus*), blackbird (*Turdus merula*), blue tit (*Cyanistes caeruleus*), a finch (*Carduelis* sp.) and buzzard (*Buteo buteo*).

4.6 Amphibians

4.6.1 Records

Records of amphibians within 2km include common toad (*Bufo bufo*), palmate newt (*Lissotriton helveticus*), smooth newt (*L. vulgaris*), common frog (*Rana temporaria*) and great crested newt (*Triturus cristatus*).

The nearest records are of great crested newt approximately 300m to the northwest, from 2008. The nearest records of smooth newt and common frog are approximately 400m to the northwest, from 2008. The nearest records of palmate newt are approximately 600m to the north, near Cai Lane, from 2008.

4.6.2 Field Observations

The site had several features for amphibians. The sheets of tarpaulin and tyres (TN1) provide potential refugia although a search underneath them found no evidence. Hedgerows and trees provide opportunity for commuting and the grassland surrounding the Dutch barn offers moderate value habitat but the buildings are of no value to newts in their terrestrial phase as there is no shelter or foraging.

Phase 2 surveys for newts were conducted, full details of which are found in Appendix F, and a summary is included below. A small population of newts was found in pond 10 (peak 3), a low-medium population in pond 12 (peak 11), and a positive eDNA result in ponds 5, 11 and 24.

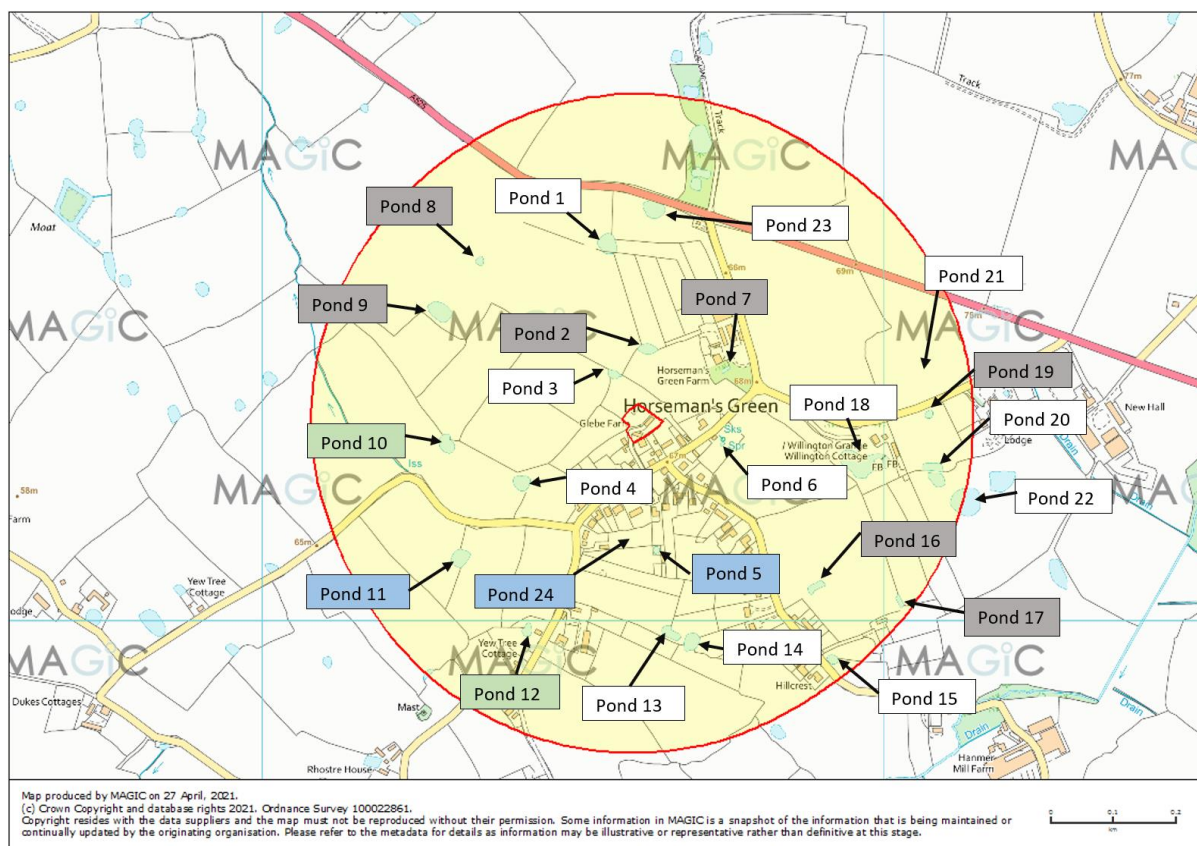


Figure 4.24. OS Map showing a 500m buffer around site

In the above map, those ponds highlighted green supported newts identified in bottle traps, blue tested positive with eDNA, grey were dry or unsurveyable, and white had no presence.

Table 4.2. Summary of ponds within 500m

Pond Name	OS Grid Reference	Distance from Site	HSI Score	Peak Count of GCN	eDNA Results. Present?
Pond 1	SJ44554160	250m	0.68 – Average	0	-
Pond 2	SJ44624143	80m	-	-	-
Pond 3	SJ44564139	50m	0.59 – Below average	0	-
Pond 4	SJ44414122	170m	0.69 – Average	0	-
Pond 5	SJ44634111	170m	-	-	Y
Pond 6	SJ44734128	100m	0.56 – Below Average	-	N
Pond 7	SJ44744140	130m	-	-	-
Pond 8	SJ44344157	330m	-	-	-
Pond 9	SJ44284149	320m	-	-	-
Pond 10	SJ44294128	280m	0.62 – Below Average	3	-
Pond 11	SJ44314110	320m	0.46 - Poor	-	Y
Pond 12	SJ44424098	340m	0.63 - Average	11	-
Pond 13	SJ44654097	300m	-	-	-
Pond 14	SJ44684096	310m	-	-	-
Pond 15	SJ44914093	460m	0.67 - Average	0	-
Pond 16	SJ44884105	360m	-	-	-
Pond 17	SJ45024103	470m	-	-	-
Pond 18	SJ44964125	290m	0.43 - Poor	-	-
Pond 19	SJ45074133	420m	0.75 - Good	-	-
Pond 20	SJ45084124	430m	0.68 - Average	0	-
Pond 21	SJ45074141	430m	-	-	-
Pond 22	SJ45134119	480m	-	-	-
Pond 23	SJ44624166	300m	0.71 - Good	0	-
Pond 24	SJ44594113	150m	0.57 – Below Average	-	Y

Pond 1

Pond 1 is located within a cattle field.



Figure 4.25. Pond 1

Pond 2

Pond 2 is dry and supported no water.



Figure 4.26. Pond 2

Pond 3

Pond 3 is located at the northern corner of the field adjacent to the site. It is connected to several drains and appears to be an area where the drains overflow. No clear banks could be seen. Mallards were seen on the water, but no fish were seen. No invertebrates were found when netting.



Figure 4.27. Pond 3



Figure 4.28. Drain leading to pond 3

Pond 4

Pond 4 is located in the middle of a field which often supports cattle. The margins of the pond are well vegetated, but the sides are steep. Two ducks were routinely seen on the pond.



Figure 4.29. Pond 4

Pond 5

Pond 5 is located next to a stable. The landowner could not originally be found, but permission was eventually gained for eDNA analysis.



Figure 4.30. Pond 5 location

Pond 6

Pond 6 is located in a field containing a horse, ducks and chickens so the pond is poached. The pond is small and is overshadowed by an oak tree. Netting revealed backswimmers, bloodworm and fly larvae.



Figure 4.31. Pond 6

Pond 7

Pond 7 is dry and is in a garden of amenity grassland.

Pond 8

This is dry.

Pond 9

This pond could not be accessed as dense vegetation covered all the banks.

Pond 10

Pond 10 is located within on a pasture field and was found to have geese on it. Egg laying vegetation was found.



Figure 4.32. Pond 10

Pond 11

Pond 11 is located within a field which was occupied by a large bull at the time of the original survey, and often supported a herd of cattle.



Figure 4.33. Pond 11

Pond 12

This is a deep garden pond with willow trees lie around the banks. Permission to access this pond was not granted until later in the surveys, on the 13th May.

Ponds 13 and 14

The landowner of ponds 13 and 14 could not be found.

Pond 15

This is on the edge of a grazed field but is fenced off from livestock and horses. The pond is heavily vegetated.



Figure 4.34. Pond 15

Pond 16

This is dry.



Figure 4.35. Pond 16 location

Pond 17

This is dry.



Figure 4.36. Pond 17 location

Pond 18

This is a large garden pond which is lined and is stocked with fish. Fowl were also seen on the pond. At the time of the phase 2 surveys, the landowner could not be contacted.



Figure 4.37. Pond 18

Pond 19

This is a small, lined pond in the middle of a grazed field. It could not be surveyed due to a risk that the young horse in the field could remove or damage the bottle traps and possibly injure itself.

Pond 20

This is in the corner of a field and is spread across the land of two separate owners. The pond was surveyed on the northern banks. The pond supported no aquatic vegetation, but willow and other trees are overgrown around the perimeter.



Figure 4.38. Pond 20

Ponds 21 and 22

Permission for access to these ponds was denied.

Pond 23

This is on the edge of a grazed field but is fenced off from cattle. No fowl or fish were seen and plenty of egg laying material was found.



Figure 4.39. Pond 23

Pond 24

This pond had only recently been dug, but was seen to support a great diversity of insects after only a few months of presence.



Figure 4.40. Pond 24

4.7 Reptiles

4.7.1 Records

No records of reptiles were found within 2km.

4.7.2 Field Observations

The site had few features for reptiles. The sheets of tarpaulin and tyres provide potential refugia, although no evidence of any reptiles was found.

4.8 Invertebrates

4.8.1 Records

No records of invertebrates were found within 2km.

4.8.2 Field Observations

The site had few features for invertebrates. The trees and hedgerows provide foraging and egg laying material.

4.9 Invasive Species

4.9.1 Records

Records of invasive species within 2km include rhododendron (*Rhododendron ponticum*).

The nearest records are approximately 200m to the northwest, from 2014.

4.9.2 Field Observations

No evidence of any invasive species was found.

5 Description of Proposed Development

The current plans are for the demolition of the existing buildings and the construction of three new dwellings with associated parking. The access is currently from an unnamed road and will be extended to lead to the new houses. Boundary H3 is to be removed as it is in the place of the footprint for the new building. It is assumed that the remaining boundaries are to be retained.

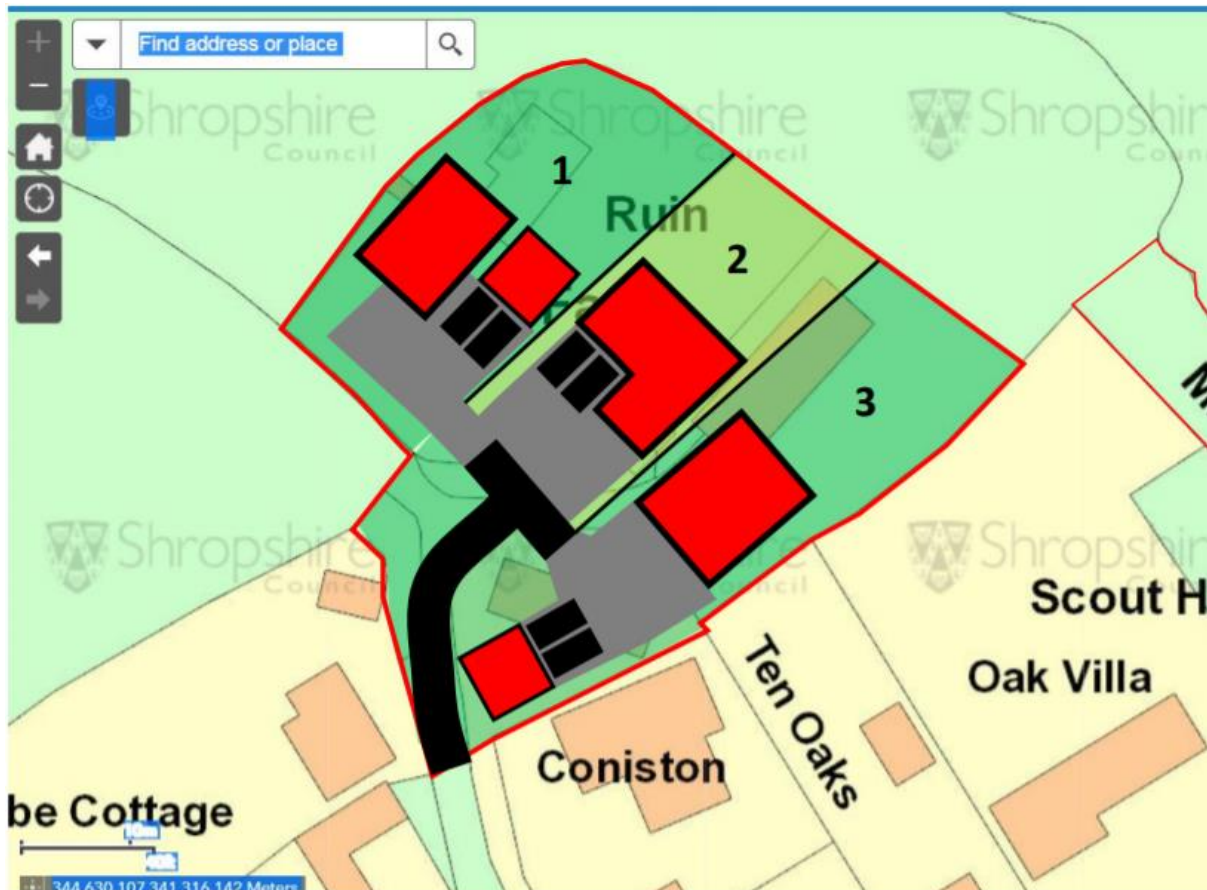


Figure 5.1. Proposed site plan

6 Impacts, Enhancements and Mitigation

6.1 Nearby Features of Importance

6.1.1 Impacts

Figure 4.1 shows that the nearest SSSI is 1.8km away. This is Hanmer Mere. Given the distance to the site no negative impact is expected from the development.

6.1.2 Mitigation

No mitigation is required.

6.2 Habitats on Site

6.2.1 Impacts

The development as proposed will see the loss of the buildings, hedgerows and trees which have potential nesting habitat for birds. The clearance of the tyres and tarpaulin will cause the loss of potential refugia for amphibians and reptiles.

Table 6.1. Summary of potential impacts on habitats recorded

Habitat	Value to Protected Species	Impact Without Consideration
Buildings	No value to bats	Negligible negative impact on bats
	Potential habitat for nesting birds. Evidence found in building 1	Negative impact on bird sin building 1. Potential negative impact in buildings 2 and 3.
Semi-improved grassland	No ecological value	No negative impact
Bare ground	No ecological value	No negative impact
Hedgerows	Potential habitat for nesting birds. No evidence found. Not protected by the Hedgerow Regulations.	Potential negative impact on birds
Fence	No ecological value	No negative impact
Wall	No ecological value	No negative impact

6.2.2 Mitigation and Enhancements

In order to obtain an ecological net gain for the site, the remaining green spaces and site boundaries will require enhancement for local wildlife.

Hedgerows

The new houses will have garden to the rear. It is recommended that the landscaping around the new buildings will include some hedge planting to enhance the area for biodiversity.

Plants to use for landscaping and gapping-up of existing boundaries will include locally sourced native species. These will be planted in accordance with BS3936 (part 1, 1992, Nursery Stock, Specifications for trees and shrubs). Planting will occur between November and April depending on the timing of the development.

Table 6.2. New hedge planting scheme

Common Name	Latin Name	Distribution (%)
Hawthorn	<i>Crataegus monogyna</i>	35%
Blackthorn	<i>Prunus spinosa</i>	35%
Hazel	<i>Corylus avellana</i>	10%
Holly	<i>Ilex aquifolium</i>	10%
Wild Service Tree	<i>Sorbus torminalis</i>	10%

Trees

Trees to be used should be from the list below. These should also be native species, locally sourced where possible. Oak should particularly be encouraged because it supports a large diversity of invertebrates.

Table 6.3. Trees proposed for enhancement

Common Name	Latin Name
English Oak	<i>Quercus robur</i>
Sessile Oak	<i>Quercus petraea</i>
Lime	<i>Tilia cordata</i>
Rowan	<i>Sorbus aucuparia</i>
Silver Birch	<i>Betula pendula</i>

6.2.3 Monitoring

All habitat enhancements will be monitored post-development and any failing plants or features will be addressed as appropriate to maintain the value of the enhancement.

6.3 Bats

6.3.1 Impacts

A precautionary phase 2 bat survey was conducted and found no bats using the building. No further surveys are considered necessary.

6.3.2 Mitigation and Enhancements

The Dutch barn can be demolished as soon as planning permission is granted.

The ruins and the cowshed will not need to be demolished under licence from Natural Resources Wales, although it will need to follow a method statement to protect transitory bats. This is because transitory bats can use features sparingly throughout the year and are therefore hard to confirm. The presence of suitable features cannot be ignored, and this method statement will ensure no transitory bats are harmed.

Working Method Statement

1. The developer and the contractors will be made aware that there is a possibility that bats may be found during works, and will be advised to work in a way to ensure bats are not harmed during the soft demolition of the roof; particularly around the slate roof. They will be provided with a simple emergency procedure to follow if bats are found at any stage of the work on site. It will be ensured that the method statement is retained on site at all times.
2. The work around the slate tile roof will occur when bats are least likely to be present, from October to January.
 - a. These months are more precise than typical bat recommendations due to timing restrictions regarding birds, explained in section 6.5.2
3. If a bat is found when the ecologist is not present, work will stop immediately, and the ecologist contacted for advice.
4. The bat can only be handled by the ecologist or authorised person unless it is in immediate danger. The bat must be carefully placed in a well-ventilated lidded box with a small container (i.e. a plastic bottle lid) with water in it. The container must be kept in a quiet and safe place.
5. Care should be taken to avoid rousing the bat whilst transferring to a suitable location, such as a suitable roost box or alternative roost space that provides a safe, quiet environment with a stable cool temperature and relatively high humidity.
6. If the bat is underweight or injured, it will be cared for by an experienced bat carer until such time that it is strong enough to be released into a suitable alternative replacement roost on site.

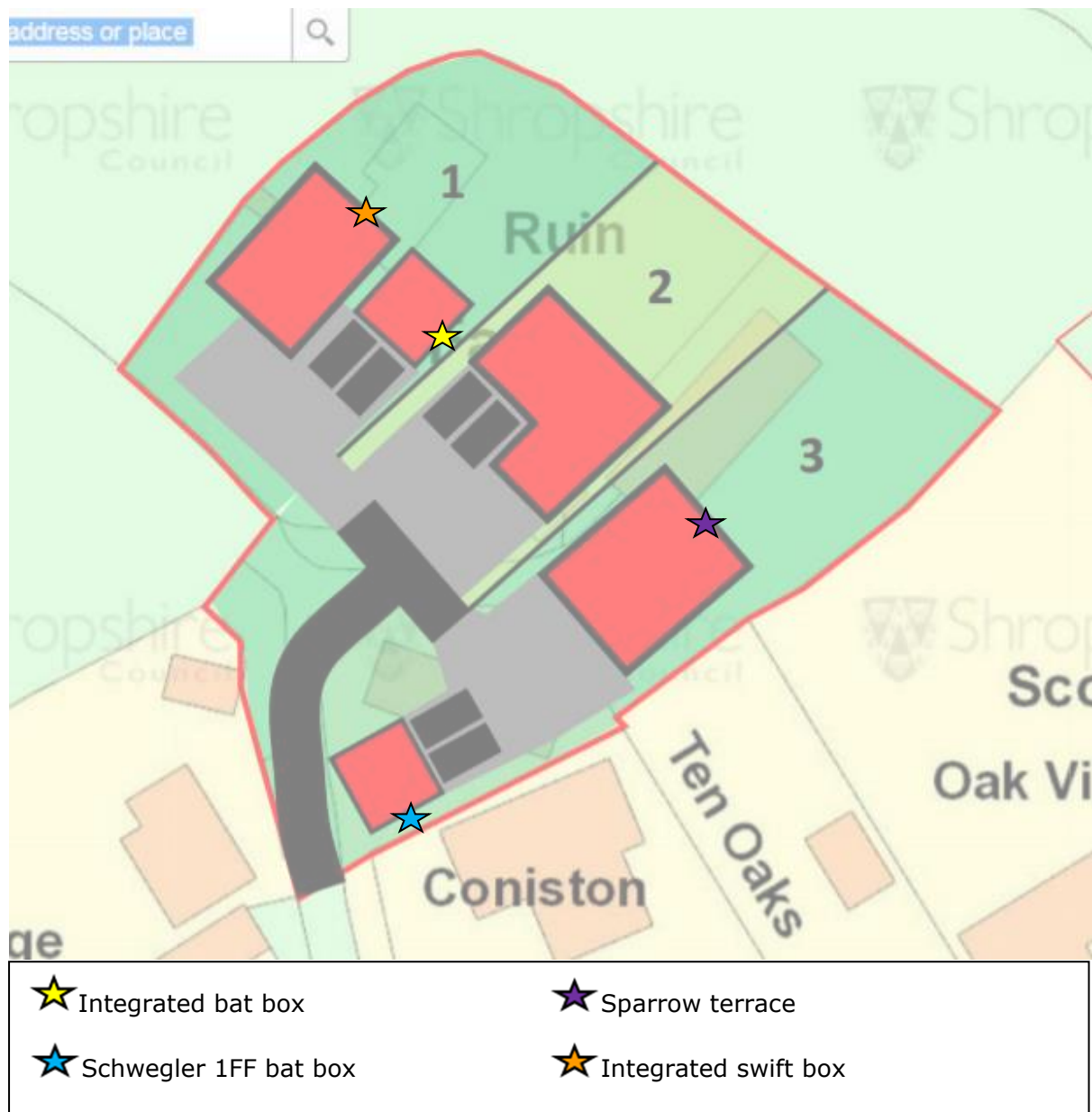


Figure 6.1. Proposed locations of enhancements

Artificial Habitats

It is recommended that provision be made for roosting opportunities for bats with the erection of at least one woodcrete bat box suitable for day roosts on one of the new buildings or a nearby tree. These will be erected at a height of 3-4 m and in a southerly, westerly or easterly facing direction.



Figure 6.2. Example woodcrete bat box: Schwegler 1FF

It is recommended that permanent provision be made for roosting opportunities for bats with the inclusion of an integral bat box in one of the new buildings. This will be erected at a height of 3-4 m and in a southerly, westerly or easterly facing direction.

Enclosed Bat Box (B and C)

- Designed specifically for the pipistrelle bat
- Available in all brick types
- Discrete home for bats
- Various sizes
- Several roosting zones are created inside the box
- Bats are contained within the bat box itself
- Maintenance free with entrance at the base
- Ideal for new build & conservation work



Bat Box B



Bat Box C

Eco Habitats for Bats	Sizes (mm)	Durability
Bat Box Type A	215 x 65	F2 S2 – Fully Frost Resistant
Bat Box Type B	215 x 215 or 215 x 290	F2 S2 – Fully Frost Resistant

Figure 6.3. Example integral bat box

Lighting

- A lighting scheme will be drawn up in line with ILP and BCT Guidance Note 08/18.
- All newly proposed external lighting will be directed away from any vegetated boundary features to retain dark corridors for commuting bats.
- There will be no direct illumination of any enhancement features erected for bats.
- All domestic lighting will be below 10 lux, orientated towards the ground and controlled by PIR (Passive Infra-red), set on a short timer.

6.3.3 Monitoring

Any enhancements erected for bats will be monitored in the summer following the completion of development to determine the level of success. This will be at the cost of the developer.

6.4 Other Mammals

6.4.1 Impacts

Without consideration there is likely to be no loss of habitat for terrestrial mammals.

6.4.2 Mitigation and Enhancements

No mitigation or monitoring is required.

6.5 Birds

6.5.1 Impacts

Work at this site will include the demolition and removal of the buildings, trees and hedgerows which could affect nesting birds if conducted during the nesting season.

6.5.2 Mitigation and Enhancements

Any tree or hedge removal will be done outside of the bird nesting season, which is February to August inclusive. If this is not possible, a suitably experienced ecologist will conduct a check within the 24 hours prior to work commencement to ensure no nesting birds will be affected.

Should a nesting bird be found, a 4m buffer will be left around the nest, and no further disturbance conducted until the young have fledged.

It is recommended that a range of woodcrete boxes are erected around the site to provide an enhancement for passerine birds, and a selection of the following would be appropriate. The location for these boxes was provided in Figure 6.1.



Figure 6.4. Bird boxes

6.6 Amphibians

6.6.1 Impacts

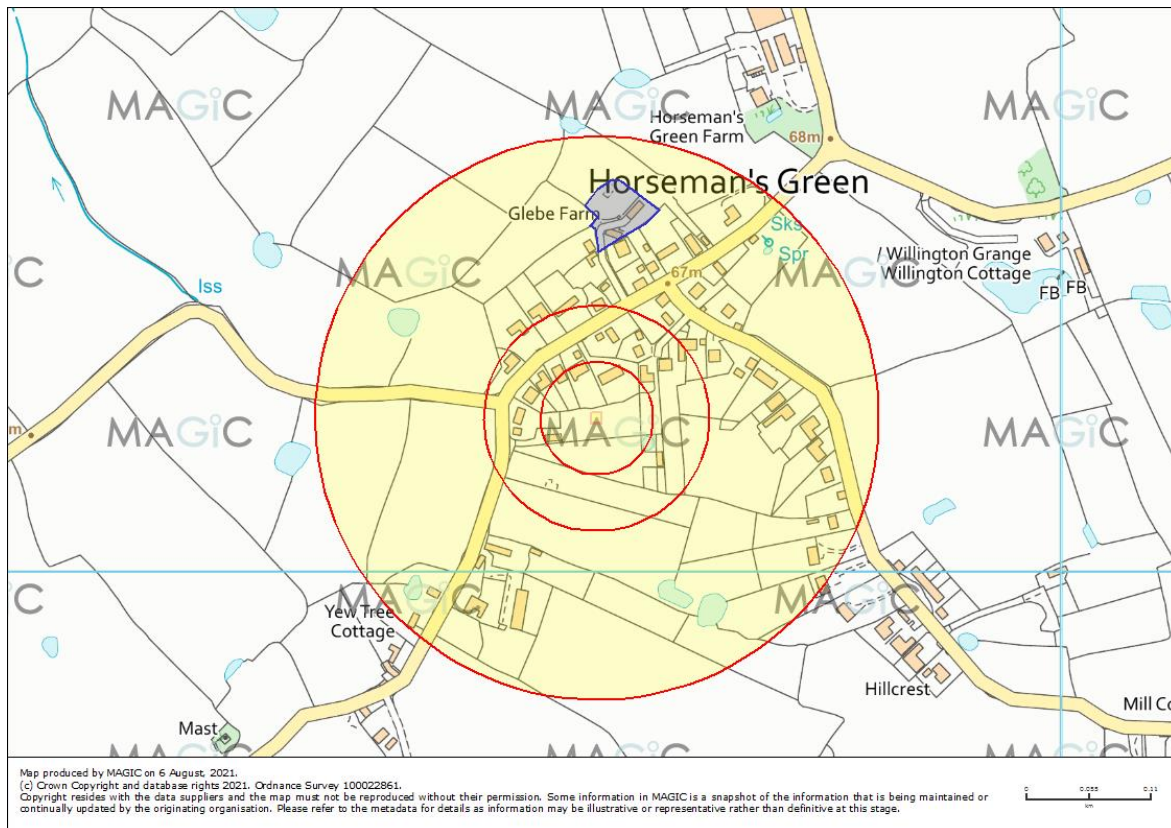


Figure 6.5. 50, 100 and 250m buffers from nearest pond containing GCN

The nearest pond to site shown to support great crested newts (through a positive eDNA analysis) was pond 24. This is approximately 150m from site.

Pre- and mid-development impacts

i. Core Terrestrial Habitat (0-50m)

The area immediately around pond 24 will not be directly affected by the development.

ii. Intermediate Terrestrial Habitat (50-250m)

The entire site falls within this range. The total area of the site is approximately 0.23ha.

The demolition of the buildings could kill and injure individual newts, which would present a moderate negative impact on the population.

The removal of the trees and hedgerows could lead to killing and injury of individual newts and the loss of terrestrial habitat for foraging and hibernacula, which would present a moderate negative impact on population.

iii. Distant Terrestrial Habitat (>250m)

The wider terrestrial habitat will not be directly affected by the development.

Long-term Impacts

The intermediate terrestrial habitat consisting of trees and hedgerows will be lost and is likely to reduce the terrestrial habitat for newts.

There is not likely to be a loss of connectivity with any newts in the area in the long term.

Post-development Interference Impacts

Post-development there is unlikely to be any interference with the population of newts.

6.6.2 Mitigation and Enhancements

The Mitigation Solution

The residential development would lead to a net loss of habitat. This has been taken into consideration at the planning stage and an area for compensation and enhancement has been identified. The rest of the field surrounding site (i.e. between the development and pond 3) will be enhanced for great crested newts by allowing vegetation to grow, and by installing shelter features such as a hibernaculum along the boundary.

Work will follow a strict method statement outlining reasonable precautions for securing the safety of individual newts. This will create a scenario by which the risk to individual newts is negated.

Summary

Great crested newts are known to be in the Horseman's Green area and the nearest pond is 50m away, although this was not seen to support newts in any survey of site. The nearest pond proven to support newts is pond 24, 150m from site, which tested positive in an eDNA analysis. This pond is separated from site by poor terrestrial habitat such as the road and domestic development.

The site itself is mostly of negligible value to amphibians in their terrestrial phase. The tyres, tarpaulin and vegetation are to be removed under a method statement to further minimise the risk to individual newts. An ecologist is also to be employed as an Ecological Clerk of Works to ensure there are no newts on site before work commences.

Working Method Statement

Pre-Construction

1. The site will be kept under management prior to construction. This will reduce the potential for newts to cross the land and reduce the potential for the terrestrial features to improve. All plants will be kept short (<10cm) to ensure there is no shelter for great crested newts on the site

Site Setup

2. A consultant will be employed as the ECoW to oversee the work in areas sensitive to great crested newts on site. This person will need to be licensed and an experienced surveyor for great crested newts.
3. The ECoW will provide contractors with a toolbox talk prior to work commencing. This will include information about the legal status of newts and responsibilities of the construction company to ensure no offence is committed. A document to assist with the identification of newts will be left on site.
4. The site will be checked thoroughly by the ECoW prior to construction commencing. This will confirm there are no newts present and that there are no potential places of shelter.

5. Soil and vegetation will be stripped prior to setting up the site compound to ensure the compound contains no vegetation which could potentially attract great crested newts
6. All cabins and equipment will be located on firm compacted ground, preferably a stone or concrete base.
7. Contractors are advised not to handle newts at any time.

Construction Phase

8. The site foreman will be responsible for ensuring all contractors are aware of the potential to find newts, and that they are familiar with the appearance of newts. If in doubt the ECoW will be contacted.
9. Contractors are advised to avoid handle newts at any time.
10. Stored subsoil must not be tipped onto any tall vegetation. The location of the storage area will be checked by the ECoW immediately before use.
11. Any plants around the site will be kept short to stop the development of an area of terrestrial habitat more suitable for newts.
12. Removal of any unwanted plants will be conducted between February and May when there is least opportunity for newts to be hibernating in the roots. The ECoW will be on site when this occurs.
13. All work will be conducted during daylight hours as newts are least likely to move during this time.
14. Major construction work within 100m of Pond 3 – this includes trenches for services, footings and other groundworks will be conducted between December to February when there is least movement of newts between ponds.
15. Trenches will be dug and filled in on the day created or will be covered over with close-fitting boards at the end of each working day, and then checked the following morning. This is particularly important when newts are most active, between March and November.
16. If necessary, a ramp will be placed in trenches to allow newts and small mammals to escape.
17. Any heavy machinery will be stored on an area of hardstanding to avoid refugia being created.
18. Stored material will be raised on pallets to reduce the potential they might act as a temporary resting place. This reduces the potential for damage or destruction of individual newts.

19. All waste will be placed straight into skips to reduce the potential of creating refugia.
20. If a newt is found, then work will stop immediately and the ECoW contacted for advice.
21. Great crested newts will not be handled or moved without express permission from Natural Resources Wales as this would constitute an offence.
22. It is recommended that regular site visits are carried out by the ECoW to ensure compliance with the legislation and the Method Statement. A record of these visits will be made as part of the audit trail.

Enhancements for Newts

1. The landscaping features will be designed to enhance the terrestrial features for newts. This will include new hedges and trees and wildflower planting.
2. A hibernaculum will be constructed along the hedgerow north of the proposed development. This is a generic term describing a place specifically designed to provide refuge for local fauna, in this case amphibians.

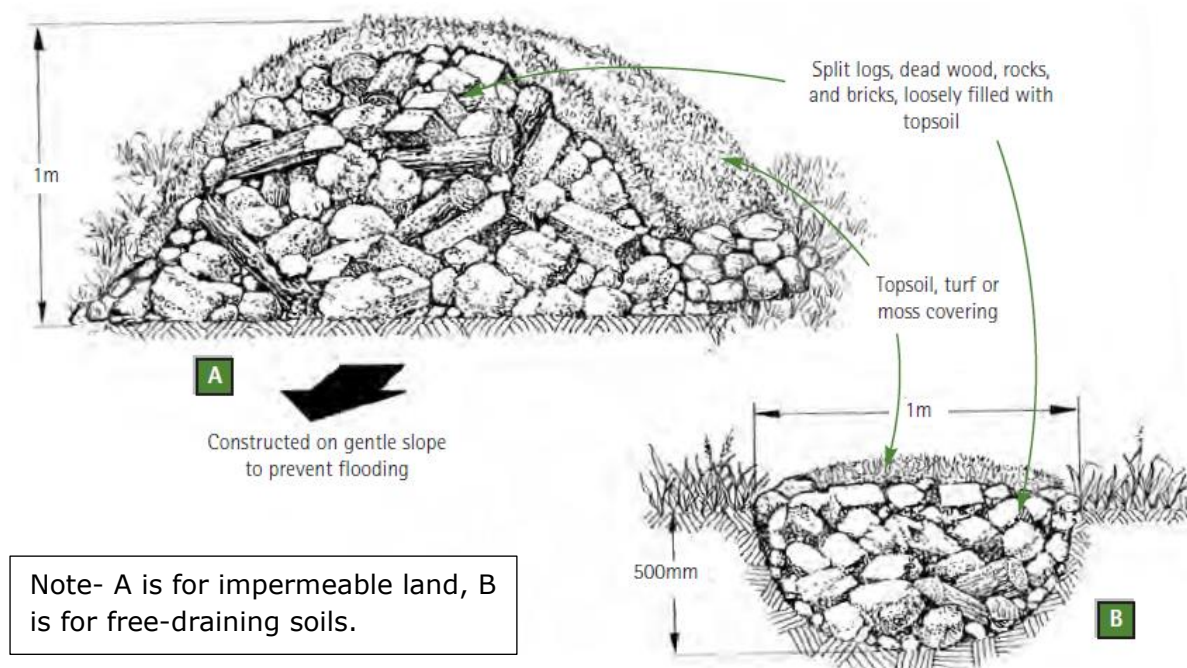


Figure 6.6. Hibernacula design from Froglife ©

3. The hibernaculum will be constructed of offcuts and bricks leftover from the development. The pile will be loosely covered with topsoil (but not compacted), and either allowed to vegetate naturally, or covered with turf.

6.7 Reptiles

6.7.1 Impacts

Working without due consideration for reptiles may result in the killing or injuring of individual newts when the vegetation, tarpaulin and tyres are removed.

6.7.2 Mitigation and Enhancements

The mitigation measures for great crested newts will also protect reptiles.

6.8 Invertebrates

6.8.1 Impacts

Without due consideration, removal of vegetation may affect local invertebrates by causing the loss of foraging habitat.

6.8.2 Mitigation and Enhancements

Invertebrate bricks will be incorporated into the new buildings to enhance the area for nesting bees.



Figure 6.7. Invertebrate brick and bug house

6.8.3 Monitoring

Failing boxes or enhancements will be replaced at the cost of the developer if deterioration or damage is noted within five years post-development.

6.9 Invasive Species

6.9.1 Impacts

There was no evidence of any invasive species on site.

6.9.2 Management

No management is required.

7 Concluding Remarks

The survey has focussed on the habitats or protected species to be damaged or destroyed as part of this development.

The buildings on site have low to negligible roost potential for bats. A precautionary bat activity survey was conducted on the ruins and the cowshed to determine whether the low-value features are being used by bats. No bats were seen using the buildings so no further surveys are necessary. The demolition of these buildings does not need to be done under a licence from Natural Resources Wales but will need to be done under a method statement. It is recommended that the site is enhanced via the erection of bat boxes.

Potential habitat for nesting birds was found in the buildings, trees and hedgerows. The only evidence found was in building 1. The demolition of the buildings and the removal of trees and hedgerows is to be done outside the bird nesting season (February to August inclusive). If this is not possible, a suitably experienced ecologist will conduct a check within the 24 hours prior to work commencement to ensure no nesting birds will be affected. It is recommended that the site is enhanced via the erection of bird boxes.

There are seven ponds within 250m of the site and 24 within 500m. Where possible these were surveyed using traditional bottle trapping methodology, though the nature of some ponds prevented this. These were assessed with eDNA techniques. A small population of newts was found in pond 10 (peak 3), a low-medium population in pond 12 (peak 11), and a positive eDNA result in ponds 5, 11 and 24. The site comprises low value habitat to newts in their terrestrial phase. The tarpaulin and tyres are to be removed under a method statement. An ecologist is also to be employed as the Ecological Clerk of Works. The rest of the field between the development and pond 3 will be left as compensatory habitat, and a hibernaculum will provide good shelter for amphibians in the area. These mitigation measures will also protect any reptiles on site.

No impact is expected on terrestrial mammals or invertebrates. No evidence of invasive species was found on site.

The method statements provided in this report will be followed, and works will be done at a suitable time of year. This will result in there being no further ecological constraints to the development as currently proposed.

Appendix A – Surveyor Details

Table A.1. Details of surveyors' experience and licences held

Name	Membership of associations/ experience	Licenses
Peta Marshall BSc(hons)MA	Principal Consultant MCIEEM PIEMA Peta has a degree in Applied Biology and has been working in commercial environmental assessment for over 10 years. She has 10+ years' experience surveying for protected species. As a member of the CIEEM she is bound by professional conduct.	Holder of survey licenses for bats and newts in England and Wales. Registered Consultant for Low Impact Class Licence for Bats <u>England:</u> Bats - 2015-12200-CLS-CLS BMCL - RC084 GCN - 2015-18939-CLS-CLS Dormice - 2017-29225-CLS-CLS <u>Wales:</u> Bats – S087133-1 GCN – S087606-1
Logan Maggs BSc(hons)	Lead Consultant Logan has a degree in Conservation and Land Management. He has 10 years' experience conducting environmental appraisals and phase 2 surveys for bats and newts in England and Wales.	Holder of survey licenses for bats and newts in England and Wales. <u>England:</u> Bats - 2016-24901-CLS-CLS GCN - 2017-29218-CLS-CLS <u>Wales:</u> Bats – S086874/1 Newts - 79665:OTH:SA:2018
Ben Jones BSc(hons) MSc	Lead Consultant Ben has a degree in Marine and Freshwater biology and a Master's degree in "Managing the Environment". He has 5 years' experience conducting environmental appraisals and phase 2 surveys for bats and newts in England and Wales.	Holder of survey licenses for bats and newts in England and Wales. <u>England:</u> Bats - 2017-29112-CLS-CLS GCN - 2016-25209-CLS-CLS <u>Wales:</u> Bats – S085098/2 GCN - 78716:OTH:SA:2018
Brian Marshall	Technical Director FIEMA CEnv PEA Consultant with over 35 years in the Environmental Sector	
Chloe Sheil MZool (Conservation)	Chloe has a master's degree in Zoology with Conservation from Bangor University. She has two years' experience assisting with surveys.	
Marcus Hoggs Bsc (hons) MSc	Marcus has a degree in Biology and master's degree in Advanced Wildlife Conservation in Practice. He has been assisting with bat surveys throughout the 2020 season.	

Appendix B – Methodology

Desk Study

Table B.1. Data sources

Organisation/Resource	Information Assessed
Cofnod	Protected/UK BAP Species records (1km)
MAGIC website	International statutory designations (1km) • Special Protection areas (SPA) • Special Areas of Conservation (SAC) • RAMSAR sites National statutory designations (1km) • Sites of Special Scientific Interest (SSSI) • National Nature Reserves (NNR) EPS Licenses for protected species (2km)

A data search was purchased from Cofnod on the 27th February 2020.

A search on Multi Agency Geographic Information for the Countryside (Magic Maps) determined nearby designated areas. The map is presented in Appendix C.

Field Survey

An assessment of habitats was conducted broadly following the JNCC Handbook for Phase 1 Surveys 2010. Target notes were used to identify potential for protected or notable species or habitats, and to give more detailed site descriptions.

The level of survey is aimed to identify field signs of or habitats with the potential to support protected species and therefore assist in the determination for detailed phase 2 surveys.

Determination of Ecological Value is based on the general criteria provided by IEEM (IEEM 2006).

Table B.2. Criteria of ecological values

Ecological Value	Description and Examples
High	Habitats or features that have high importance for nature conservation, such as statutory designated nature conservation sites of international or national importance or sites maintaining viable populations of species of international or national importance (e.g. Red Data Book species; European protected species).
Medium	Sites designated at a county or district level, e.g. Local Wildlife Site (LWS), ancient woodland site, ecologically 'important' hedgerows or ecological features that are notable within the context of a region, county or district (e.g. a viable area of a Priority Habitat on the county BAP or a site that supports a viable population of a county BAP species).
Low	Sites of nature conservation value within the context of a parish or neighbourhood, low-grade common habitats, such as arable fields and improved grasslands and sites supporting common, widespread species.

Hedgerows

The aim of the assessment is to ascertain whether the hedgerow could be classified as important according to the definitions listed in the Hedgerow Regulations 1997.

Species Surveys

Bats

Methodology used is in accordance with recommendations by BCT, Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition, Collins (2016).

Features on site were assessed for potential for bat roosts, foraging and commuting.

An external assessment of all structures on site was undertaken to determine potential roost features (PRF). The potential suitability of the structures assessed was assigned a rating of low to high in accordance with table 4.1 of Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd edition, Collins (2016).

An internal assessment of all structures was undertaken by a Natural Resources Wales licensed surveyor for evidence of roosting bats such as droppings, feeding remains and staining.

All trees were assessed from ground level. All trees examined were categorised on their potential roost features (PRF). These features include cracks, splits in limbs, cavities, loose bark and thick stemmed ivy. Where appropriate and accessible these features were assessed using binoculars and/or endoscopes.

Table B.3. Categorisation of trees for bats

Value for Bats	Example Features
Negligible	Young tree with no potential roost features
Low	Mature enough to have PRF, but no holes in trunk or limbs visible from ground level, very light ivy cover
Moderate	Broken limbs or hazard beams, raised bark, extensive ivy coverage
High	Extensive holes in trunk or limbs, dense ivy coverage, presence of cavities
Confirmed roost	Bat presence has been confirmed

Daytime surveys were conducted with the aid of a strong torch and a pair of Pentax Papilio 8.5x21 close focus binoculars. Bat species may leave little evidence of their presence. Evidence for the presence of bats includes:

- Holes, cracks and rot holes used as roosts, marked by streaks of urine and faeces.
- Smoothed, darkened edges where bats have rubbed and left natural body oils when entering and exiting a space.
- Faeces under a roof access point, a well-used feeding point or a resting spot.
- Feeding signs such as discarded insect wings under a feeding point.
- Lack of cobwebs around eaves, roof spaces, beams or ceilings where routes are kept clear by bats or presence of droppings in a cobweb.
- Presence of roosting or dead bats in or behind any object.

Phase 2 bat activity surveys were conducted to reinforce the findings using frequency division bat detectors (Anabat SD2, Anabat Walkabout, Wildlife Acoustics Echo Meter Touch).

Surveys were conducted when the weather conditions were suitable for bat activity, i.e. when the ambient temperature exceeded 10°C at sunset and when there was little or no rain. Dawns surveys are begun at least 1h30m before sunrise and continue until gone sunrise.

Activity surveys are conducted to establish the presence of bats within a structure, what species they are, approximately how many are present, and if possible, where they are exiting a roost.

Bats were identified from the characteristic echolocation calls using appropriate computer sonogram analysis software.

Badgers

Surveys were conducted using guidance from Scottish Natural Heritage commissioned Report No 096 (2003).

Daytime surveys for badgers involved looking for:

- Scrapings where badgers have dug for food or used as latrines.
- Signs of a sett, including signs of use such as presence of badger hair
- Tracks and prints.

Birds

Searching for evidence of nesting birds, including barn owls, involved looking for:

- Presence of nests
- Collections of droppings and/or feathers
- Highly distinctive droppings or splats under roosting points.
- Presence of owl pellets/feathers
- Listening for bird song
- Recording bird activity

Amphibians and Reptiles

The assessment of aquatic habitat is based on the Habitat Suitability Index (HSI) and is applied according to guidance set out by the Oldham 2000, superseded by ARG in 2010, ARG UK Advice note 5. The HSI is a quantitative method of assessing the potential quality of a body of water in terms of its ability to sustain a population of great crested newts.

The terrestrial habitats at the application site were surveyed and assessed for their suitability and potential value for the support of GCN. The general topography, ground conditions and presence or absence of vegetation were recorded. A refugia search was conducted for amphibians and reptiles by looking under any logs, large stones and other debris.

Egg searches were conducted by checking aquatic vegetation for folded leaves. Where possible, these leaves were unfolded to check for the presence of an egg. This is a destructive search, and so if a great crested newt egg was found the search was considered complete and no more leaves unfolded.

Four surveys were initially conducted for GCN, and if the presence of GCN was recorded, two further surveys were conducted to estimate the population size. At least three methods were used on each occasion from the following; egg searching, netting, torching and bottle trapping.

An eDNA test for great crested newts was conducted in accordance with the protocol set out in the Natural England technical advice note WC1067 (Biggs, J. *et al.*, 2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Appendix 5. Technical advice note for field and laboratory sampling of great crested newt (*Triturus cristatus*) environmental DNA. Freshwater Habitats Trust, Oxford. Water samples were analysed by Nature Metrics.

Appendix C – Policy

The following areas of policy and legislation are of relevance to ecology and provide context to the surveys conducted. Findings presented in this report are in line with the following:

The Conservation of Habitats and Species Regulations (2017) – as listed in:

- Schedule 2. European protected species of animals
- Schedule 5. European protected species of plants

The Wildlife and Countryside Act (1981) – as listed in:

- Schedule 1. Birds protected by special penalties at all times
- Schedule 5. Protected animals
- Schedule 8. Protected plants

Countryside and Rights of Way Act (2000)

Hedgerow Regulations (1997)

The Protection of Badgers Act (1992)

Natural Environment and Rural Communities (NERC) Act (2006)

National Planning Policy Framework (2018)

Policy 15 – Conserving and Enhancing the Natural Environment

The Nature Recovery Plan for Wales – Setting the course for 2020 and beyond (2015)

Environment Act (Wales) (2016)

Section 7

Wrexham Unitary Development Plan – EC6 Biodiversity Conservation

Hedgerows

All hedgerows are potentially protected by the Hedgerow Regulations 1997. Under these regulations it is against the law to remove or destroy certain hedgerows without permission from the LPA. These Regulations do not apply to any hedgerow within the curtilage of or marking the boundary of a dwelling house.

Permission is required before removing hedges that are least 20m in length and over 30 years old. Permission is gained by submitting a Hedgerow Removal Notice to the LPA as set out in Schedule 4 of the Regulations.

Permission is not required in the following instances:

- To make a new opening in substitute for an existing one which gives access to land.
- To obtain temporary access to any land in order to give assistance in an emergency.
- To gain access to land where another means of access is not available or is available at a disproportionate cost.
- For National Defence purposes.
- Where planning permission has been authorised except where permission has been granted by the Town and Country Planning General Permitted Development Order 1995.
- To carry out work for the purposes of flood defence or land drainage.
- To prevent spread of or ensure eradication of a plant or tree pest.
- For work undertaken by the Secretary of State in respect of any highway for which he is the highway authority or in relation to which he has the same powers as the Local Highway Authority.
- To prevent obstruction of or interference with electric lines and plant or prevent danger under the Electricity Act 1989.
- For the proper management of the hedgerow.

Hedgerows in areas covered by Historic Landscape Characterisation are often protected on the basis of historical importance and their wildlife value.

Hedgerows are listed as a habitat of principal importance under section 41 of the NERC Act (2004). This draws on the UK Biodiversity Action Plan (BAP) definition of priority habitats. Under the 2007 UK BAP, hedgerow priority habitat includes all hedgerows with at least 80% cover of at least one woody UK Native species (BRIG 2011).

Bats

All bat species are protected under the Conservation of Habitats and Species Regulations 2017 which implements the EC Directive 92/43/EEC in the United Kingdom. It is an offence, with certain exceptions, to:

- deliberately capture or kill any wild animal of a European Protected Species.
- deliberately disturb any such animal.
- damage or destroy a breeding site or resting place of such a wild animal.
- keep (possess), transport, sell or exchange, or offer for sale or exchange, any live or dead wild animal or plant of a European Protected Species, or any part of, or anything derived from such a wild animal or plant.

A person found guilty of an offence is liable on summary conviction to imprisonment for a term not exceeding six months or to an unlimited fine or to both.

Other Mammals

Badgers

Badgers and their setts are specifically protected under the Protection of Badgers Act 1992. The act was primarily brought into force to prevent the deliberate injury to or death of badgers. Some aspects of the act affect developers. It is important that developers are aware of any badger setts located on the land they intend to develop.

All personnel working on sites where there are badgers should be aware of the Protection of Badgers Act 1992. Under this legislation it is an offence to:

- Damage a badger sett or any part of it.
- Destroy a badger sett.
- Obstruct access to, or any entrance of a badger sett.
- Causing a dog to enter a badger sett.
- Disturbing a badger when it is occupying a badger sett.

Birds

Under Section 1 of the Wildlife and Countryside Act 1981 (as amended), birds, their nests and young are all protected from damage, particularly during the breeding season. The Act allows for fines or prison sentences for every bird, egg or nest destroyed. It makes it an offence to:

- Intentionally kill, injure or take any wild bird.
- Take, damage or destroy the nest of any wild bird whilst it is in use or being built.
- Take damage or destroy the egg of any wild bird.
- To have in one's possession or control any wild bird, dead or alive or egg or any part of a wild bird or egg.

Barn Owls

Barn owls are listed on Schedule 1 which gives them special protection.

It is an offence to:

- Intentionally kill, injure or handle any wild barn owl.
- Intentionally take, damage or destroy any wild barn owl nest whilst in use or being 'built'.

- Intentionally take or destroy a wild barn owl egg.
- Have in one's possession or control a wild barn owl (dead or alive) or egg (unless one can show it was obtained legally).
- Intentionally or recklessly disturb any wild barn owl whilst 'building' a nest or whilst in, on, or near a nest containing young.
- Intentionally or recklessly disturb any dependent young of wild barn owls.

It is not an offence to:

- Take a disabled wild barn owl solely for the purpose of tending it until fully recovered and then returning it to the wild.
- Kill, injure, take or disturb barn owls if these were incidental results of a lawful operation and could not reasonably have been avoided.

Amphibians and Reptiles

All species of amphibians receive a measure of protection under legislation.

The Wildlife and Countryside Act 1981 has been amended by the Countryside and Rights of Way Act (CROW) 2000. This applies to England and Wales only. The key relevant fact is:

- Section 9(4) is amended to create an additional offence of reckless damage to, destruction of, or obstruction of access to, any structure or place used for shelter or protection; and reckless disturbance while occupying such a structure or place.

Great Crested Newts

Great crested newts are protected under the Conservation of Habitats and Species Regulations 2017 which implements the EC Directive 92/43/EEC in the United Kingdom. It is an offence, with certain exceptions, to:

- Deliberately capture or kill any wild animal of a European Protected Species.
- Deliberately disturb any such animal.
- Deliberately take or destroy eggs of any such wild animal.
- Damage or destroy a breeding site or resting place of such a wild animal.
- Keep (possess), transport, sell or exchange, or offer for sale or exchange, any live or dead wild animal or plant of an European Protected Species, or any part of, or anything derived from such a wild animal or plant.

Great crested newts are listed as a priority species on the UK BAP and Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006.

A person found guilty of an offence is liable on summary conviction to imprisonment for a term not exceeding six months or to an unlimited fine, or to both.

Work can be conducted under derogation licence from Natural Resources Wales providing suitable compensation and mitigation is provided and the "three tests" can be met. These are:

- Regulation 55(2)(e) states: a licence can be granted for the purposes of "preserving public health or public safety" or other imperative reason of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment.

- Regulation 55(9)(a) States: the appropriate authority (Natural Resources Wales) shall not grant a licence unless they are satisfied "that there is no satisfactory alternative"
- Regulation 55(9)(b) states that the appropriate authority shall not grant a licence unless they are satisfied "that the action licensed will not be detrimental to the maintenance of the population of the species concerned at favourable conservation status in its natural range."

Invasive Species

Himalayan Balsam

Himalayan Balsam is identified as an invasive non-native plant. It is listed under Section 9 schedule 14 of The Wildlife and Countryside Act. It is illegal to plant or otherwise cause Himalayan Balsam to grow in the wild in the UK.

Japanese Knotweed

The management of Japanese knotweed (*Fallopia japonica*) is regulated by several pieces of legislation:

- The Wildlife and Countryside Act (as amended) 1981
- The Environment Protection Act 1990
- The Waste (England & Wales) Regulations 2011
- Third party litigation where damages may be sought for allowing Japanese knotweed to spread onto other properties.

Japanese Knotweed is listed in Schedule 9 of the Wildlife and Countryside Act 1981 (as amended). It is an offence to plant, cause the plant, or allow the plant to grow in the wild.

Giant Hogweed

Giant hogweed is a non-native invasive species originally introduced as an ornamental plant. It is now listed under Schedule 9 of the Wildlife and Countryside Act 1981. This means it is an offence to plant or otherwise cause this species to grow in the wild.

Appendix D – Bat Activity Survey

Conditions

The precautionary bat activity survey was conducted at dawn on 28th May 2020. The survey began at 03:00 and ended at 04:55. Sunrise was at 04:55.

The weather conditions were optimal for the survey. The temperature was 11°C at the beginning and 12°C at the end of the survey, the temperature at sunset on the previous day was 18°C. There was no wind or rain and cloud cover was less than 10%.

Location of Surveyors

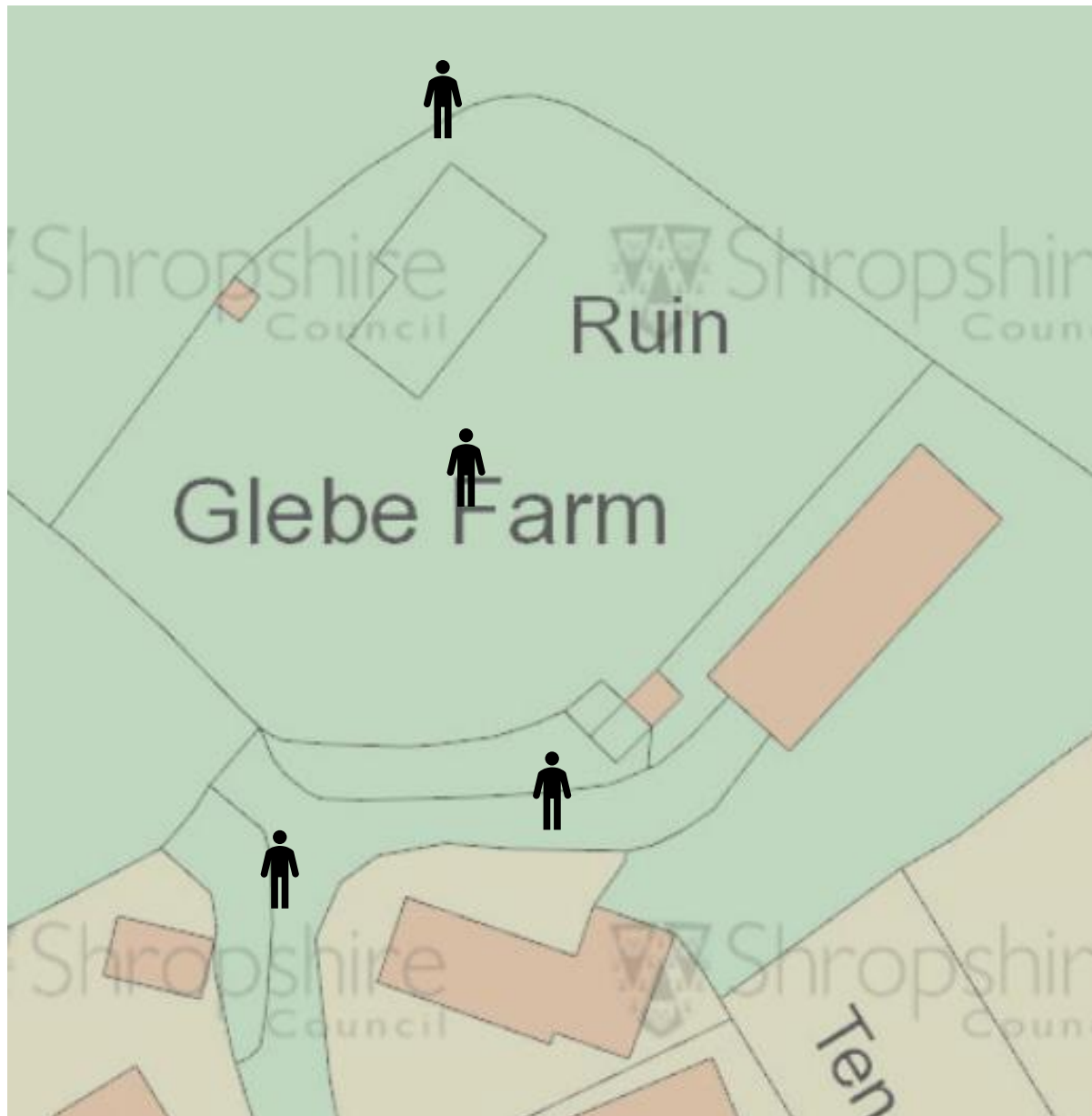


Figure D.1. Location of surveyors

Sonograms

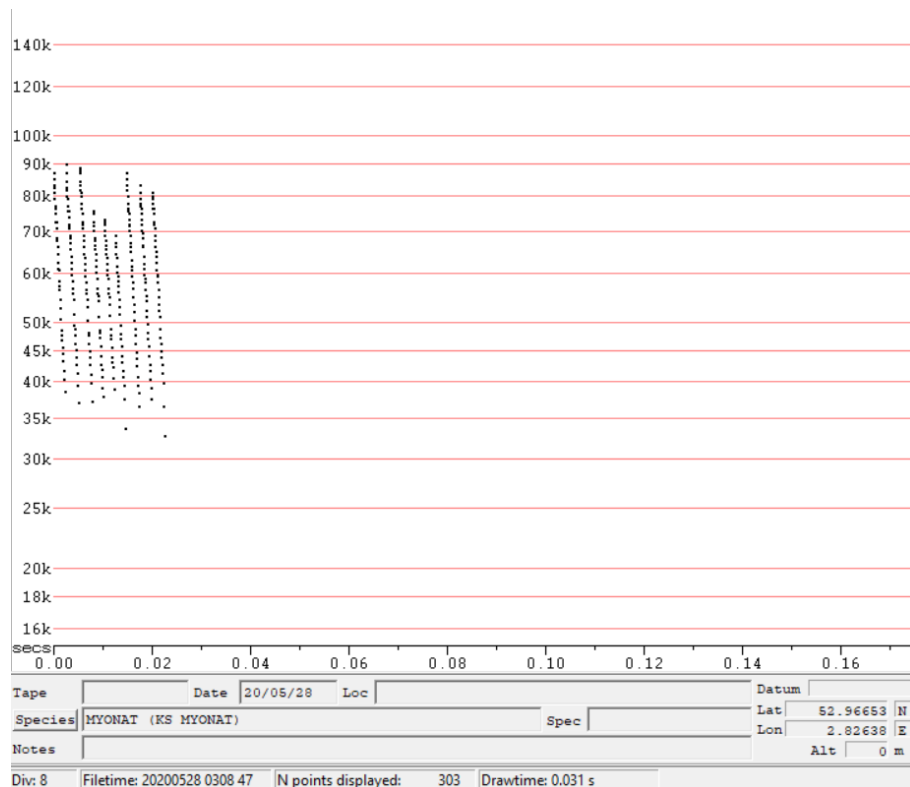


Figure D.2. Whiskered/Brandt's bat recorded at 03:09 (F7 compressed)

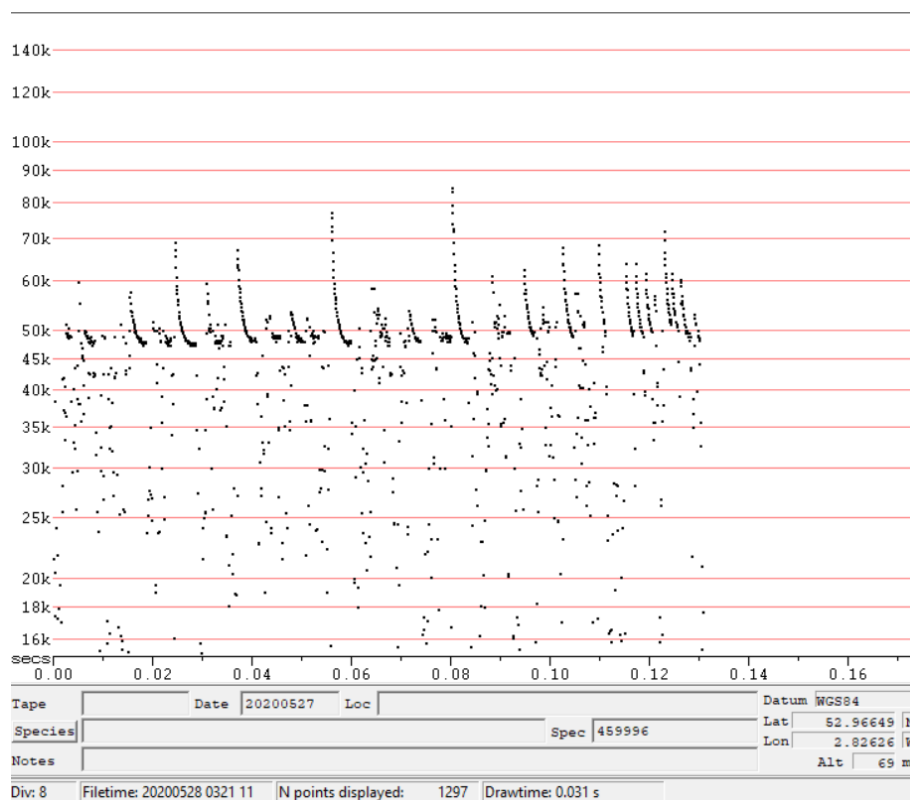


Figure D.3. Common pipistrelle recorded at 03:18 (F7 compressed)

Appendix E – HSI Scores

Pond 1

Pond 1 Grid reference: SJ44554160		
Geographic Location	1	Zone A
Pond Area	1	The pond is approximately 680m ²
Permanence	0.9	Never dries
Water Quality	0.33	Low invertebrate diversity
Shade	1	There was estimated to be 60% shading of the area within 1m of the perimeter
Waterfowl	0.67	Two mallards were seen on the pond
Fish	0.67	No evidence of fish but local conditions suggest they may be present
Pond Count	1	There are over 20 ponds within a 1km radius not separated by significant barriers
Terrestrial Habitat	0.33	Habitat with poor structure, mostly of grassland covering over 90% of 250m buffer
Macrophytes	0.5	There was approximately 20% cover of emergent vegetation in this pond
HSI Score	0.68 Average	

Pond 3

Pond 3 Grid reference: SJ44564139		
Geographic Location	1	Zone A
Pond Area	0.5	The pond is approximately 225m ²
Permanence	0.5	Dries between three years in ten to most years
Water Quality	0.33	Low invertebrate diversity, no submerged plants
Shade	1	There was estimated to be 50% shading of the area within 1m of the perimeter
Waterfowl	0.67	Two mallards were seen on the pond
Fish	1	No evidence of fish but local conditions suggest they may be present
Pond Count	1	There are over 20 ponds within a 1km radius not separated by significant barriers
Terrestrial Habitat	0.33	Habitat with poor structure, mostly of grassland covering over 90% of 250m buffer
Macrophytes	0.3	There was no floating or emergent vegetation in this pond
HSI Score	0.59 – Below Average	

Pond 4

Pond 4 Grid reference: SJ44414122		
Geographic Location	1	Zone A
Pond Area	1	The pond is approximately 500m ²
Permanence	0.9	Never dries
Water Quality	0.33	Low invertebrate diversity
Shade	1	There was no shading within 1m of the perimeter
Waterfowl	0.33	None seen, but potential given ducks and geese seen in the area – cattle just moved into the field so will poach the banks similarly to fowl
Fish	0.67	No evidence of fish but local conditions suggest they may be present
Pond Count	1	There are over 20 ponds within a 1km radius not separated by significant barriers
Terrestrial Habitat	0.33	Habitat with poor structure, mostly of grassland covering over 90% of 250m buffer
Macrophytes	0.4	There was very little floating or emergent vegetation in this pond, cover was estimated to be 10%
HSI Score	0.62 – Below Average	

Pond 6

Pond 6 Grid reference: SJ44734128		
Geographic Location	1	Zone A
Pond Area	0.05	The pond is approximately 40m ²
Permanence	1	Rarely dries
Water Quality	0.67	Moderate water quality. Netting revealed backswimmers and small insect larvae
Shade	1	There was <5% shading within 1m of the perimeter
Waterfowl	0.67	None seen, but feathers found along the banks and geese seen on the pond in the past
Fish	1	No fish seen
Pond Count	1	There are over 20 ponds within a 1km radius not separated by significant barriers
Terrestrial Habitat	0.33	Habitat with poor structure, mostly of grassland covering over 80% of 250m buffer
Macrophytes	0.4	There was very little floating or emergent vegetation in this pond, cover was estimated to be 10%
HSI Score	0.56 – Below Average	

Pond 10

Pond 10 Grid reference: SJ44294128		
Geographic Location	1	Zone A
Pond Area	0.85	The pond is approximately 450m ²
Permanence	0.9	Never dries
Water Quality	0.33	Low invertebrate diversity
Shade	1	There was shading of approximately ~10% of the 1m perimeter
Waterfowl	0.33	Greylag geese with goslings seen on pond, left during assessment and returned as surveyor moved on
Fish	0.67	No evidence of fish but local conditions suggest they may be present
Pond Count	1	There are over 20 ponds within a 1km radius not separated by significant barriers
Terrestrial Habitat	0.33	Habitat with poor structure, mostly of grassland covering over 90% of 250m buffer
Macrophytes	0.45	There was very little floating or emergent vegetation in this pond, cover was estimated to be 15%
HSI Score	0.62 – Below Average	

Pond 11

Pond 11 Grid reference: SJ44314110		
Geographic Location	1	Zone A
Pond Area	1	The pond is approximately 580m ²
Permanence	0.9	Never dries
Water Quality	0.01	Only fly larvae found, and those in low numbers
Shade	1	There was shading of approximately ~20% of the 1m perimeter
Waterfowl	0.67	Duck seen on the surface upon arrival
Fish	0.67	No evidence of fish but local conditions suggest they may be present
Pond Count	1	There are over 20 ponds within a 1km radius not separated by significant barriers
Terrestrial Habitat	0.33	Habitat with poor structure, mostly of grassland covering over 90% of 250m buffer
Macrophytes	0.3	There was no floating or emergent vegetation in this pond
HSI Score	0.46 – Poor	

Pond 12

Pond 12 Grid reference: SJ44424098		
Geographic Location	1	Zone A
Pond Area	0.45	The pond is approximately 220m ²
Permanence	0.9	Never dries
Water Quality	0.33	Low invertebrate diversity
Shade	1	There was almost no shading of the pond
Waterfowl	0.67	Two mallards seen on the water, limited aquatic vegetation aside from yellow flag iris
Fish	0.67	No evidence of fish but local conditions suggest they may be present
Pond Count	1	There are over 20 ponds within a 1km radius not separated by significant barriers
Terrestrial Habitat	0.33	Habitat with poor structure, mostly of residential areas and grassland covering over 90% of 250m buffer
Macrophytes	0.5	There is approximately 20% cover of yellow flag iris
HSI Score	0.63 - Average	

Pond 15

Pond 15 Grid reference: SJ44914093		
Geographic Location	1	Zone A
Pond Area	0.3	The pond is approximately 130m ²
Permanence	0.5	Sometimes dries
Water Quality	0.67	Moderate water quality. Netting revealed water beetles and water slaters
Shade	1	There was no shading of the pond at all
Waterfowl	1	No evidence of waterfowl
Fish	0.67	No evidence of fish but local conditions suggest they may be present
Pond Count	1	There are over 20 ponds within a 1km radius not separated by significant barriers
Terrestrial Habitat	0.33	Habitat with poor structure, mostly of residential areas and grassland covering over 90% of 250m buffer
Macrophytes	0.8	This pond is completely covered in vegetation
HSI Score	0.67 - Average	

Pond 18

Pond 18 Grid reference: SJ44964125		
Geographic Location	1	Zone A
Pond Area		The pond is approximately 2000m ² , so this factor is not included
Permanence	0.9	Never dries
Water Quality	0.33	Low invertebrate diversity. Only water slaters found
Shade	1	There was 10% shading of the pond banks
Waterfowl	0.67	A heron was seen on the pond
Fish	0.01	Stocked with koi carp.
Pond Count	1	There are over 20 ponds within a 1km radius not separated by significant barriers
Terrestrial Habitat	0.67	Habitat with poor structure, mostly of arable fields and grassland covering over 80% of 250m buffer
Macrophytes	0.4	Vegetation cover is 10%
HSI Score	0.43 - Poor	

Pond 19

Pond 19 Grid reference: SJ45074133		
Geographic Location	1	Zone A
Pond Area	0.3	The pond is approximately 130m ²
Permanence	1	Rarely dries
Water Quality	0.67	Moderate water quality. Dragonfly larvae, damselfly larvae and small insect larvae found.
Shade	1	There was no shading of this pond
Waterfowl	1	No evidence of waterfowl
Fish	1	No fish seen or netted
Pond Count	1	There are over 20 ponds within a 1km radius not separated by significant barriers
Terrestrial Habitat	0.33	Habitat with poor structure, mostly of arable fields and grassland covering over 80% of 250m buffer
Macrophytes	0.8	Vegetation cover is 50%
HSI Score	0.75 - Good	

Pond 20

Pond 20 Grid reference: SJ45084124		
Geographic Location	1	Zone A
Pond Area	0.985	The pond is approximately 800m ²
Permanence	1	Rarely dries
Water Quality	0.33	Poor water quality. Very little vegetation
Shade	0.8	There was 70% shading of this pond
Waterfowl	1	No evidence of waterfowl
Fish	0.67	No fish seen
Pond Count	1	There are over 20 ponds within a 1km radius not separated by significant barriers
Terrestrial Habitat	0.33	Habitat with poor structure, mostly of arable fields and grassland covering over 90% of 250m buffer
Macrophytes	0.35	Vegetation cover is <5%
HSI Score	0.68 - Average	

Pond 23

Pond 23 Grid reference: SJ44624166		
Geographic Location	1	Zone A
Pond Area	1	The pond is approximately 700m ²
Permanence	0.9	Never dries
Water Quality	0.33	Low invertebrate diversity
Shade	1	There was almost no shading of this pond
Waterfowl	0.67	Mallards seen on the pond
Fish	0.67	No fish seen but local conditions suggest they may be present
Pond Count	1	There are over 20 ponds within a 1km radius not separated by significant barriers
Terrestrial Habitat	0.33	Habitat with poor structure, mostly of residential areas and grassland covering over 80% of 250m buffer
Macrophytes	0.7	There is at least 40% cover of emergent vegetation
HSI Score	0.71 - Good	

Pond 24

Pond 24 Grid reference: SJ44594113		
Geographic Location	1	Zone A
Pond Area	0.1	The pond is approximately 80m ²
Permanence	0.9	Never dries
Water Quality	0.33	Poor water quality. Very little vegetation. No invertebrates netted
Shade	1	There was no shading of this pond
Waterfowl	1	No evidence of waterfowl
Fish	1	No fish seen
Pond Count	1	There are over 20 ponds within a 1km radius not separated by significant barriers
Terrestrial Habitat	0.33	Habitat with poor structure, mostly of residential areas and grassland covering over 80% of 250m buffer
Macrophytes	0.35	Vegetation cover is <5%
HSI Score	0.57 – Below Average	

Appendix F – Phase 2 Newt Surveys

Date	Time	Temp °C Start-Finish	Sunset / Sunrise	Condition
12/05/2021	20:00-00:00	12-11	20:58	Dry, 100% cloud cover, F2 wind
13/05/2021	20:45-22:00	12-12	20:59	Light drizzle, overcast, no wind
14/05/2021	20:45-22:00	11-10	21:00	Light rain, overcast, F2 wind
25/05/2021	20:30-22:15	11-9	21:19	Dry, overcast, F2 wind
01/06/2021	20:00-20:30	20-19	21:26	Dry, sunny, F1 wind
02/06/2021	20:00-20:30	18-17	21:28	Dy, sunny, F0 wind

Pond 1 - GR: SJ44554160															
Visit No	Date	Turbidity	GCN Results							SN		PN		CF	CT
			Torch/Net			Bottle trap			Egg						
			M	F	J	M	F	J		M	F	M	F		
1	12/05/2021	1/5	0	0	0	0	0	0	N	0	0	0	0	0	0
2	13/05/2021	1/5	0	0	0	0	0	0	N	0	0	0	0	0	0
3	14/05/2021	1/5	0	0	0	0	0	0	N	0	0	0	0	0	0
4	25/05/2021	1/5	0	0	0	0	0	0	N	0	0	0	0	0	0
Bottles	10 bottles. Some areas of banks are too heavily vegetated.														
Veg cover/5	2/5														

Pond 3 - GR: SJ44564139															
Visit No	Date	Turbidity	GCN Results							SN		PN		CF	CT
			Torch/Net			Bottle trap			Egg						
			M	F	J	M	F	J		M	F	M	F		
1	12/05/2021	2/5	0	0	0	0	0	0	N	0	0	0	0	0	0
2	13/05/2021	2/5	0	0	0	0	0	0	N	1	0	0	0	0	0
3	14/05/2021	2/5	0	0	0	0	0	0	N	1	1	0	0	0	0
4	25/05/2021	2/5	0	0	0	0	0	0	N	0	0	0	0	0	0
Bottles	5 bottles. Some areas of banks not accessible.														
Veg cover/5	0/5														

Pond 4 - GR: SJ44414122															
Visit No	Date	Turbidity	GCN Results							SN		PN		CF	CT
			Torch/Net			Bottle trap			Egg						
			M	F	J	M	F	J		M	F	M	F		
1	12/05/2021	1/5	0	0	0	0	0	0	N	0	0	0	0	0	0
2	13/05/2021	1/5	0	0	0	0	0	0	N	5	0	0	0	0	0
3	14/05/2021	1/5	0	0	0	0	0	0	N	5	0	0	0	0	0
4	25/05/2021	1/5	0	0	0	0	0	0	N	2	1	0	0	0	0
Bottles	20 bottles.														
Veg cover/5	3/5														

Pond 10 - GR: SJ44294128															
Visit No	Date	Turbidity	GCN Results							SN		PN		CF	CT
			Torch/Net			Bottle trap			Egg						
			M	F	J	M	F	J		M	F	M	F		
1	12/05/2021	1/5	0	0	0	0	0	0	Y	0	0	0	0	0	0
2	13/05/2021	1/5	0	0	0	0	0	0	-	0	0	0	0	0	0
3	14/05/2021	1/5	0	0	0	1	0	0	-	1	0	0	0	0	0
4	25/05/2021	1/5	0	0	0	0	0	0	-	0	0	0	0	0	0
5	01/06/2021	1/5	0	0	0	0	3	0	-	2	0	0	0	0	0
6	02/06/2021	1/5	0	0	0	0	1	0	-	1	0	0	0	0	0
Bottles	10 bottles. Some areas of banks not accessible due to heavy vegetation.														
Veg cover/5	3/5														

Pond 12 - GR: SJ44914093															
Visit No	Date	Turbidity	GCN Results							SN		PN		CF	CT
			Torch/Net			Bottle trap			Egg						
			M	F	J	M	F	J		M	F	M	F		
1	12/05/2021	Permission was not granted to view this pond until after this survey date													
2	13/05/2021	4/5	0	0	0	1	6	0	N	0	0	0	0	0	0
3	14/05/2021	4/5	0	0	0	1	5	0	N	1	0	0	0	0	0
4	25/05/2021	3/5	0	0	0	1	2	0	N	0	0	0	0	0	0
5	01/06/2021	3/5	0	0	0	1	7	0	N	1	0	0	0	0	0
6	02/06/2021	3/5	0	0	0	3	8	0	N	1	0	0	0	0	0
Notes	15 bottles. Late start as permission not granted until 13/05/2021														
Veg cover/5	1/5														

Pond 15 - GR: SJ44914093															
Visit No	Date	Turbidity	GCN Results							SN		PN		CF	CT
			Torch/Net			Bottle trap			Egg						
			M	F	J	M	F	J		M	F	M	F		
1	12/05/2021	1/5	-	-	-	0	0	0	N	1	1	0	0	0	0
2	13/05/2021	1/5	0	0	0	0	0	0	N	1	1	0	0	0	0
3	14/05/2021	1/5	0	0	0	0	0	0	N	1	0	0	0	0	0
4	25/06/2021	1/5	0	0	0	0	0	0	N	0	0	0	0	0	0
Bottles	5 bottles. Some areas of banks not trappable due to heavy vegetation.														
Veg cover/5	5/5														

Pond 20 - GR: SJ45084124															
Visit No	Date	Turbidity	GCN Results							SN		PN		CF	CT
			Torch/Net			Bottle trap			Egg						
			M	F	J	M	F	J		M	F	M	F		
1	12/05/2021	1/5	0	0	0	0	0	0	N	0	0	0	0	0	0
2	13/05/2021	1/5	0	0	0	0	0	0	N	0	0	0	0	0	0
3	14/05/2021	1/5	0	0	0	0	0	0	N	0	0	0	0	0	0
4	25/05/2021	0	0	0	0	0	0	N	0	0	0	0	0	0	0
Bottles	10 bottles. Southern section of the pond not accessible.														
Veg cover/5	0/5														

Pond 23 - GR: SJ44624166															
Visit No	Date	Turbidity	GCN Results							SN		PN		CF	CT
			Torch/Net			Bottle trap			Egg						
			M	F	J	M	F	J		M	F	M	F		
1	12/05/2021	1/5	0	0	0	0	0	0	N	0	0	0	0	0	0
2	13/05/2021	1/5	0	0	0	0	0	0	N	0	0	0	0	0	0
3	14/05/2021	1/5	0	0	0	0	0	0	N	0	0	0	0	0	0
4	25/05/2021	1/5	0	0	0	0	0	0	N	0	0	0	0	0	0
Bottles	15 bottles. Northern section of the pond not accessible.														
Veg cover/5	0/5														

eDNA Survey Results

Table F.1. eDNA results for ponds 5, 6, 11 and 24

Kit ID	Pond ID	Arrived	Inhibition	Degradation	Score	Status
2784	'Pond 5'	15-Jun	NA	No	11	Positive
2785	'Pond 6'	15-Jun	No	No	0	Negative
2788	'Pond 11'	15-Jun	NA	No	4	Positive
2787	'Pond 24'	15-Jun	NA	No	11	Positive

Appendix G – Bibliography

ARG UK (2010). ARG UK Advice Note 5: Great Crested Newt Habitat Suitability Index. Amphibian and Reptile Groups of the United Kingdom.

Chartered Institute of Ecology and Environmental Management (CIEEM), (2006). *EcIA Guidance (Terrestrial, Freshwater and Coastal 2006)*.

Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn).

Bat Conservation Trust

Biggs J, Ewald N, Valentini A, Gaboriaud, C, Griffiths, RA, Foster, J, Wilkinson, J, Arnett, A Williams, P and Dunn F (2014). Analytical and methodological development for improved surveillance of Great Crested Newt Appendix 5. Technical advice note for field and laboratory sampling of great crested newts (*Triturus cristatus*) environmental DNA. Freshwaters Habitats Trust, Oxford

Conservation of Habitats and Species Regulations 2017:

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

English Nature (2001) *Great crested newt mitigation guidelines* - English Nature

JNCC

HMSO (2000) *Countryside and Rights of Way Act 2000* - HMSO, London

<http://www.legislation.gov.uk/ukpga/2000/37/contents>

HMSO (1981) *Wildlife and Countryside Act 1981* - HMSO, London

<http://www.legislation.gov.uk/ukpga/1981/69>

HMSO (1992) *The Protection of Badgers Act* - HMSO, London

<http://www.legislation.gov.uk/ukpga/1992/51/contents>

ILP (2018) Guidance Note 08/18 Bats and artificial lighting in the UK, The Institute of Lighting Professionals

Mitchell-Jones A.J. (2004) Bat Mitigation guidelines, English Nature

National Planning Policy Framework 2018:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/728643/Revised_NPPF_2018.pdf

Natural England – Nature on the Map, Magic Maps. Copyright Natural England, containing Ordnance Survey data, crown copyright and database right 2018:

<http://magic.defra.gov.uk/magicmap.aspx>

Natural Environment and Rural Communities Act 2006:

<http://www.legislation.gov.uk/ukpga/2006/16/contents>