

Land at Llanfoist  
**Monmouthshire**

An Ecological Survey  
Report By:



On behalf of:



**October 2020**  
Revision 1: November 2020

<b>Client</b>	<b>Monmouthshire County Council</b>
<b>Project Name</b>	<b>Land at Llanfoist, Monmouthshire</b>
<b>Report Title</b>	<b>Ecological Survey Report</b>
<b>File Reference</b>	<b>GEN1819</b>

<b>Status</b>	<b>Name</b>	<b>Position</b>	<b>Date</b>
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## 1 Executive Summary

- 1.1 An area of land, to the east of Llanfoist is to be developed for the purposes of creating a Velo Park; a traffic-free, tarmac cycling track. To support the proposals, a Preliminary Ecological Appraisal was undertaken in 2019. Further survey effort was recommended following this initial survey which included survey for great crested newts, reptiles and bats. This further survey work was undertaken in 2020.
- 1.2 Further survey effort was carried out in order to ascertain the great crested newt population class size of Pond 6 and Pond 1, since these were found to be positive for great crested newt by eDNA assessment carried out in 2019. No great crested newts were noted during the survey, however great crested newt eggs were found within emergent vegetation of Pond 1. The site is therefore a breeding site for great crested newts and a European Protected Species Licence for this species is required in order to carry out the works.
- 1.3 A robust survey for reptiles was carried out across the site, a single grass snake was found beneath a refuge on the 9<sup>th</sup> April 2020. All British reptile species are protected under the Wildlife and Countryside Act 1981 (as amended), an Ecological Method Statement is required to safely carry out the works with regard to reptiles and other protected and priority species on site.
- 1.4 A number of trees were assessed as suitable for roosting bats, if these trees are to be retained and safeguarded, no further survey is required for bats. If trees are to be removed or pruned, targeted survey effort of identified trees must occur during the appropriate time of year. Recommendations are detailed in this report.
- 1.5 The site is used for foraging and commuting by a number of bat species, as observed during the transect and vantage point surveys. The majority of the site is currently dark and sheltered, therefore light spill from the proposed velo park will have a detrimental impact on bat behaviour, if light levels are not kept low. High levels of light pollution may result in bats altering their foraging and commuting behaviour, especially as a number of light sensitive species were recorded at the site. A sensitive lighting scheme is therefore necessary to consider the presence of nocturnal fauna on site.
- 1.6 A static monitoring device was deployed on the site twice during the survey period, in July and October, each time running for a week. It was deployed in the same location on both occasions. Over 1500 records were gathered during the first occasion, yet only just over 30 records were recorded during the first survey session.

## 2 Introduction

- 2.1 Plans are being prepared for development of a Velo Park or Closed Road Circuit (CRC) on an area of land at Llanfoist, Monmouthshire. The design for this leisure and sport cycling facility includes associated infrastructure. The site comprises an area of land covering some 21.3 hectares and is centred on National Grid Reference SO 29673 12921, at an altitude of approximately 52m Above Ordnance Datum.
- 2.2 At present the site is tenanted by several local farming businesses and comprises a mixture of semi-improved grassland and marshy grassland, along with non-ruderal vegetation and many mature trees. In order to support the proposals and determine the presence of protected species to be present, the Just Mammals Consultancy LLP was commissioned to conduct survey for great crested newt (GCN), reptiles, and bats, following the recommendations of the original Preliminary Ecological Appraisal in 2019.
- 2.3 A small area in the south-west of the site was not included in the original Phase 1 Habitat Assessment carried out in 2019, in order to update the survey with the correct red line boundary, a site visit was made to this area to assess the habitat in May 2020.
- 2.4 Previous eDNA assessment, carried out in 2019 of ponds within 500m of the site to determine the presence/absence of GCN, found samples from Pond 6 and Pond 1 were positive, indicating the presence of GCN in these ponds. Therefore, further survey effort was carried out in 2020 in order to ascertain population class size. An eDNA assessment of Pond 7, which was not accessible during the initial 2019 survey was also carried out as part of the 2020 suite of surveys.

A robust survey effort for reptiles was carried out across the site, in addition to an assessment of trees on site for the suitability of roosting bats. A number of dusk observation surveys to determine the use of the site by bats were also undertaken, by way of transects and vantage point observations. This report sets out the findings of the survey effort and makes appropriate recommendations in light of these findings.

### 3 Survey Team Experience

- 3.1 Leading the survey and co-author of this report is Carola Hoskins, assisted by Phoebe Williams and a small team of experienced ecologists in the survey, further details are given in Table 1 below.

**Table 1: Survey Team Experience**

Name/Position	Experience
Diane Morgan BA (Hons) ACIEEM Senior Ecologist	Diane is an ecologist of 20 years, with considerable experience of surveying built structures for bats. With respect to amphibians, and specifically great crested newts, she is an accredited agent on Natural Resources Wales (NRW) licence to survey for GCN (licence number: S085764/1 expiry date 31 <sup>st</sup> January 2021). Prior to her work as a consultant ecologist, Diane was the Director of Brecknock Wildlife Trust and was involved in a wide range of nature conservation work including species and habitat protection and conservation land management. Other areas of interest include otter, dormice, water voles, reptiles, amphibians, fungi and crayfish. Diane is a Senior Ecologist with the Just Mammals Consultancy LLP and an Associate Member of the Chartered Institute for Ecology and Environmental Management
Robert Morgan Ecologist	Rob is an experienced ecologist with over 10 years' experience. With respect to great crested newts, Rob is an accredited agent on NRW licence number: S085764/1 expiry date 31 <sup>st</sup> January 2021. Rob is an Ecologist with the Just Mammals Consultancy LLP
Carola Hoskins BA (Hons) MSc ACIEEM Senior Ecologist	Carola holds an MSc in Environmental Conservation Management and has practical expertise with bats, birds, botanical assessments, mammalian and reptile surveys. She holds licences for several protected species. As well as assisting in conservation-based research, she has carried out biodiversity audits and ecological enquiries. Carola holds licences with Natural Resources Wales for otters, bats, white-clawed crayfish and great crested newts (licence number: S086094/1 expiry date 31 <sup>st</sup> March 2021). She has completed a study of water voles and is currently assisting with bird ringing. Carola is a Senior Ecologist with the Just Mammals Consultancy LLP. She is an Associate Member of the Institute of Ecology and Environmental Management (ACIEEM).
Maja Hudej BA (Hons) MSc QCIEEM Trainee Ecologist	Maja is a Qualifying Member of the Chartered Institute of Ecology and Environmental Management (QCIEEM). She holds an MSc in Wildlife Conservation and Management. Maja has practical experience with bat and reptile surveys and is working towards protected species licences. Maja is a Trainee Ecologist with the Just Mammals Consultancy LLP.
Phoebe Williams BA (Hons) Student CIEEM Assistant Ecologist	A Geography graduate from the University of Exeter, and a former trainee at Gwent Wildlife Trust she has completed a Natural Talent trainee programme, studying Hemiptera at the National Museum of Wales. Practical experience includes survey work for dormice, botany, newts, reptiles, and invertebrates. She has also carried out practical habitat management work whilst volunteering for Gwent Wildlife Trust. Phoebe is undertaking a MSc in Wildlife and Conservation Management at the University of South Wales. She is currently employed as an Assistant Ecologist with the Just Mammals Consultancy LLP.
Andrew Ross MSc MCIEEM Ecologist	Andrew has over ten years of experience working as an ecological consultant with considerable experience working to safeguard wildlife at a range of development projects. As well as being a Full member of CIEEM, Andrew also carries EPS licences for surveying bats (NRW S087519/1 expiry January 2022), dormice (NRW S087518/1 Expiry Jan 2022) and great crested newts (NRW S085338/1 Expiry 31 Oct 2020) in England and Wales. Being certified in tree climbing and aerial rescue techniques, Andrew can also assess potential roosting features from height. Andrew is also certified as a Professionally Qualified Person under the ROLO (Registration of Land based Operatives) Health & Safety scheme. Between 2017 and 2019, Andrew worked very closely with the Bat Conservation Trust on their Bat Mitigation Project where he investigated the success of numerous bat mitigation schemes in England and Wales many years after compensation roosts were created.
Nic Aldridge MSc Survey Assistant	Following a degree in Botany and Zoology, Nic completed an MSc in Wildlife Management, Conservation and Control, both at the University of Reading. He has practical experience of field based research with a focus on invertebrate and vegetation diversity and has produced Phase 1 habitat surveys and habitat management plans. He has attended courses with the Bat Conservation Trust to improve his knowledge and skills and has led voluntary projects to develop habitats and collect species data.

## 4 Survey Methodology

### Reptile Survey Methodology

- 4.1 In order to ascertain reptile presence or likely absence of the site, 47 refugia were placed on site on Wednesday 18<sup>th</sup> March 2020. Refugia comprised corrugated metal sheets, which were distributed across the site in areas of suitable habitat. Refugia varied in size between 0.5m x 0.75m – 1.0m x 0.75m. Metal sheets were painted black on one side to maximise solar gain. Three sheets of roofing felt, sized between 0.5m x 0.75m were also used.
- 4.2 Each refuge was numbered and mapped on a site plan as shown in Figure 2 (see Appendix I). A two week bedding-in period was then observed. Seven subsequent monitoring visits were undertaken throughout April 2020, in suitable temperature conditions, carefully lifting each refuge to check specifically for the presence of reptiles. Any other animal found under the refugia was also recorded in a field notebook.

### Amphibian Survey Methodology

- 4.3 Analysis using eDNA is a recent development in surveying of GCN and is recognised by Natural Resources Wales as a method of determining their absence or presence. The eDNA water sample collected was undertaken in accordance with guidance set out in Biggs et al (2014). The sampling kits (provided by Surescreen Scientifics) allow real time polymerase chain reaction (qPCR) eDNA testing, in accordance to the Technical Advice Note (Biggs et al, 2014).
- 4.4 A total of 20 water samples were taken from Pond 7 on a day with suitable weather conditions between mid-April and mid-June. Samples were taken without disturbing the sediment or the surveyor entering the pond. Care was taken to prevent cross-contamination, and sterile equipment and gloves were used. The 20 samples were then aggregated and mixed, after which six 15ml sub-samples were pipetted into sterile tubes containing ethanol to preserve any eDNA present.
- 4.5 All six samples are pooled together for the extraction process. This pooled sample is then tested with real time PCR (qPCR), which amplifies the selected part of the DNA to allow it to be detected and measured, giving a positive or negative result. Each pooled sample is replicated eight times to ensure accurate results.
- 4.6 If results are returned as positive for great crested newt eDNA, it is concluded that this species is present, although the results are not a reliable indicator of population size, and detailed population assessment using traditional survey methods may be required depending on the nature, scale and potential impacts of the proposals. If the results are negative, it is concluded that GCN are absent from the pond and no further survey is required.
- 4.7 Survey effort to determine population class of great crested newts in Pond 6 and Pond 1 was conducted in May 2020. A refuge search was conducted in the surrounding area of the ponds, looking for amphibians under logs and litter. Following the refuge search, a search for newt eggs was carried out on the emergent vegetation. Bottle trapping was carried out using 15 bottle traps along the south-eastern edge of Pond 1 and 25 bottle traps in Pond 6. Additionally, the pond was inspected after dark with a 1million-candle power torch, to search for newts when they are active. Six survey occasions with three survey methods on each occasion were carried out, with bottle trapping being carried out on each occasion.

### Bat Survey Methodology

- 4.8 An assessment of trees was made from ground level, to consider their suitability for roosting bats, on Wednesday 20<sup>th</sup> May 2020. Assessment was undertaken in accordance with the Bat Conservation Trust's (BCT) Survey Guidelines (Collins, 2016). Trees were all categorised according to the highest suitability of the Potential Roost Feature (PRF) present. Trees noted as being suitable for roosting bats were tagged. Notes were made on a site plan, and photographic records taken.
- 4.9 When considering the likelihood of bats using the trees, the surveyor was not concerned with the size of the overall tree or its trunk diameter as even quite small trees can be used for roosting activity. Tree health is considered to be a much better indicator of the likely use by bats, as these



animals have no means of making holes in wood themselves. Instead they are reliant on naturally occurring cavities caused by rot or wind damage; holes made by other species such as woodpeckers; branches or limbs damaged by vehicles or other artificial means; growth of ivy (*Hedera helix*); and loose bark on trunks.

- 4.10 A transect route was determined as part of the preliminary assessment of trees on site on the 20<sup>th</sup> May 2020, to identify different habitats across the site that will likely be impacted by the proposed works. Transects were carried out in accordance with guidelines set out by BCT (Collins, 2016). This route was walked by an ecologist once a month from May to October 2020, commencing at sunset, and walked at a constant speed, stopping at numbered points for three minutes per stop. The surveyor was equipped with a bat detector and was listening to and recording the bats encountered, as well as making notes of the time, location and brief details of bat activity. The starting point was randomised across the surveys.
- 4.11 Simultaneous to the transect survey, a single observer was positioned at a strategic vantage point to obtain maximum coverage across the site, vantage points were different across the surveys and chosen to ensure a good coverage of the site was obtained. The surveyor recorded bat activity and focused their attention on particular commuting or foraging areas for bats, documenting the time, bat species and behaviour. Sunset times were established on site using a hand-held geo positioning system (GPS) and observers were able to communicate with each other using walkie talkie radio sets.
- 4.12 Surveyors were equipped with Pettersson D-240X machines. These devices are particularly sensitive and excellent at separating species which employ the middle range frequencies for foraging (45 – 55 kHz). They are therefore very good at identifying the different pipistrelle species (*Pipistrellus* sp.), and the different myotis bats\* (*Myotis* sp.) (\*myotis bat is a collective term used where the species could not be specifically identified beyond this broad group). The myotis group encompasses seven species of British bat including Alcaethoe's (*Myotis alcathoe*); Bechstein's (*M. bechsteinii*); Brandt's (*M. brandtii*); Daubenton's (*M. daubentonii*); Mouse-eared (*M. myotis*); Natterer's (*M. nattereri*); and the whiskered bat (*M. mystacinus*).
- 4.13 The Pettersson D-240X machine can be used in heterodyne or time expansion modes and for the purposes of this survey, only the time expansion facility was used. The received signals were then recorded to Roland RO-5, recording devices for later analysis. The time expansion method is similar to making a high-speed tape recording of a bat's ultrasonic call and then playing it back at a slower speed. Digital technology is used to make the recording and slow it down for play back. Since the signal is stretched out in time, it is possible to hear details of the sound not audible with other types of detector.
- 4.14 Time expansion is also the only technique which preserves all characteristics of the original signal, which makes time expanded signals ideal for sound analysis. In addition to the simple echo-location calls which can be used for commuting, enabling the bat to find its way about, bats will also produce feeding 'buzzes' when foraging. These buzzes occur when the bat closes in on its prey and are a consequence of the Doppler Effect, which results in a feeding 'buzz' as the reflected signal shortens when the animal approaches its prey. Such buzzes are used to assess the importance of an area for foraging. The recorded echo-location calls are then interpreted using BatSound sound analysis software. By use of the software it is possible to separate the different species by analysis of the sonograms produced.
- 4.15 A passive monitoring device (Song Meter SM3+BAT) full spectrum detector was deployed at the site from the 13<sup>th</sup>-20<sup>th</sup> of July 2020 and the 23<sup>rd</sup>-30<sup>th</sup> of October, attached to a tree just east of Pond 1 (See Figure 11). This device was programmed to record high frequency calls, typical of those made by bats during the night-time period between sunset and sunrise. Calls are automatically recorded and given filenames, which are time stamped and include a programmable prefix to uniquely identify recordings made by the device.

## 5 Site Description

- 5.1 Located to the east of the community of Llanfoist, the site is accessible through a gate west of the Llanfoist Household Waste Recycling Centre, and comprises several fields. A large proportion of the site is covered by grassland, although habitats along the field boundaries provide variety: dense scrub, non-ruderal vegetation and a small parcel of woodland are also present. A small



area of marshy grassland is located toward the south of the site. The fields toward the western extent of the site appear to be more regularly grazed, and have a sward height of some 3-5cm, compared with the less-regularly grazed eastern fields, which are rank and overgrown.

- 5.2 Small watercourses dissect the site, and lead into the River Usk, which runs north-south adjacent to the eastern boundary. Mature trees are dotted throughout, although are more prevalent on the peripheries of the site. Fields to the east are level and lead down to the Usk, and to the west the land formation develops into a few gentle slopes. A sewage pipeline rises centrally on the site, and runs parallel with a small water course.
- 5.3 Surrounding land use to the south is a golf course, pastoral and arable land and pockets of woodland. To the north lies the A465 dual carriageway, a sewage plant and further pastoral fields. To the east lie additional arable fields and the southern tip of Abergavenny.

## 6 Survey Constraints

- 6.1 Access to the site was possible at all times during the survey work. Slight disturbance was noted to two of the reptile tins on two separate occasions, they had been moved from their original positions. This was not considered a major constraint as the majority of tins remained undisturbed for the entirety of the survey.
- 6.2 The eastern end of Pond 7 was not accessible due to the dense vegetation and steep banks, therefore obtaining water samples from this area of the pond was not possible for eDNA testing. Samples were collected from various locations along the southern and western end of the pond.
- 6.3 Due to land ownership restrictions only the south-eastern end of Pond 1 was accessible, bottle traps were only placed within this end of the pond, similarly egg searches and torching was undertaken at this end of the pond only, limiting the reliability of the results, as effectively only part of the pond was surveyed and a lower survey effort was therefore carried out.
- 6.4 Torching was restricted in both ponds, in Pond 6 the water was very black making it difficult to see within the water, in Pond 1 there is very little open space of clear water in which to torch, much of the pond is covered with vegetation. However, in both ponds there were some clear areas to undertake torching.
- 6.5 The water levels of both ponds gradually decreased throughout the survey period, resulting in some difficulty in placement of bottle traps during the final visits in Pond 1. All bottle traps were however used.

## 7 Survey Results

### Reptile Survey Results

- 7.1 The reptile survey was carried out in April 2020. Details of the conditions under which survey was carried out are given in Table 2. Wind speeds given employ the Beaufort Scale.

**Table 2: Summary of Reptile Survey Activity and Weather Conditions**

Date	Activity	Timing	Weather Conditions
25/03/2020	Installation of reptile refugia (1 – 47) (PW, CH, MH)	N/A	N/A
07/04/2020	Monitoring of reptile refugia (PW)	16.00 – 17.00 hours British Summer Time (BST)	Air temperature: 17°C Cloud cover: 1/8 oktas Wind speed: F1, light air Conditions: Dry
09/04/2020	Monitoring of reptile refugia (PW)	09.45 – 10.40 hours BST	Air temperature: 14°C Cloud cover: 7/8 oktas Wind speed: F2, light breeze Conditions: Hazy
14/04/2020	Monitoring of reptile refugia (PW)	16.00 – 16.45 hours BST	Air temperature: 12°C Cloud cover: 0/8 oktas Wind speed: F1, light air Conditions: Dry
20/04/2020	Monitoring of reptile refugia (PW)	10.20 – 11.10 hours BST	Air temperature: 12.6°C Cloud cover: 0/8 oktas Wind speed: F3, gentle breeze Conditions: Dry

22/04/2020	Monitoring of reptile refugia (PW)	09.45 – 10.35 hours BST	Air temperature: 11.5°C Cloud cover: 0/8 oktas Wind speed: F3, gentle breeze Conditions: Dry
24/04/2020	Monitoring of reptile refugia (PW)	08.40 – 09.25 hours BST	Air temperature: 10.5°C Cloud cover: 0/8 oktas Wind speed: F3, gentle breeze Conditions: Dry
27/04/2020	Final monitoring and removal of refugia (PW, DM)	09.00 – 10.30 hours BST	Air temperature: 11°C Cloud cover: 8/8 oktas Wind speed: F3, gentle breeze Conditions: Dry
<b>Surveyors</b>	Carola Hoskins (CH), Maja Hudej (MH), Phoebe Williams (PW), Diane Morgan (DM).		

- 7.2 All refugia were checked during each visit, and the underneath inspected for reptiles. During the reptile survey a single male grass snake (*Natrix natrix*) was encountered on the second visit under tin number 29, just west of the watercourse. No other reptiles were recorded during the survey, two common toads (*Bufo bufo*) were noted under two tins on site. A number of small mammals were found under the tins, these included common shrew (*Sorex araneus*) and a vole (*Microtus sp.*), several mammal nests were also noted. Full details of survey results are shown in Table 6.

### Amphibian Survey Results

- 7.3 GCN surveys were conducted in April and May 2020 and the eDNA sample was collected on Tuesday 5<sup>th</sup> May 2020. Details of the conditions under which survey was carried out are given in Table 3. Wind speeds given employ the Beaufort Scale.

**Table 3: Summary of GCN Survey Activity and Weather Conditions**

Date	Survey Type Activity	Timing	Weather Conditions
07/04/2020	Newt survey of ponds 1 and 6 Refuge search, egg search, setting bottle traps, torch search. (Pond 1= 15 traps: Pond 6 = 25 traps) (DM/PW)	17.00 – 21.15 hours BST	Air temperature: 16.5°C Cloud cover: 4/8 oktas Wind speed: F2, light breeze Conditions: Dry
08/04/2020	Checking and taking in bottle traps (DM/PW)	07.15 – 09.00 hours BST	Air temperature: 9°C Cloud cover: 8/8 oktas Wind speed: F1, light air Conditions: Dry
10/04/2020	Newt survey of ponds 1 and 6 Refuge search, egg search, setting bottle traps, torch search. (Pond 1= 15 traps: Pond 6 = 25 traps) (DM/PW)	17.30 – 21.30 hours BST	Air temperature: 11°C Cloud cover: 0/8 oktas Wind speed: F3, gentle breeze Conditions: Dry
11/04/2020	Checking and taking in bottle traps (DM/PW)	07.15 – 9.00 hours BST	Air temperature: 10°C Cloud cover: 1/8 oktas Wind speed: F0, calm Conditions: Dry
23/04/2020	Newt survey of ponds 1 and 6 Refuge search, egg search, setting bottle traps, torch search. (Pond 1= 15 traps: Pond 6 = 25 traps) (DM/PW)	18.15 – 21.35 hours BST	Air temperature: 19°C Cloud cover: 1/8 oktas Wind speed: F0, calm Conditions: Dry
24/04/2020	Checking and taking in bottle traps (DM/PW)	09:00 – 09:25 hours BST	Air temperature: 8°C Cloud cover: 0/8 oktas Wind speed: F1, light air Conditions: Dry
30/04/2020	Newt survey of ponds 1 and 6 Refuge search, egg search, setting bottle traps, torch search. (Pond 1= 15 traps: Pond 6 = 25 traps) (DM/PW/MH)	19.00 – 22.00 hours BST	Air temperature: 9°C Cloud cover: 1/8 oktas Wind speed: F1, light air Conditions: dry
01/05/2020	Checking and taking in bottle traps (DM/PW/MH)	07.00 – 08.45 hours BST	Air temperature: 9°C Cloud cover: 1/8 oktas Wind speed: F3, gentle breeze Conditions: Dry
06/05/2020	Newt survey of ponds 1 and 6 Refuge search, egg search, setting bottle traps, torch search.	19.15 – 22.20 hours BST	Air temperature: 17°C Cloud cover: 1/8 oktas Wind speed: F1, light air

	(Pond 1= 15 traps: Pond 6 = 25 traps) (RM/PW)		Conditions: Dry
07/05/2020	Checking and taking in bottle traps (RM/PW)	07.00 – 08.30 hours BST	Air temperature: 9°C Cloud cover: 5/8 oktas Wind speed: F1, light air Conditions: Dry
17/05/2020	Newt survey of ponds 1 and 6 Refuge search, egg search, setting bottle traps, torch search. (Pond 1= 15 traps: Pond 6 = 25 traps) (RM/PW)	19.30 – 10.25 hours BST	Air temperature: 14°C Cloud cover: 4/8 oktas Wind speed: F2, light breeze Conditions: Dry
18/05/2020	Checking and taking in bottle traps (RM/PW) Phase 1 Habitat Assessment to update boundary line (PW)	07.30 – 09.15 hours BST 09.15 – 10.00 hours BST	Air temperature: 11°C Cloud cover: 0/8 oktas Wind speed: F4, moderate breeze Conditions: Dry
<b>Surveyors</b>	Diane Morgan (DM), Phoebe Williams (PW), Maja Hudej (MH), Rob Morgan (RM)		

- 7.4 The results from the newt survey sessions are summarised below in Table 4. No great crested newts (GCN) were encountered through any of the survey methods at either pond. However, GCN eggs were found in Pond 1 within the emergent vegetation which included water mint (*Mentha aquatica*). Smooth newts (*Lissotriton vulgaris*) were recorded in both ponds, a common toad (*Bufo bufo*) was found beneath a log to the south-west of Pond 1 and a common frog (*Rana temporaria*) was found beneath a stone on the western edge of Pond 6.

**Table 4: Summary of GCN Survey Results**

Session	Date	Activity	Results	
			Pond 1	Pond 6
1	07/04/2020	Natural refuge search	1 x toad under log	-
		Egg search	8 x GCN eggs on water mint	-
		Torch lit search	3 x small newts (smooth/palmate)	-
	08/04/2020	Monitoring of overnight bottle traps	-	2 x smooth newt (male)
2	10/04/2020	Natural refuge search	1 x toad under log	-
		Egg search	1 x GCN egg on water mint	-
		Torch lit search	-	-
	11/04/2020	Monitoring of overnight bottle traps	1 x smooth newt (female)	-
3	23/04/2020	Natural refuge search	1 x toad under log	-
		Egg search	1 x GCN egg on water mint	-
		Torch lit search	-	-
	24/04/2020	Monitoring of overnight bottle traps	-	-
4	30/04/2020	Natural refuge search	-	-
		Egg search	2 x GCN eggs on water mint	-
		Torch lit search	-	-
	01/05/2020	Monitoring of overnight bottle traps	-	-
5	06/05/2020	Natural refuge search	-	-
		Egg search	1 x GCN on emergent vegetation	-
		Torch lit search	-	-
	07/05/2020	Monitoring of overnight bottle traps	-	-
6	17/05/2020	Natural refuge search	-	1 x frog under stone
		Egg search	1 x GCN on emergent vegetation	-
		Torch lit search	-	-
	18/05/2020	Monitoring of overnight bottle traps	-	1 x smooth newt (female)

- 7.5 A variety of invertebrates were found in both ponds, these include mosquito larvae, great diving beetle (*Dytiscus marginalis*) and a whirligig beetle (*Gyrinus substriatus*) in addition to tadpoles found in Pond 1. Full details of survey results are shown by Table 7. Waterfowl was recorded on both ponds. A dead water shrew (*Neomys fodiens*) was found in one of the traps during the final, sixth bottle trapping session on the 18<sup>th</sup> of May. A population of water shrew was not known to be in this area prior to bottle traps being used.

- 7.6 The eDNA sample returned negative results for the presence of GCN eDNA in Pond 7. GCN eDNA was not detected, or was noted as being below the threshold detection level, the test result must therefore be considered as likely absence of GCN in Pond 7.

### Bat Survey Results

- 7.7 An assessment to determine the suitability of trees on site for roosting bats was undertaken on the 20<sup>th</sup> May 2020. Many trees, of a variety of ages were recorded on site. Trees with notable and obvious features were noted and mapped, and a suitability scale employed. Table 5 details the assessed trees and level of suitability noted. Trees with suitability were tagged.

**Table 5: Overall Suitability of Trees for Roosting Bats**

Tree Ref.	Tag no.	Tree Description	Level of Suitability	Reasons for Assessed Suitability
T1	001	Willow (dead), 10m high, DBH 0.75m	Low	Rot hole on north side of main trunk (1m high). Fully inspected with a torch, no bats or evidence of bats, suitable as an occasional day roost for small number of bats in the future. Lifted bark was noted and considered unsuitable.
T2	002	Sycamore, 9m high, DBH 0.5m	Low - Medium	Leafy ivy coverage on main stem, rot hole on inside of hollowed out main stem which extends upwards.
T3	003	Sycamore (dual-stemmed), 11m high	Low	Rot hole not extensive enough. Canker 6.5m high, slightly above protruding branch.
T4	004	Goat willow, 8m high	Negligible - Low	Several rot holes 0.5-2m high. Fully inspected with torch. No bats are evidence of bats. Potentially suitable for transient use in the future.
T5	Not tagged	Pedunculate oak, 10m high, DBH 1.2m	Low	No specific potential roost features noted, ivy could be covering features.
T6/T21	006	Pedunculate oak, 14m high, DBH 1.4m	High	Two large rot holes noted on the south-side, 2.2m and 5m high.
T7	007	Sessile oak, 12m high, DBH 1.3m	Low	No specific potential roost features noted, features may only be viewable from a height
T8	008	Crack willow, Multi-stemmed, 7m high, DBH 0.7m	Medium	Large crack on second stem that extends west over pond, looks extensive from the ground.
T9	009	Pedunculate oak, 8m high, DBH 1.2m	Low - Medium	Potential for PRFs in large trunk split from 5m upwards. Other features such as loose bark and a rotted-out cleft were exposed, with limited opportunities for shelter.
T10	Not tagged	Ash	Negligible	Looks suitable, but no obvious features
Wet woodland cluster	Not tagged	Crack willow	Low	Crack willow with cracks/splits, no obvious potential
Sycamore cluster	Not tagged	Sycamore	Negligible	No obvious potential roost features

- 7.8 A single tree was assessed as having high suitability due to the presence of large rot holes, a map showing the location and suitability of trees is shown in Appendix IV.
- 7.9 To determine the use of the site by bats, vantage point surveys and transects were carried out. Details of the conditions under which survey was carried out are given in Table 6. Wind speeds given employ the Beaufort Scale.

**Table 6: Summary of Bat Activity and Details of Weather Conditions**

Date	Survey Type Activity	Timing	Weather Conditions
28/05/2020	Vantage point survey and transect (PW, AR)	21.18 – 23.49 hours BST (sunset 21.18 hours)	Air temperature: 16.8 – 13.5°C Cloud cover: 1/8 oktas Wind speed: F1, light air Conditions: Dry
25/06/2020	Vantage point survey and transect (AR, NA)	21.35 – 23.39 hours BST (sunset 21.35 hours)	Air temperature: 16.5°C Cloud cover: 1/8 oktas Wind speed: F0, calm Conditions: Dry
28/07/2020	Vantage point survey and transect (AR, DM)	21.07 – 23.29 hours BST (sunset 21.07 hours)	Air temperature: 16°C Cloud cover: 1/8 oktas Wind speed: F1, light air Conditions: Dry
28/08/2020	Vantage point survey and transect	20.07 – 22.06 hours BST	Air temperature: 13.5°C

	(AR, RM)	(sunset 22.07 hours)	Cloud cover: 8/8 oktas Wind speed: F4, moderate breeze Conditions: Dry
29/09/2020	Vantage point survey and transect (RM, PW)	18.53 – 21.07 hours BST (sunset 18.53 hours)	Air temperature: 14.5°C Cloud cover: 1/8 oktas Wind speed: F1, light air Conditions: Dry
26/10/2020	Vantage point survey and transect (RM, PW)	16:50 – 20.00 hours Greenwich Mean Time (GMT) (sunset 16.54 hours)	Air temperature: 10.3 - 8 °C Cloud cover: 3/8 oktas Wind speed: F4, moderate breeze Conditions: Dry
<b>Surveyors</b>	Phoebe Williams (PW), Andrew Ross (AR), Nic Aldridge (NA), Rob Morgan (RM), Diane Morgan (DM)		

- 7.10 Full details of the bat transect and vantage point data gathered are shown in Appendix V. Common pipistrelle (*Pipistrellus pipistrellus*) and soprano pipistrelle (*Pipistrellus pygmaeus*) bats dominated the assessment. The third most recorded bat species at the site was Noctule (*Nyctalus noctule*), closely followed by a number of different *myotis* species. A small number brown long-eared (*Plecotus auritus*) and lesser horseshoe (*Rhinolophus hipposideros*) bats were also observed along the site boundaries. Foraging activity commenced shortly after sunset and regular flight lines were observed along the site boundaries. Dark corridors were noted for the passage of bats across the site.
- 7.11 A static monitoring device, an SM3, was deployed on site for a week on two occasions. Full results are presented in Tables 15 and 16. A large number of recordings were made during the July deployment, 1,525 in total, recording 2,146 bats. It is possible that the battery of the unit run out in the early hours of the 30<sup>th</sup> July. Some of the bats will have been recorded multiple times. Out of the bats recorded, just over 1,600 were pipistrelle bats, with nearly a thousand passes of soprano pipistrelles recorded, another five hundred passes of Noctule bats were recorded. First and last bats recorded during every night were Noctules, apart from the last recording, which as previously mentioned may have been just before the battery ran out. The number of recordings made decreased each night. Two passes of lesser horseshoe bats were recorded.
- 7.12 The second SM3 session yielded far fewer results, with only just over 30 records being made, some of which were not bats. Bats were not recorded on all nights. Recordings included common and soprano pipistrelles, brown-long eared, a Natterer's bat and three passes of lesser horseshoes.

### Additional Phase 1 Survey

- 7.12 A daytime visit was made on the 18<sup>th</sup> May 2020 to an area to the south-west of the site that was not included in the initial Phase 1 Habitat Assessment, this area falls within the new red line boundary. The area is consistent with the surrounding habitat and is essentially two heavily grazed horse fields with a hedgerow/tree boundary to the south and west. The grassland yielded common and widespread species including daisy (*Bellis perennis*), creeping buttercup (*Ranunculus repens*), with some bramble (*Rubus fruticosus*) and nettle (*Urtica dioica*) encroachment at the field margins. The updated Phase 1 Habitat map that includes this area can be seen by Figure 3. Assessment of the site remains the same following the survey of this area.

## 8 Discussion and Conclusions

- 8.1 It is planned to develop a Velo Park on land at Llanfoist in Monmouthshire, providing sport and leisure cycling facilities to local residents and tourists. The site is considered to be of moderate ecological interest. The original preliminary ecological appraisal recommended further survey effort for great crested newts, bats and reptiles due to the habitat recorded on site, which have since been carried out and are detailed in this report.
- 8.2 A robust survey effort for reptiles was conducted in the spring of 2020, where a single grass snake was recorded beneath a refuge on the 9<sup>th</sup> of April 2020. This was identified as an adult male. This tin was located on the edge of non-ruderal vegetation to the west of the site, at the bottom of an east facing slope, adjacent to the nearby watercourse. A presence/absence survey is only ever designed to ascertain whether reptiles are present on site, and which species.



Reptiles are elusive and it is considered likely that actual population size is larger than what was recorded during the survey. Suitable habitat on site includes areas where grassland and scrub meet, the large area of marshy grassland and a manure pile noted to the west of the site. Grass snakes occupy large territories and it is not unusual to only have found the specimen present on a single occasion.

- 8.3 It is anticipated that the proposed Velo Park will result in ground disturbance and the loss of suitable habitat for reptiles. All reptile species are protected under British Legislation, in particular the Wildlife and Countryside Act 1981 (as amended). The legal protection afforded to the species makes it an offence to kill, injure or sell the animals. Measures are recommended below to avoid an offence occurring and killing or harming reptiles, as well as features to retain and provide enhancements.
- 8.4 No GCN were found during the survey effort, however, GCN eggs were found within emergent vegetation in Pond 1. No eggs were found in Pond 6, there was a clear lack of emergent vegetation. Although no GCN were found during the survey effort, the positive eDNA results prove their presence within Pond 1 and Pond 6. Furthermore, the presence of GCN eggs within Pond 1 indicates the site is a breeding site for GCN. The ponds are to remain in situ following the development, however there will be terrestrial habitat loss to the development that is suitable for GCN as mentioned previously. Due to the proximity of both ponds to the development, and the presence of a breeding population of GCN in Pond 1, there is a high risk of killing or injuring a great crested newt during the development works. This would be an offence, whether intentionally or recklessly, under Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), unless working under a European Protected Species (EPS) licence (see Section 9).
- 8.5 The population size class assessment determines the population present within the ponds to be small. Pond 6 lies nearly 300m from the southern edge of the site. It is not anticipated that the development will have any impact on this pond. Pond 1 however, lies directly adjacent to the development site. The pond itself will be retained following development and no direct impact to the waterbody will be caused. However, the grassland habitat immediately surrounding pond 1 will be subject to development. No live GCN, but eggs were found present, indicating a small population. However, as only a section of the pond was surveyed, the result must be assessed with caution. The total circumference of the pond is 420m, the section Just Mammals was able to survey was 70m in length. Therefore, approximately a sixth of the pond was surveyed. The most straightforward approach is to times the survey results by six. As no live GCN was found, this multiplication would result in there still being a small population present within the ponds. Based on the evidence found, it seems unlikely that there is a moderate population present.
- 8.6 The track will run in close proximity to pond 1. It must be designed in such a way that movement to and from the pond is not cut off. As some of the grassland will be lost to the track, it will be necessary to improve the quality of the remaining grassland, as well as other suitable habitat on site. A scheme must be developed which ensures that suitable high quality features will be included within the designs, as well as managed and monitored adequately. Amphibian underpasses must be installed under the track, hibernation opportunities must be provided and the remaining grasslands quality must be high. GCN are not necessarily opposed to disturbance, so long as habitat conditions are right. The pond itself is not within the ownership of the applicant, but if possible management of the pond must occur in order to prevent it from scrubbing over completely.
- 8.7 A ground level assessment was carried out for determining the suitability of trees on site for roosting bats. Trees were categorised according to the highest suitability PRF present. Several trees were noted to be of medium and high suitability, three of which (T6, T9 and T8) are located within close proximity to the proposed Velo Park. All British bat species are named on Schedule 2 of the Conservation of Habitats and Species Regulations (Amendment) (EU Exit) 2019, which protects them from killing, injury and disturbance, as well as giving their roosts and places of rest protection from destruction, whether occupied or not. The proposed layout on the indicative masterplan does not appear to be in a location that requires felling of any trees. If trees are to be felled or severely pruned, further survey must be conducted on identified trees to ascertain the status of the tree(s) as potential bat roosts. Similarly, due to the age of trees, it is likely that over time features will develop increasing their suitability for roosting bats, therefore re-assessment is required if a considerable amount of time passes before development occurs.
- 8.8 The bat transects and vantage point observations revealed that bat activity occurs principally along the dark fringes of the site which are made up of hedgerows and treelines, and are planned

for retention. The north-east end of the site is relatively well-lit by light spill from security lighting of the adjacent waste centre, and during the transects light tolerant bats such as pipistrelle were recorded in this area. The areas further south, east and west of the site are considerably darker, with no artificial lighting present. Within these dark and sheltered areas, more light sensitive species, such as lesser horseshoe and several *myotis* species were recorded. These animals were observed commuting and foraging along the dark vegetated corridors of the site. The pond (Pond 1) and its adjacent vegetated margins were used by numerous bats for foraging and commuting, including the light sensitive species, lesser horseshoe. Similarly, a mature oak tree (T6/21) near to Point 16 was noted as a particular hot-spot for bats, with a variety of species using the tree canopy and adjacent dark treelines for commuting and foraging. The majority of the site is currently dark and sheltered, therefore light spill from the proposed velo park into these existing zones of dark vegetated habitat will have a detrimental impact on bat behaviour, if light levels are not kept low. High levels of light pollution may result in bats altering their foraging and commuting behaviour, especially as a number of light sensitive species were recorded at the site. A lighting scheme is therefore recommended and already in preparation.

- 8.9 Static monitoring was carried out on the site. A large number of records were returned, most of which were made during the summer session. These will serve to inform the lighting plan for the site. The majority of the calls were of pipistrelle bats, which are less light averse than other species. However, more light averse species including lesser horseshoe bats were also recorded and in general a lot of passes were made during the summer session. The tree is located in the centre of the site, near the pond and this area will likely be impacted by lighting.

## 9 Recommendations

- 9.1 No further survey effort is recommended for the site at this time. An Ecological Method Statement (EMS) must be provided, which will set out the various processes including a timetable for works with regard to reptiles and bats, in addition to general good practice measures. The legal protection of reptiles and GCN means that every effort must be made to ensure that they are not harmed during the development. Suitable mitigation habitat must be provided of either equal size or greater quality than the habitat currently present on site. A relocation effort for reptiles in this case is not recommended, instead a destructive search of the whole site must take place following the relocation effort for GCN as outlined below.
- 9.2 There is a population of breeding GCN in Pond 1 and GCN have been found to be present within Pond 6 as shown by the results of the eDNA assessment. Pond 1 is directly adjacent to the development site which means the risk of killing or injuring a newt during the works is high, and it will be necessary to apply for a European Protected Species licence from Natural Resources Wales, in order to carry out the works relating to GCN and the proposed Velo Park. Works must be preceded by a relocation of newts in order not to harm any animals during the works. This relocation must be conducted at the appropriate time of year when newts are active, and preferably trying to disperse into their breeding habitats. For the relocation effort, it will be necessary to install temporary amphibian/reptile fencing around the whole perimeter of the development site and likely also at intervals across the site. An adequate number of pitfall traps must be also installed and a trapping effort in accordance with the guidelines, which for a small sized population involves at least 30 nights of trapping, must be carried out.
- 9.3 Before any other action is taken, a mitigation area for both reptiles and amphibians must be created. The creation of compensatory terrestrial habitat must be made for the loss of habitat due to the development. It must be sited in an area unlikely to be disturbed and that will have free access to the breeding pond adjacent to the development site. The ponds will be retained following the works, so will the marshy grassland to the south of the site. This will serve as the relocation habitat area.
- 9.4 Prior to the development, a reptile/amphibian proof fence must be erected around the site and maintained through the development phase. Enhancements beyond the mitigation requirements must be carried out in order to satisfy the local planning policy. These must include areas of marshy and rough grassland, as well as hibernation features, such as a stone wall or hibernaculum. A general design for a log or rock pile is shown in Appendix VI. The manure pile located just north-east of Pond 1 must be dismantled by hand and relocated to the mitigation area in order to provide suitable egg laying habitat for grass snake. The manure pile must not be interfered with from June to September when eggs may be present, and not within the hibernation period, therefore it must be dismantled between April to May or October solely. Once the pile is relocated, it can be used to dispose of grass cuttings.



- 9.5 Due to the proximity of the Velo Park to the pond, GCN under-passes are proposed to ensure GCN can continue to move safely across the landscape to and from the breeding pond. These recommendations will form the basis of the measures to be included in an EMS for GCN for the site, in order to protect the GCN population and ensure its future viability. The EPS licence process will require its own method statement to be submitted, which will be for GCN only. Another EMS will need to be drawn up for reptiles and other issues on site.
- 9.6 Reptiles and amphibians can be found unexpectedly during the development works. If any such species are found during the development works, all works must cease and a suitably qualified ecologist contacted for appropriate advice. All native reptiles are listed on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), and are therefore protected under its provisions.
- 9.7 The majority of trees on site and all trees around the boundaries will be retained. A small number of trees are to be removed. Opportunistic roosting can occur within trees at any time. If tree felling is to be carried out within the active season, trees to be removed must be inspected by an ecologist prior to soft-felling being carried out.
- 9.8 Trees must be safeguarded during the works, this includes protection from root compaction and unnecessary damage during works. No heavy machinery is to be used within the 'drip-zone' of any of the mature trees and those identified as suitable for roosting bats, with said machinery to be kept on a designated hard standing pad.
- 9.9 Lighting is a key consideration for this site, a sensitive lighting scheme must be drawn up to take into account the presence of light-adverse, nocturnal fauna such as bats and GCN. Dark areas and corridors must be created, and maintained especially around the margins and vegetated areas of the site, including around Pond 1. Artificial lighting columns must be no higher than 5m, and be of a lux level of the lowest that is permitted by the Health and Safety Executive. Light sources must be directed away from any natural features such as the trees, hedgerow, water courses, and the pond.
- 9.10 Birds are likely to be using the site for nesting purposes. Clearance work of trees and scrub must therefore be carried out outside the breeding season for birds between the months of March to August inclusive. Where this is not possible, a search by an Ecological Clerk of Works immediately prior to the works will have to be carried out. If any nests are found during such a search, all works in the area must cease until such a time when the breeding effort is completed. Care must be taken to include the ground in any search, as ground nesting birds may be using the site.
- 9.11 To protect badgers and other mammals, such as otter, that may pass through the site, any trenches dug as part of the groundworks must be covered overnight, or, left with a 45° sloping side to prevent any animal from becoming trapped. Similarly, any unconnected pipes must be capped overnight to prevent any animal from becoming stuck.
- 9.12 Due to the close proximity of the River Usk SSSI and SAC, the Method Statement produced for GCN and reptiles must also ensure that the risk of contaminating this protected site from harmful pollutants as a result of development. This document must include emergency procedures if a spill occurs, measures to prevent spills and other safety measures such as storage of harmful materials, equipment and other tools. The MS must also include issues around run-off and change of the hydrology to the site, as such the marshy grassland to the south, must be retained as marshy grassland.

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## Appendix I: Site Plans

Figure 1: Site location plan



### Legend

- Site boundary
- Site location

### Phase 1 Habitat Survey Map

Site Reference:  
GEN1819

Map Scale:  
1:50,000 & 1:7,500


Source:  
© Google Satellite  
Imaging 2020

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Figure 2: Reptile refugia location map



Reptile refugia locations	
Site Reference: GEN1819	
Map Scale: 1:5700	
Source: © Google Satellite Imaging 2020	

**Legend**

- Reptile refugium
- Site boundary



## Appendix II: Site Photographs

Plate 1: Reptile tin no.29 location of grass snake



Plate 2: Grass snake found under tin no.29



Plate 3: Manure pile to the west of site



Plate 4: Marshy grassland to the south of the site



Plate 5: Pond 7 to the north-east of the site



Plate 6: Looking north-east at Pond 1



Plate 7: GCN egg found in Pond 1



Plate 8: Looking east over Pond 6





**Plate 9: Smooth newt found in bottle traps at Pond 6**



**Plate 10: Catch bucket from Pond 1 24/04/2020**

















## Appendix III: Phase 1 Vegetation Map

**Figure 3: Phase 1 habitat survey map**



### Legend

-  Site boundary
-  B2.2 - Neutral grassland - semi-improved
-  B5 - Marsh/marshy grassland
-  A2.1 - Scrub - dense/continuous
-  A1.1.1 - Broadleaved woodland - semi-natural
-  C3.2 - Other tall herb and fern - non ruderal
-  J1.3 - Cultivated/disturbed land - ephemeral/short perennial
-  Pond Accessed in 2020 for eDNA survey
-  Pond Accessed in 2019 for eDNA survey
-  Tree with notable/obvious features for roosting bats
-  Tree
-  G2.2 - Running water
-  Target note
-  Sewage pipeline

### Phase 1 Habitat Survey Map

Site Reference:  
GEN1819

Map Scale:  
1:4500

Source:  
© Google  
Satellite Imaging  
2020



## Target Notes

- TN1: Himalayan Balsam
- TN2: Giant Hogweed



## Appendix IV: Tree Assessment for Bats

Figure 4: Map showing overall suitability of trees assessed for roosting bats



### Legend

Overall tree suitability for roosting bats:

- High
- Medium
- Low-medium
- Low
- Negligible-low
- Negligible
- Site boundary

### Aerial View of Site

Site Reference:  
GEN1819

Map Scale:  
1:2,500

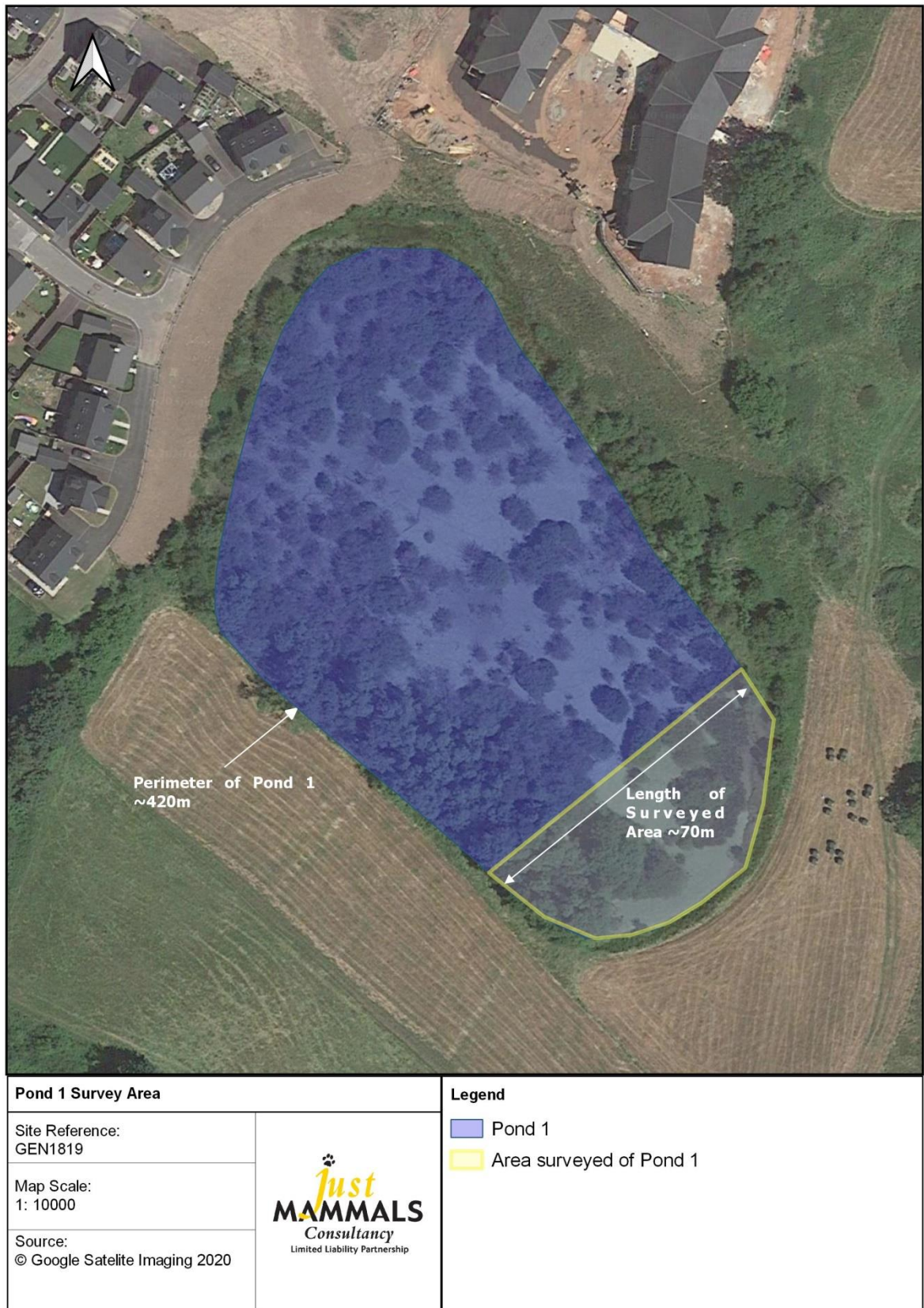
Source:  
© Google Satellite  
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## Appendix V: Perimeter and Survey Area of Pond 1

Figure 5: Map showing perimeter of pond and area surveyed



## Appendix VI: Full Survey Results

**Table 7: Reptile Survey Results**

No	Refuge	07/04/20	09/04/20	14/04/20	20/04/20	22/04/20	24/04/20	27/04/20
1	13							
2	23A							
3	12						Common shrew	
4	50							
5	31		Ants nest					
6	14	Ants nest	Ants nest					
7	6B				Ants nest	Ants nest		
8	19				Ants nest	Ants nest	Ants nest	
9	16							
10	3			Ants nest		Ants nest	Ants nest	
11	5A				Ants nest	Ants nest	Ants nest	
12	18		Ants nest	Ants nest	Ants nest	Ants nest		
13	46A				Ants nest	Ants nest	Ants nest	
14	13			Ants nest	Ants nest	Ants nest	Ants nest	
15	15					Ants nest	Ants nest	
16	14c							
17	45	Ants nest						
18	59							
19	38					Ants nest	Ants nest	
20	42							
21	52							
22	60							
23	10							
24	40	Had been moved						
25	34							
26	37	Ants nest						
27	7	Ants nest		Ants nest	Ants nest			
28	29	Ants nest	<b>Grass snake</b>					
29	6							
30	54							
31	9						Had been moved	Had been moved
32	14							
33	53							
34	2							
35	25				Ants nest			Ants nest
36	21				Vole	Mammal run		
37	24							
38	47							
39	21			Mammal nest			Toad	Toad
40	24						Vole	
41	14	Mammal nest						
42	15							
43	33							
44	58				Common shrew	Mammal nest		
45	9							Toad
46	8							
47	43							

**Key**

(A)= adult

(SA)= sub adult

(J) = juvenile

♂ = male

♀ = female

**Table 8: Great Crested Newt Survey Results**

Sessions 1 – 6	Activity	Result	Comment
Session 1	Pond 1 refuge search	1 med size toad under log	Limited potential refuges
	Pond 1 egg search	8 x GCN eggs on water mint	
	Pond 1 torch search	3 x small newts (smooth/palmate)	
	Pond 1 bottle traps	0	No newts, 1 x whirligig beetle, 1 x tadpole, 1 x stonefly larva 1 x great diving beetle larva
	Pond 6 refuge search	0	
	Pond 6 egg search	0	Lack of vegetation
	Pond 6 torch search	0	Mosquito larvae, water very dark and poor visibility
	Pond 6 bottle traps	0 GCN, 2 smooth newt (m)	A pair of mallard
Session 2	Pond 1 refuge search	1 med size toad under log	
	Pond 1 egg search	1 x GCN egg on water mint	Egg developing, larval features visible
	Pond 1 torch search	0	
	Pond 1 bottle traps	0 GCN, 1 smooth newt (f)	1 great diving beetle larva
	Pond 6 refuge search	0	A pair of mallard
	Pond 6 egg search	0	No vegetation
	Pond 6 torch search	0	1 x great diving beetle adult
	Pond 6 bottle traps	0	2 x great diving beetle larvae, 4 x tadpoles
Session 3	Pond 1 refuge search	1 med size toad under log	A pair of Canada geese
	Pond 1 egg search	1 x GCN egg on water mint	Egg developing, larval features visible
	Pond 1 torch search	1 x small newt (smooth/palmate)	
	Pond 1 bottle traps	0 GCN, 1 smooth newt (f)	2 x tadpoles, 2 x great diving beetle
	Pond 6 refuge search	0	A pair of mallard
	Pond 6 egg search	0	No vegetation
	Pond 6 torch search	0	Water level much lower, 1 x great diving beetle adult
	Pond 6 bottle traps	0	1 x great diving beetle adult, 1 x great diving beetle larva
Session 4	Pond 1 refuge search	0	4 pairs of Canada geese
	Pond 1 egg search	2 x GCN eggs on water mint	
	Pond 1 torch search	0	Very little clear open water
	Pond 1 bottle traps	0	
	Pond 6 refuge search	0	
	Pond 6 egg search	0	No vegetation
	Pond 6 torch search	0	Water very black
	Pond 6 bottle traps	0 GCN, 1 smooth newt (f)	
Session 5	Pond 1 refuge search	0	
	Pond 1 egg search	1 x GCN on water mint	
	Pond 1 torch search	0	
	Pond 1 bottle traps	0	4 x tadpoles, 3 x diving beetle adult
	Pond 6 refuge search	0	
	Pond 6 egg search	0	
	Pond 6 torch search	0	
	Pond 6 bottle traps	0	
Session 6	Pond 1 refuge search	0	
	Pond 1 egg search	1 x GCN on water mint	
	Pond 1 torch search	0	
	Pond 1 bottle traps	0	8 x tadpoles, 1 x diving beetle larvae 1 x leech
	Pond 6 refuge search	1 x frog under stone	
	Pond 6 egg search	0	
	Pond 6 torch search	0	Water very black
	Pond 6 bottle traps	1 x smooth newt (f)	1 x dead adult water shrew, 2 x diving beetle adult, 1 x water slater

**Table 9: Transect and Vantage Point Observation 28<sup>th</sup> May 2020**

Time (24 Hour Clock)	Species (Common Name)	Recording No.	Transect Static Point	Observed Activity
21.43 hours	Soprano pipistrelle	1 AR	Point 6	Heard not seen
21.47 hours	Soprano pipistrelle	1 PW	Vantage point by manure pile	Heard not seen
21.52 hours	Noctule	2 AR	Point 8	Commuting and foraging
21.58 hours	Noctule	3 AR	Point 8	Commuting and foraging
22.00 hours	Common pipistrelle	4 AR	Point 8	Heard not seen
22.01 hours	Noctule	2 PW	Vantage point	Flying in field and around tree immediately south of manure pile
22.03 hours	Noctule	5 AR	Point 8	Heard not seen
22.07 hours	Noctule and common pipistrelle	6 AR	Point 9	Heard not seen
22.08 hours	Noctule	3 PW	Vantage point	Flying in field and around tree to east of manure pile
22.14 hours	Noctule and soprano pipistrelle	7 AR	Point 9 to 10	Heard not seen
22.16 hours	Soprano pipistrelle and noctule	4 PW	Vantage point	Activity in trees and field to east of manure pile
22.17 hours	Common pipistrelle	8 AR	Point 10	Foraging along hedge
22.18 hours	Common pipistrelle	9 AR	Point 10	Heard not seen
22.25 hours	Soprano pipistrelle	10 AR	Point 12	Heard not seen
22.27 hours	Common pipistrelle	11 AR	Point 12 to 13	Heard not seen
22.29 hours	Myotis sp.	12 AR	Point 13	Heard not seen
22.32 hours	Common pipistrelle	13 AR	Point 13	Heard not seen
22.34 hours	Common pipistrelle and Natterers bat	14 AR	Point 14	Heard not seen
22.36 hours	Soprano pipistrelle	15 AR	Point 14	Heard not seen
22.40 hours	Common pipistrelle	16 AR	Point 14	Heard not seen
22.41 hours	Common pipistrelle	17 AR	Point 14	Heard not seen
22.44 hours	Common pipistrelle	18 AR	Point 14 to 15	Heard not seen
22.48 hours	Noctule and soprano pipistrelle	19 AR	Point 15	Heard not seen
22.50 hours	Common pipistrelle	20 AR	Point 15 to 16	Heard not seen
22.52 hours	Soprano pipistrelle	21 AR	Point 16	Heard not seen
22.54 hours	Common pipistrelle	22 AR	Point 16	Heard not seen
23.00 hours	Common pipistrelle	23 AR	Point 18	Heard not seen
23.02 hours	Common pipistrelle	24 AR	Point 18	Heard not seen
23.05 hours	Common pipistrelle	25 AR	Point 18	Heard not seen
23.12 hours	Common pipistrelle	26 AR	Point 19	Heard not seen
23.14 hours	Common pipistrelle, soprano pipistrelle and possible brown long-eared bat	27 AR	Point 19	Heard not seen
23.19 hours	Pipistrelle sp.	Not recorded	Point 20	Heard not seen
23.29 hours	Natterer's bat	28 AR	Point 22	Heard not seen
23.28 hours	Common pipistrelle	29 AR	Point 22	Heard not seen
23.37 hours	Common pipistrelle	30 AR	Point 22 to 23	Heard not seen
23.38 hours	Common pipistrelle and noctule	31 AR	Point 22 to 23	Heard not seen
23.39 hours	Common pipistrelle	32 AR	Point 22 to 23	Heard not seen
23.40 hours	Common pipistrelle	33 AR	Point 22 to 23	Heard not seen
23.44 hours	Common pipistrelle	34 AR	Point 23	Heard not seen
23.49 hours	Common pipistrelle and noctule	35 AR	Point 24	Heard not seen

**Table 10: Transect and Vantage Point Observation 25<sup>th</sup> June 2020**

Time (24 Hour Clock)	Species (Common Name)	Recording No.	Transect Static Point	Observed Activity
21.45 hours	Noctule	1 AR	Point 12	Heard not seen
21.51 hours	Noctule x 2	2 AR	Point 13	Commuting/foraging high overhead, commuting north to south then south to north
21.55 hours	Noctule	3 AR	Point 14	Foraging high overhead above horse paddock
21.58 hours	Noctule	4 AR	Point 14 to 15	Foraging high overhead above horse paddock
22.08 hours	Common pipistrelle x 2	5 AR	Point 16	Commuting west to east on north side of tree line
22.13 hours	Noctule	6 AR	Point 17	Commuting/foraging overhead
22.16 hours	Common pipistrelle	7 AR	Point 18	Foraging
22.18 hours	Common pipistrelle	8 AR	Point 18	Foraging up and over hedge line
22.20 hours	Soprano pipistrelle	9 AR	Point 19	Foraging in corner up and over hedge
22.26 hours	Soprano pipistrelle	10 AR	Point 20a	Foraging up and down hedgerow
22.28 hours	Common pipistrelle	11 AR	Point 20b	Heard not seen
22.33 hours	Brown long-eared bat	12 AR	Point 21	Social calls, heard not seen
22.44 hours	Common pipistrelle	13 AR	Point 21 to 22	Heard not seen
22.55 hours	Noctule and Soprano pipistrelle	14 AR	Point 25	Heard not seen
22.56 hours	Common pipistrelle	15 AR	Point 25	Heard not seen
23.00 hours	Noctule	16 AR	Point 1	Heard not seen
23.05 hours	Common pipistrelle	17 AR	Point 2	Heard not seen
23.11 hours	Common pipistrelle	18 AR	Point 3	Heard not seen
23.12 hours	Soprano pipistrelle	19 AR	Point 3	Heard not seen
23.21 hours	Common pipistrelle	20 AR	Point 5	Heard not seen
23.22 hours	Common pipistrelle	21 AR	Point 5	Heard not seen
23.25 hours	Common pipistrelle	22 AR	Point 4	Heard not seen
23.26 hours	Soprano pipistrelle	23 AR	Point 4	Heard not seen
23.28 hours	Soprano pipistrelle	24 AR	Point 3 to 6	Heard not seen
23.30 hours	Soprano pipistrelle	25 AR	Point 3 to 6	Heard not seen
23.30 hours	Common pipistrelle	26 AR	Point 6	Heard not seen
23.33 hours	Common pipistrelle	27 AR	Point 6 to 7	Heard not seen
23.37 hours	Common pipistrelle	28 AR	Point 7	Heard not seen
23.37 hours	Common pipistrelle and probable Daubenton's bat	29 AR	Point 7	Heard not seen
23.39 hours	Common pipistrelle	30 AR	Point 7	Heard not seen



**Table 11: Transect and Vantage Point Observation 28<sup>th</sup> July 2020**

Time (24 Hour Clock)	Species (Common Name)	Recording No.	Transect Static Point	Observed Activity
21.30 hours	Soprano pipistrelle	1 PW	Point 20b	Seen in trees to south-west of pond, before flying east
21.32 hours	Soprano pipistrelle x 2	2 PW	Point 20b	Two bats seen commuting along trees at the western edge of the pond
21.33 hours	Soprano pipistrelle	3 PW	Point 20b	Foraging over pond 1 and around the tree canopy
21.35 hours	Noctule	4 PW	Point 20b	Foraging over the pond 1 and around the tree canopy
21.45 hours	Soprano pipistrelle	5 PW	Point 20b	Commuting south-west across the fields towards to the western side of pond 1
21.48 hours	Soprano pipistrelle	6 PW	Point 20b	Flew from pond 1 across the fields and into trees to the south-west of the site
21.54 hours	Soprano pipistrelle	7 PW	Point 20b	Foraging over pond 1
21.55 hours	Soprano pipistrelle	8 PW	Point 20b	Foraging over pond 1
21.59 hours	Soprano pipistrelle x 2	9 PW	Point 20b	Foraging around trees at the western edge of pond 1
22.03 hours	Soprano pipistrelle	10 PW	Point 20b	Foraging around the trees at the western edge of pond 1
22.07 hours	Soprano pipistrelle	11 PW	Pont 20b	Foraging over pond
22.07 hours	Soprano pipistrelle	1 AR	Point 3	Heard not seen
22.09 hours	Soprano pipistrelle	12 PW	Point 20b	Heard not seen
22.11 hours	Soprano pipistrelle	2 AR	Point 4	Heard not seen
22.13 hours	Soprano pipistrelle	3 AR	Point 4 to 5	Heard not seen
22.15 hours	Common pipistrelle	4 AR	Point 5	Heard not seen
22.56 hours	Soprano pipistrelle	5 AR	Point 11	Heard not seen
22.59 hours	Common pipistrelle	6 AR	Point 12	Heard not seen
23.04 hours	Soprano pipistrelle	7 AR	Point 13	Heard not seen
23.11 hours	Common pipistrelle	8 AR	Point 14	Heard not seen
23.14 hours	Common pipistrelle	9 AR	Point 15	Heard not seen
23.20 hours	Common pipistrelle	10 AR	Point 15 to 16	Heard not seen
23.29 hours	Soprano pipistrelle	11 AR	Point 18	Heard not seen



**Table 12: Transect and Vantage Point Observation 28<sup>th</sup> August 2020**

Time (24 Hour Clock)	Species (Common Name)	Recording No.	Transect Static Point	Observed Activity
20.15 hours	Soprano pipistrelle	1 RM	Pont 16	Heard not seen, quick pass
20.27 hours	Soprano pipistrelle	2 RM	Point 16	Flew out from beneath oak tree, foraging off to the south-east
20.29 hours	Soprano pipistrelle	3 RM	Point 16	Foraging near mature oak tree, heard not seen
20.31 hours	Soprano pipistrelle x 2	4 RM	Point 16	Two bats foraging around mature oak tree
20.33 hours	Common pipistrelle	5 RM	Point 16	Commuting fast from north-west to south-east, before cutting through low gap in tree line to the south-west
20.41 hours	Lesser horseshoe	6 RM	Point 16	Heard not seen, close to tree line
20.41 hours	Myotis sp.	7 RM	Point 16	Heard not seen, close to tree line
20.43 hours	Myotis sp.	8 RM	Point 16	Heard not seen, close to tree line
20.48 hours	Soprano pipistrelle	9 RM	Point 16	Under mature oak tree
20.49 hours	Lesser horseshoe and Soprano pipistrelle	10 RM	Point 16	Commuting south-east to north-west, low to ground on other side of tree line
20.51 hours	Common pipistrelle, Soprano pipistrelle and Myotis sp.	11 RM	Point 16	Commuting north-west to south-east
20.52 hours	Common pipistrelle, Soprano pipistrelle x 2	12 RM	Point 16	Foraging under oak tree
20.53 hours	Soprano pipistrelle	1 AR	Point 4 to 3	Heard not seen
20.54 hours	Common pipistrelle, Whiskered/Brandt's bat	13 RM	Point 16	Heard not seen, foraging
20.58 hours	Common pipistrelle	14 RM	Point 16	Commuting south-east to north-west
20.59 hours	Common pipistrelle	2 AR	Point 7	Heard not seen
21.00 hours	Myotis sp.	15 RM	Point 16	Foraging by oak tree
21.00 hours	Brown long-eared bat	3 AR	Point 7	Heard not seen
21.02 hours	Brandt's bat and common pipistrelle	16 RM	Point 16	Foraging under oak tree
21.03 hours	Common pipistrelle and soprano pipistrelle	17 RM	Point 16	Foraging along treeline
21.06 hours	Soprano pipistrelle	18 RM	Point 16	Foraging along treeline
21.10 hours	Common pipistrelle and soprano pipistrelle	19 RM	Point 16	Heard not seen, foraging
21.11 hours	Myotis sp. and noctule	4 AR	Point 9	Heard not seen
21.13 hours	Common pipistrelle and soprano pipistrelle	20 RM	Point 16	Heard not seen, foraging
21.17 hours	Myotis sp.	21 RM	Point 16	Heard not seen, foraging
21.17 hours	Natterer's bat	5 AR	Point 11	Heard not seen
21.19 hours	Brown long eared bat	6 AR	Point 11	Heard not seen
21.23 hours	Common pipistrelle, soprano pipistrelle and Myotis sp.	22 RM	Point 16	Heard not seen, foraging
21.28 hours	Myotis sp. likely natterer's bat	23 RM	Point 16	Heard not seen, foraging
21.32 hours	Natterer's/whiskered bat	7 AR	Point 14	Heard not seen
21.33 hours	Soprano pipistrelle, brown long eared bat	24 RM	Point 16	Seen at point 14
21.34 hours	Common pipistrelle	8 AR	Point 14 to 15	Constant foraging at hedge
21.43 hours	Common pipistrelle	9 AR	Point 16	Heard not seen, brief pass
21.44 hours	Myotis sp.	10 AR	Point 16	Heard not seen
21.45 hours	Myotis sp.	11 AR	Point 16	Heard not seen, constant activity
21.55 hours	Soprano pipistrelle	12 AR	Point 18	Heard not seen
22.02 hours	Common pipistrelle	13 AR	Point 20a	Heard not seen
22.04 hours	Lesser horseshoe	14 AR	Point 20b	Flying in top of canopy
22.06 hours	Lesser horseshoe	15 AR	Point 20b	Flying west to east approximately 6m in from canopy through field

**Table 13: Transect and Vantage Point Observation 29<sup>th</sup> September 2020**

Time (24 Hour Clock)	Species (Common Name)	Recording No.	Transect Static Point	Observed Activity
19.18 hours	Soprano pipistrelle	1 PW	Point 8	Heard not seen
19.19 hours	Soprano pipistrelle	1 RM	Point 23	Commuting east to west, south of point 23
19.21 hours	Soprano pipistrelle and noctule	2 PW	Point 8	Commuting from south-east up and over trees to the north-west
19.24 hours	Soprano pipistrelle	3 PW	Point 8	Foraging in field west of Point 7, before flying south-east over the trees
19.28 hours	Noctule	4 PW	Point 8	Heard not seen
19.33 hours	Soprano pipistrelle x 2	5 PW	Point 8	Flew down bank from north-west before foraging in field to west of Point 7
19.35 hours	Lesser horseshoe	2 RM	Point 22	Commuting south-west to north along edge of pond 1
19.40 hours	Soprano pipistrelle	6 PW	Point 8	Heard not seen
19.40 hours	Common pipistrelle	3 RM	Point 22	Heard not seen, likely over pond
19.42 hours	Lesser horseshoe	4 RM	Point 21	Commuting north-west to south-east along edge of pond 1
19.52 hours	Soprano pipistrelle	7 PW	Point 8	Heard not seen
19.57 hours	Common pipistrelle	5 RM	Point 18	Foraging and commuting south-east to north-east at point 18
20.02 hours	Common pipistrelle and soprano pipistrelle	6 RM	Point 16	Foraging at point 16
20.03 hours	Common pipistrelle and soprano pipistrelle	7 RM	Point 16	Foraging along tree line
20.04 hours	Common pipistrelle	8 RM	Point 16	Foraging along tree line
20.10 hours	Soprano pipistrelle	9 RM	Point 15 to 14	Commuting between points 14 and 15
20.11 hours	Common pipistrelle and soprano pipistrelle	10 RM	Point 14	Foraging between point 15 and 14
20.14 hours	Soprano pipistrelle x 2	11 RM	Point 14	Commuting at point 14
20.15 hours	Common pipistrelle	12 RM	Point 14	Heard not seen, along trees
20.19 hours	Natterer's bat	13 RM	Point 13	Commuting west to east at corner
20.20 hours	Common pipistrelle and soprano pipistrelle	14 RM	Point 13	Foraging at corner
20.26 hours	Common pipistrelle	15 RM	Point 12 to 11	Commuting between points 12 and 11
20.59 hours	Soprano pipistrelle	16 RM	Point 4 to 5	Heard not seen
21.03 hours	Common pipistrelle and soprano pipistrelle	17 RM	Point 5	Heard not seen
21.07 hours	Common pipistrelle	18 RM	Point 4	Heard not seen, quick pass

**Table 14: Transect and Vantage Point Observation 26<sup>th</sup> October 2020**

Time (24 Hour Clock)	Species (Common Name)	Recording No.	Transect Static Point	Observed Activity
17.23 hours	Soprano pipistrelle	1 RM	Pont 13	Foraging and commuting along treeline west to east
17.32 hours	Soprano pipistrelle x 2	2 RM	Point 13	Foraging by gate to the south of Point 13
17.36 hours	Soprano pipistrelle	3 RM	Point 13	Commuting east to west along treeline
17.37 hours	Myotis sp.	4 RM	Point 13	Flew onto site from the south, before foraging at Point 13
17.38 hours	Natterer's bat	5 RM	Point 13	Commuting east to west by the gate to the south of Point 13
17.40 hours	Common pipistrelle	6 RM	Point 13	Foraging at Point 13 before flying to the north along treeline
17.41 hours	Natterer's bat	7 RM	Point 13	Commuting east to west along the track to the south of Point 13
17.43 hours	Natterer's bat	8 RM	Point 13	Commuting east to west along the track to the south of Point 13
17.45 hours	Myotis sp.	9 RM	Point 13	Commuting east to west along the track to the south of Point 13
17.46 hours	Myotis sp.	1 PW	Point 12	Heard but not seen
17.48 hours	Soprano pipistrelle	10 RM	Point 13	Foraging, heard but not seen
17.52 hours	Soprano pipistrelle	2 PW, 11 RM	Point 13	Heard but not seen
17.54 hours	Myotis sp.	12 RM	Point 13	Heard but not seen

Figure 6: Map showing the results of the bat observations carried out in May 2020





Figure 7: Map showing the results of the bat observations carried out in June 2020





Figure 8: Map showing the results of the bat observations carried out in July 2020

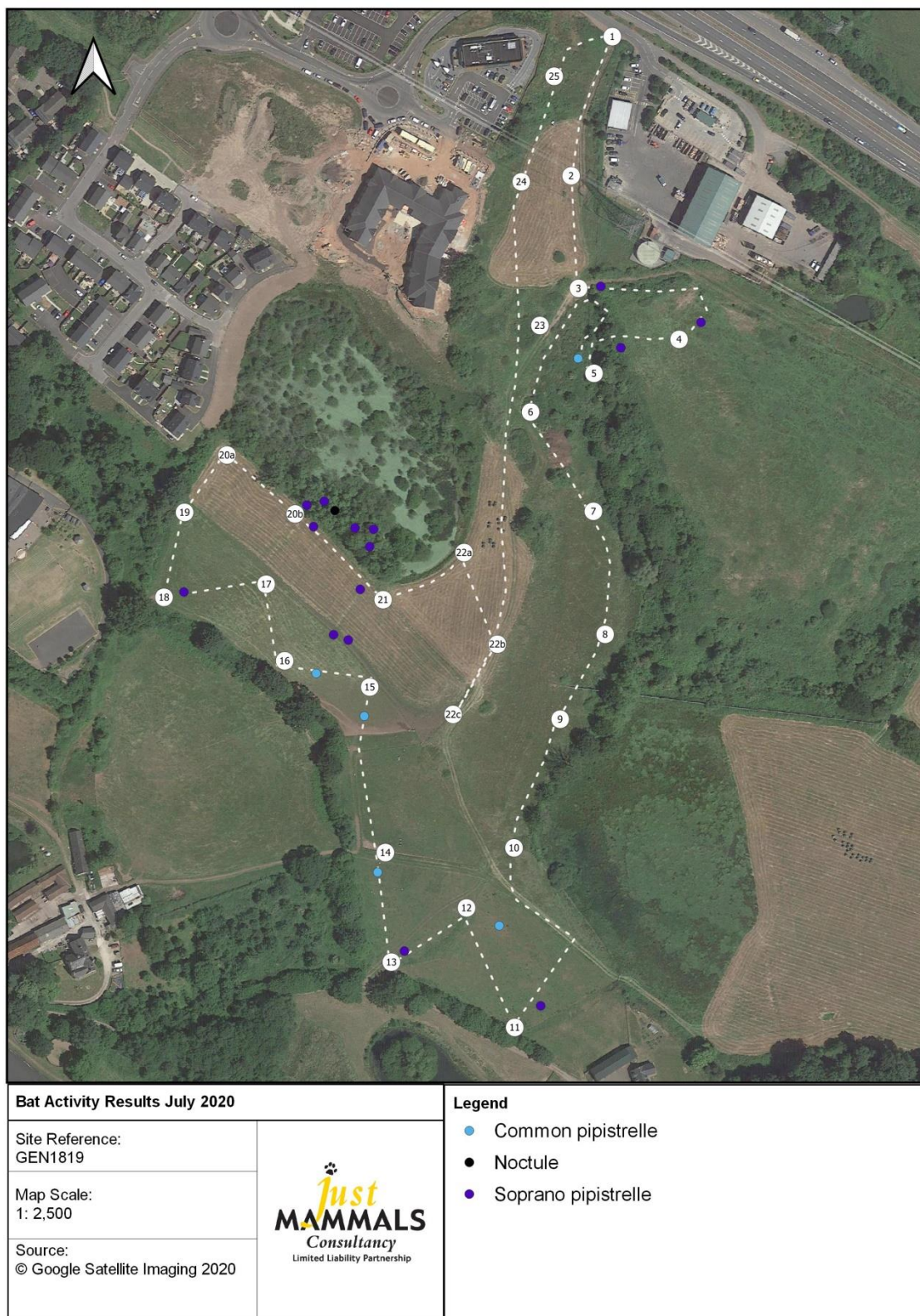




Figure 9: Map showing the results of the bat observations carried out in August 2020





Figure 10: Map showing the results of the bat observations carried out in September 2020

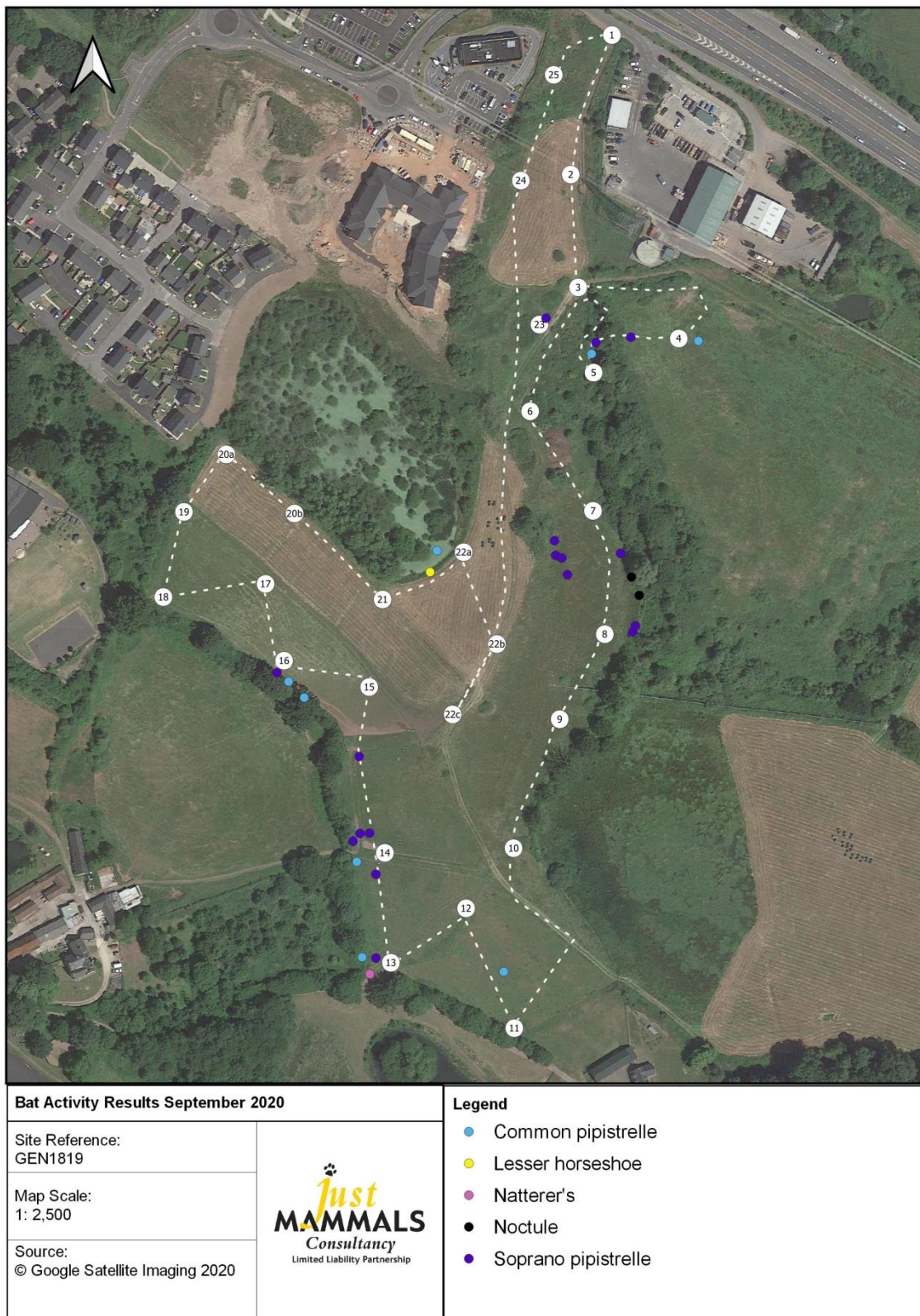
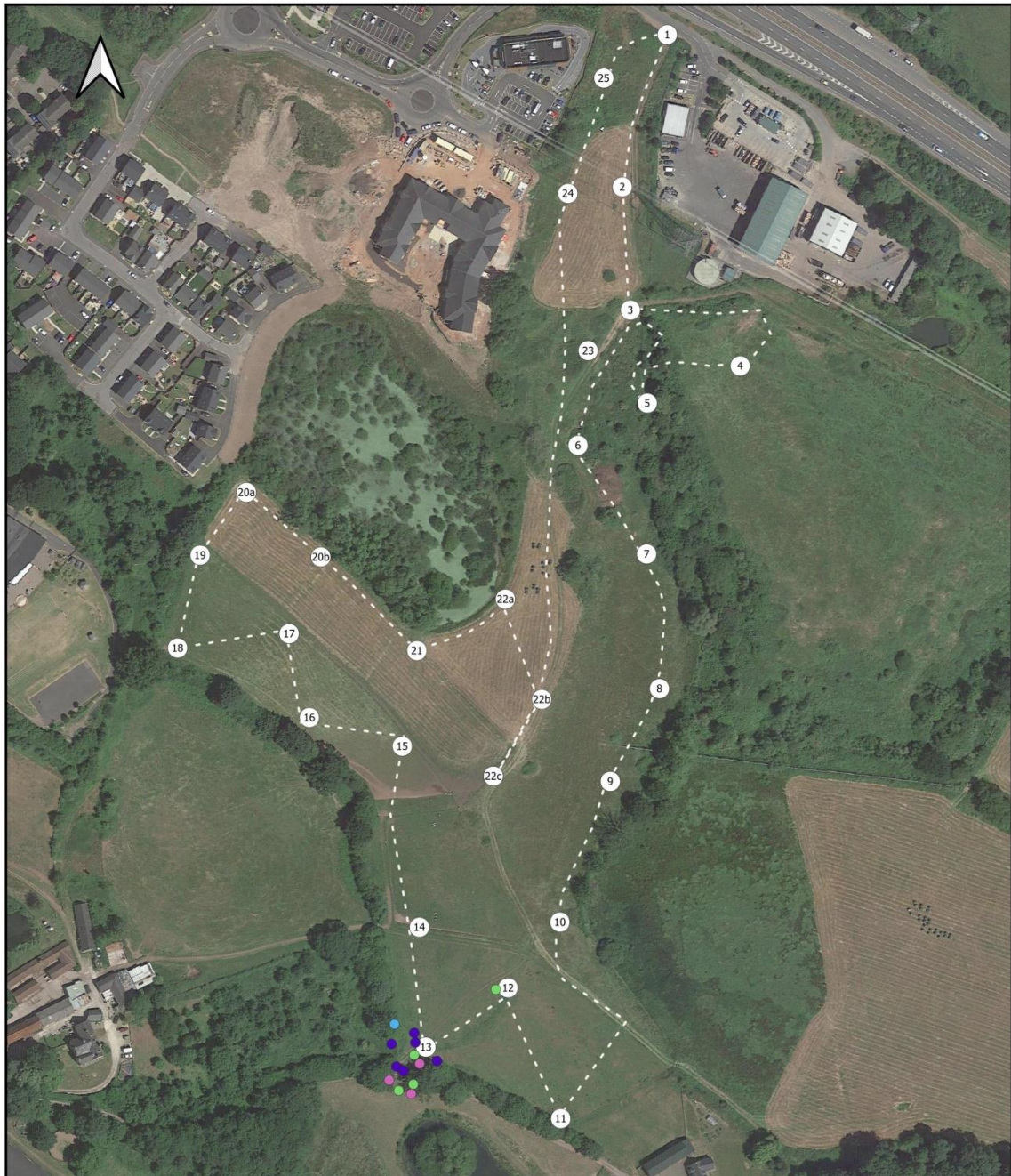




Figure 11: Map showing the results of the bat observations carried out in October 2020

**Bat Activity Results October 2020**

Site Reference:  
GEN1819

Map Scale:  
1: 2,500

Source:  
© Google Satellite Imaging 2020

**Legend**

- Common pipistrelle
- Myotis sp.
- Natterer's
- Soprano pipistrelle



Figure 12: Map showing the location of vantage point observations and location of the passive monitoring device



**Table 15: Passive Monitoring 13<sup>th</sup> – 20<sup>th</sup> July 2020**

Data is presented by the hour, with specific timings for the first and last record

 = 13/14 July
 = 14/15 July
 = 15/16 July
 = 16/17 July
 = 17/18 July
 = 18/19 July
 = 19/20 July

Time	Species	Number of Recordings
21.35	Noctule	1
21.35 – 21:59	Noctule	31
22:00 – 22:59	Noctule	6
	Common Pipistrelle	4
	Soprano Pipistrelle	8
23:00 – 23:59	Soprano Pipistrelle	13
	Noctule	5
	Common Pipistrelle	12
00:00 – 00:59	Common Pipistrelle	5
	Soprano Pipistrelle	7
	Brown Long-eared	1
01:00 – 01:59	Common Pipistrelle	7
	Soprano Pipistrelle	12
02:00 – 02:59	Soprano Pipistrelle	56
	Common Pipistrelle	9
	Brown Long-eared	1
03:00 – 03:59	Soprano Pipistrelle	42
	Common Pipistrelle	16
04:00 – 04:58	Soprano Pipistrelle	41
	Common Pipistrelle	7
	Noctule	94
	Myotis sp.	1
04:58	Noctule	1
21:25	Noctule	1
21:25 – 21:59	Noctule	15
22:00 – 22:59	Common Pipistrelle	4
	Natterer's	1
	Soprano Pipistrelle	8
	Noctule	1
23:00 – 23:59	Soprano Pipistrelle	5
	Common Pipistrelle	1
	Noctule	2
00:00 – 00:59	Common Pipistrelle	7
	Soprano Pipistrelle	7
	Brown Long-eared	2
01:00 – 01:59	Soprano Pipistrelle	185
	Common Pipistrelle	198
	Myotis sp.	1
	Brown Long-eared	3
02:00 – 02:59	Soprano Pipistrelle	98
	Common Pipistrelle	175
	Natterer's	2
	Soprano Pipistrelle	52
03:00 – 03:59	Common Pipistrelle	9
	Natterer's	1
	Common Pipistrelle	5
04:00 – 04:59	Soprano Pipistrelle	2
	Noctule	47
05:00 – 05:06	Noctule	7
05:06	Noctule	1
21:34	Noctule	1
21:34 – 21:59	Noctule	22
22:00 – 22:59	Common Pipistrelle	2
	Soprano Pipistrelle	3
	Noctule	1
23:00 – 23:59	Noctule	3
	Soprano Pipistrelle	9
	Common Pipistrelle	1
00:00 – 00:59	Noctule	2
	Soprano Pipistrelle	8
	Common Pipistrelle	4
01:00 – 01:59	Common Pipistrelle	10
	Soprano Pipistrelle	10
	Myotis sp.	1
	Noctule	1
02:00 – 02:59	Common Pipistrelle	1

03:00 – 03:59	Soprano Pipistrelle	1
04:00 – 04:55	Soprano Pipistrelle	3
	Daubenton's	1
	Noctule	14
04:55	Noctule	1
21:32	Noctule	1
21:32 – 21:59	Noctule	19
22:00 – 22:59	Noctule	56
	Soprano Pipistrelle	35
	Common Pipistrelle	8
	Myotis sp.	1
23:00 – 23:59	Soprano Pipistrelle	47
	Common Pipistrelle	23
	Noctule	4
	Myotis sp.	2
00:00 – 00:59	Soprano Pipistrelle	1
	Common Pipistrelle	1
01:00 – 01:59	Noctule	2
	Soprano Pipistrelle	8
	Common Pipistrelle	3
02:00 – 02:59	Soprano Pipistrelle	8
	Common Pipistrelle	9
03:00 – 03:59	Noctule	2
	Soprano Pipistrelle	20
	Common Pipistrelle	8
04:00 – 04:59	Common Pipistrelle	3
	Soprano Pipistrelle	13
	Noctule	67
	Myotis sp.	1
04:59	Noctule	1
21:38	Noctule	1
21:38 – 21:59	Noctule	1
22:00 – 22:59	Noctule	21
	Common Pipistrelle	10
	Soprano Pipistrelle	13
	Brown Long-eared	1
23:00 – 23:59	Noctule	2
	Common Pipistrelle	20
	Soprano Pipistrelle	28
00:00 – 00:59	Common Pipistrelle	27
	Soprano Pipistrelle	11
	Brown Long-eared	4
	Noctule	2
01:00 – 01:59	Soprano Pipistrelle	18
	Common Pipistrelle	9
	Noctule	1
	Brown Long-eared	1
02:00 – 02:59	Soprano Pipistrelle	28
	Myotis sp.	1
	Common Pipistrelle	8
	Noctule	1
03:00 – 03:59	Soprano Pipistrelle	19
	Common Pipistrelle	15
04:00 – 04:59	Common Pipistrelle	13
	Soprano Pipistrelle	15
	Noctule	14
	Natterer's	1
05:00 – 05:05	Noctule	3
05:05	Noctule	1
21:36	Noctule	1
21:36 – 21:59	Noctule	14
22:00 – 22:59	Noctule	18
	Soprano Pipistrelle	34
	Common Pipistrelle	24
	Brown Long-eared	1
23:00 – 23:59	Common Pipistrelle	6
	Soprano Pipistrelle	5
00:00 – 00:59	Soprano Pipistrelle	7
	Common Pipistrelle	4
	Noctule	1
01:00 – 01:59	Noctule	1
02:00 – 02:59	Soprano Pipistrelle	3
03:00 – 03:59	Soprano Pipistrelle	23



	Common Pipistrelle	2
	Lesser Horseshoe	2
04:00 – 04:42	Noctule	3
	Soprano Pipistrelle	4
04:42	Noctule	1
21:45	Noctule	1
21:45 – 21:59	Soprano Pipistrelle	1
	Noctule	6
22:00 – 22:59	Soprano Pipistrelle	10
	Common Pipistrelle	4
	Noctule	3
23:00 – 23:59	Common Pipistrelle	2
	Soprano Pipistrelle	8
00:00 – 00:59	Common Pipistrelle	1
01:00 – 01:59	Soprano Pipistrelle	3
	Noctule	1
02:59	Soprano Pipistrelle	1

**Table 16: Passive Monitoring 23<sup>rd</sup>-30<sup>th</sup> October 2020**

Data is presented by the hour, with specific timings for the first and last record

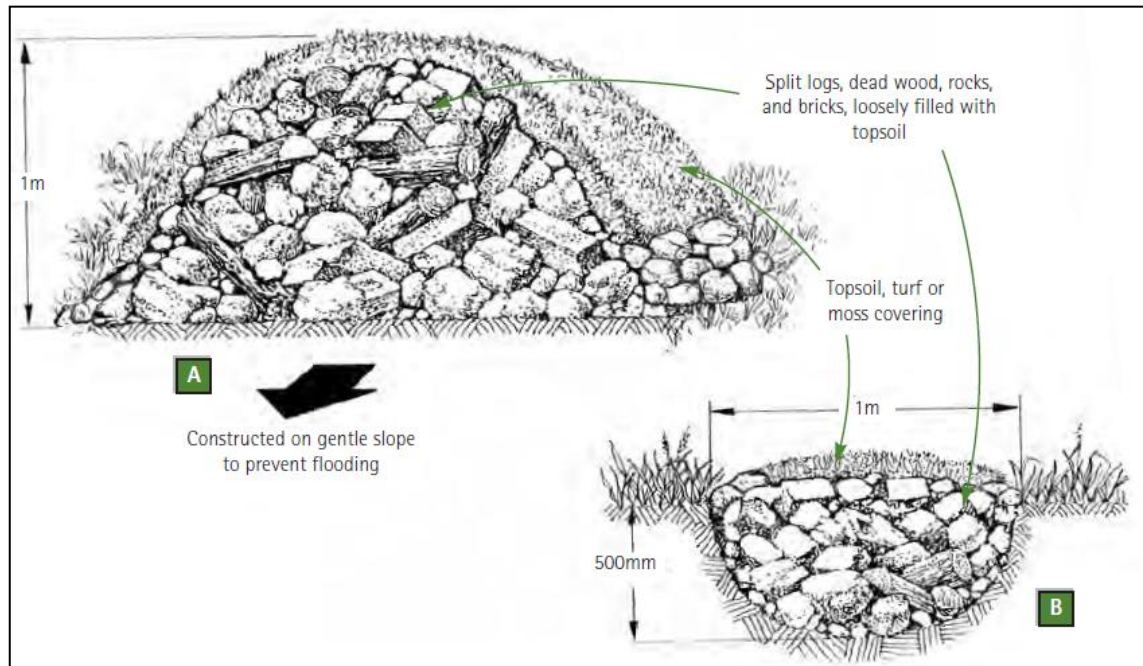
= 23/24 October
  = 25/26 October
  = 26/27 October

= 27/28 October
  = 29/30 October

Time	Species	Number of Recordings
19:52	Brown Long-eared	1
00:25	Soprano Pipistrelle	1
18:00 – 18:59	Common Pipistrelle	2
03:00 – 03:59	Lesser Horseshoe	3
18:17	Soprano Pipistrelle	1
22:11	Soprano Pipistrelle	1
19:00	Common Pipistrelle	1
00:20	Natterer's	1

## Appendix VII: Reptile Hibernaculum

Figure 13: Example of hibernaculum creation



## Appendix VIII: Ponds within 500m and eDNA results

Figure 12: Ponds within 500m and eDNA results



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## **Natural** Problem Solvers

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