United Environmental Services Ltd
1 Booths Park,
Chelford Road,
Knutsford,
Cheshire
WA16 8QZ

www.ues.org.uk
enquiries@ues.org.uk
01565 757788

BAT ACTIVITY SURVEY

At

The Oaks
Wrexham Industrial Estate
Wrexham
LL13 9RG

NGR: SJ 38806 49238

Prepared for:	Boris Byrne, FI Facilities Management Ltd
Written by:	Bethan Beeston, UES Trainee Ecologist
Approved by:	Tom Kenwright, UES Senior Ecologist

Tom Kenwright

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UES reference:	UES03918/21

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EXECUTIVE SUMMARY

This report is written by Bethan Beeston, UES Trainee Ecologist at United Environmental Services Ltd (UES). It provides an assessment of the potential impacts on foraging and commuting bats as a result of the proposed development at The Oaks Site, Wrexham Industrial Estate.

The majority of the site is composed of dense scrub with glades and pathways of semi-improved neutral grassland, which provides moderate quality habitat for foraging and commuting bats. In addition, the site contains pockets of higher quality habitat including strips of broadleaved woodland to the south, scattered mature trees, ponds and watercourses at the site boundaries.

Due to the size of the site and the quality of habitats present, UES were commissioned to conduct a bat activity survey across April to October 2023. The objective of the survey was to assess the bat species and number of bats that are using the site, and determine the importance of the site for foraging and commuting bats.

Across all survey methods, a minimum of seven species of bat were recorded: common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared (BLE) bat *Plecotus auritus*, noctule *Nyctalus noctula*, lesser horseshoe *Rhinolophus hipposideros*, Leisler's *Nyctalus leisleri* and unspecified Myotis *Myotis sp.* Common pipistrelles were the most abundant species during the survey, accounting for approximately 46% of all recordings. Soprano pipistrelle bats accounted 42% of all transect survey recordings whilst noctule, BLE, lesser horseshoe, Myotis and Leisler's bats were recorded to a lesser extent.

Overall, moderate levels of bat activity were recorded during the surveys, with bats exhibiting foraging and commuting behaviours. Bat activity was recorded across the entire site but was generally highest along the southern woodland, tree lines, and commuting corridors through the centre of the site due to breaks in the dense scrub. The woodland and tree lines associated with the ponds on site provided a hotspot of activity.

The development proposals should be designed to retain and incorporate linear features where possible and focus on providing connecting corridors at the site boundaries and across the development site. The pockets of higher quality habitat on site should be prioritised for retention where possible, including the woodland to the south which flanks the River Clywedog, in addition to ponds, which have been identified as hotspots for bat activity. If suitable foraging habitats are lost to facilitate the development proposals, they should be compensated for, however the loss of dense scrub could be compensated for through the enhancement of retained sections of the site by increasing structural and floristic diversity through species-rich wildflower grassland and additional planting.

A wildlife friendly lighting plan should be implemented to ensure that potential operational impacts of the development on bats is reduced to the lowest practicable level and to ensure that retained foraging habitats and commuting corridors across the site remain undisturbed and functional.

The report should be read in conjunction with appendices 1 to 8, which give visual representations of the survey results, and the following reports prepared for the site by UES:

- Preliminary Ecological Appraisal (reference UES03918/02)
- Bat Scoping Survey (reference UES03918/19)
- Bat Ground-Level Tree Assessment (reference UES03918/20)

- Bat Hibernation Survey (reference UES03918/37)
- Bat Aerial Tree Assessment and Presence / Absence Surveys (reference UES03918/38)

1 INTRODUCTION

1.1 Author, surveyors and qualifications

This report is compiled and written by Bethan Beeston, UES Trainee Ecologist. Other surveyors include:

- Toby Hart BSc MCIEEM PIEMA, UES Managing Director. Toby is licensed by Natural Resources Wales to disturb, take and handle all species other than greater or lesser horseshoe under licence number S092789/1.

- Daniel Smith BSc MScRes, UES Ecologist. Daniel is listed as an accredited agent on the bat survey licence of Toby Hart. Daniel has been deemed capable by the licence holder to disturb (including using an endoscope) and to handle all species of bat other than greater or lesser horseshoe.

- Alasdair Grubb BSc ACIEEM, UES Sub-contractor. Alasdair is licensed by Natural Resources Wales to disturb, take and handle all species other than greater or lesser horseshoe under licence number S091891/01

- Noah Fulton BSc, UES Graduate Ecologist.

- Robert Mooney MSc, UES Graduate Ecologist.

- Paula Llewellen, UES Sub-contractor.

- Mark Jeffries, UES Sub-contractor.

- James Stubbs BSc, UES Sub-contractor.

All surveyors have the knowledge, skills and experience identified within CIEEM's "Competencies for Species Survey: Bats" (2013), or were under the supervision of a surveyor with the required competencies.

1.2 Survey objectives

UES was commissioned to conduct site surveys which include the following activities:

- Conduct activity surveys to assess the quality of habitat for bats
- Assess the bat species and numbers that are using the site
- Assess the relative importance of areas and habitats within the site for bat activity
- Recommend appropriate mitigation and compensation, if applicable

1.3 Proposed development

At this stage, no detailed proposals have been submitted to UES.

1.4 Structure of the report

The report should be read in conjunction with appendices 1 to 8, which give visual representations of the survey results, and the following reports prepared for the site by UES:

- Preliminary Ecological Appraisal (reference UES03918/02)
- Bat Scoping Survey (reference UES03918/19)
- Bat Ground-Level Tree Assessment (reference UES03918/20)
- Bat Hibernation Survey (reference UES03918/37)
- Bat Aerial Tree Assessment and Presence / Absence Surveys (reference UES03918/38)

2 METHODOLOGY

2.1 General

All surveys were carried out to recognised guidelines, timings and weather conditions, with particular reference to Natural England and BCT publications (see references for further information).

The habitats on site and in the surrounding area were assessed during the activity survey and through studying aerial photographs, in order to gauge their suitability to support roosting, foraging and commuting bats.

2.2 Desk study

A record search for protected or otherwise notable species, including all species of bat, was conducted through Cofnod – North Wales Environmental Information Service in November 2022, as part of UES' Preliminary Ecological Appraisal (report reference – UES03918/02). The records search included the land within the development boundary and a buffer of 2km around the site.

2.3 Transect surveys

A transect route was mapped across the site following the PEA and covered a distance of 3.9km. Care was taken to cover the entire site, especially any habitats considered to be of particular suitability for roosting, foraging or commuting bats. The transect route is provided at Appendix 1 – Site plan.

The site is predominantly considered to present moderate suitability habitat for bats; therefore one survey visit was carried out each month, from April to October inclusive with the exception of June. The omission of this month is not considered to have a significant impact on the results of the survey, as an additional transect survey was undertaken in July.

During each survey visit, two surveyors walked slowly along the transect route, equipped with Elekon Batlogger M bat detectors and recorders. This device records bat echolocation calls across the full spectrum, with a sensitivity range of 10 – 150 kHz. The integrated heterodyne live monitoring also allows the observer to hear the echolocation calls in real time, with automatic tuning. The recordings are individually time/date, GPS and temperature stamped, and are of high enough quality to produce time expansion quality sonograms. Any observations of bats were recorded, including time, species, location, number of bats, flight direction, flight height and behaviour, where possible.

The starting point and direction of the transect route was varied throughout the surveys, to reduce survey bias.

The survey dates, timings and weather conditions are provided in Table 1 below.

Table 1 – Survey dates, timings and weather conditions

MONTH	DATE	SUNSET / SUNRISE	SURVEY TIMINGS	TEMP	WIND	RAIN	CLOUD COVER
April	20/04/23	20:20	20:05 – 22:05	11°C	Still	Dry	0%
May	26/05/23	21:20	21:05 – 23:05	14°C	Still	Dry	30%
July	04/07/23	21:40	21:25 – 23:25	15°C	Still	Light rain	40%
	16/07/23	21:30	21:15 – 23:15	16°C	Light breeze	Dry	80%
August	09/08/23 10/08/23	20:52 05:42	20:37 – 22:37 03:57 - 05:57	13°C 10°C	Light breeze Light breeze	Patchy rain Dry	90% 50%
September	10/09/23	19:40	19:25 – 21:25	21°C	Light breeze	Dry	15%
October	25/10/23	18:06	17:51 – 19:51	12°C	Light breeze	Patchy rain	70%

2.4 Static detector monitoring surveys

In addition to the transect surveys, static detectors were deployed across the site, fixed to mature trees in discrete locations that were anticipated to record bat activity. Static detectors were deployed in three locations across the site (see Appendix 1).

The static detectors were set to record for a minimum of five consecutive nights per month in their respective locations, from April to October. Following each recording cycle, each detector's batteries were changed, the data was retrieved, and detectors re-set to record. The following static detectors were used during the survey:

- Two Anabat Swift static bat detectors were used throughout the surveys. This device uses frequency division technology with a frequency range of 5 – 150khz and records echolocation calls in zero crossing format. It has an integrated GPS receiver which automatically sets the internal clock, calculates sunset and sunrise times and records the location. All registrations are automatically recorded onto an SD card and time, date and temperature stamped.

- One Anabat Express static bat detector was also used. This device uses frequency division technology with a frequency range of 5 – 150khz and records echolocation calls in zero crossing format. It has an integrated GPS receiver which automatically sets the internal clock, calculates sunset and sunrise times and records the location. All registrations are automatically recorded onto an SD card and time, date and temperature stamped.

2.5 Survey limitations

The site is considered to present moderate suitability habitat for bats; therefore one survey visit was carried out each month, from April to October inclusive with the exception of June. The omission of this month is not considered to have a significant impact on the results of the survey, as an additional transect survey was undertaken in early July.

Static detector 1 failed to record bat activity during the month of September due to water damage within the equipment. However, the other static detectors deployed on site recorded sufficient data during this period. Static 1 recorded the least amount of data between all statics throughout the monitoring period. The static detector and transect surveys combined, ensured that all suitable habitat onsite was surveyed to determine its importance with regards to bats.

Static detector 2 failed to record bat activity due to technical / file corruption issues in August. However, the other static detectors deployed on site recorded sufficient data during this period.

The October transect data was lost due to file corruption. As such, detailed numbers of recordings and heat maps are not available, however the general results of the survey are available and have been considered within this report.

Due to the overall amount of data gathered during the transect and static detector surveys, collected over the majority of the active bat season, it is considered that the results present a good representation of the bat activity within the proposed development site. The above limitations are therefore not considered to be significant, as robust conclusions and appropriate recommendations can still be made based on the data.

3 RESULTS

3.1 Desk study

The protected species records search highlighted records of the following bat species within 2km of the site:

- Brandt's bat *Myotis brandtii*
- Whiskered bat *Myotis mystacinus*
- Lesser horseshoe
- Daubenton's bat *Myotis daubentonii*
- Noctule
- BLE bat
- Common pipistrelle
- Soprano pipistrelle
- Other records were returned but only identified bats to genus level for *Myotis, Plecotus and Pipistrellus sp.*, as well as unidentified bat species.

No records of bats were returned from within the site itself.

3.2 Habitat assessment

The Oaks is located within Wrexham Industrial Estate, south-east of the city of Wrexham. The proposed development site is dominated by dense scrub with scattered trees, ponds and derelict buildings. Small stands of more mature scrub and broadleaved woodland are present within the southern section of the site. Small areas of disturbed ground and semi-improved grassland are also present across the site. Redwither Brook flows along part of the western site boundary and the Clywedog River demarcates the southern site boundary.

The surrounding area consists of commercial, office and warehouse buildings with well-lit roads which may cause noise and light pollution for commuting bats. However, there is an extensive area of arable land with hedge-lined fields and tree lines to the south of the proposed development site. These habitats provide low-moderate quality foraging and commuting opportunities for bats.

The wider surrounding areas consists of further industrial estate buildings to the north and arable fields bordered by hedgerows and tree lines to the south of the site. There are additional woodland habitats within the surrounding areas which may provide commuting, foraging and roosting opportunities for bats, all of which are connected to the site by hedgerows and tree lines.

3.3 Transect surveys

A minimum of five bat species were recorded during the transect surveys conducted between April and October 2023: common pipistrelle, soprano pipistrelle, noctule, lesser horseshoe and a Myotis species.

Moderate levels of bat activity were recorded during the surveys, the majority of recordings being common pipistrelles (approximately 46% of all transect recordings). Soprano pipistrelles were recorded the second highest (42% of all transect recordings) the remaining three species

accounted for the remining recordings; Noctule (8.5%) lesser horseshoe (1.5%) and *Myotis* sp. (1.1%).

Across all species, the majority of activity was recorded in August (approximately 39% of all transect recordings), May (approximately 17% of all transect recordings), and early July (approximately 12% of all transect recordings). The remaining months activity was generally low. Peak activity levels for individual species varied across the season:

- Common pipistrelle activity peaked in August with recordings in this month accounting for 45% of all common pipistrelle recordings over the course of the transects surveys.
- Soprano pipistrelle activity peaked in May and August with approximately 27.9% and 27.3% respectively.
- Noctule activity peaked in August with approximately 69% of all noctule data recorded.
- *Myotis sp*. activity was only recorded during the August dawn survey and therefore accounted for 100% of all recordings. Bats of this species were located close to the watercourse along the southern site boundary. Based on the sonogram analysis it is considered that the Myotis species recorded in this location was likely Daubenton's.
- Lesser horseshoe activity was recorded during the April transect survey only, close to within the south-eastern section of the site. The six recordings accounted for 100% of the lesser horseshoe data.

The data from the October transect survey was lost due to file corruption, however the survey results were similar to September, with only low numbers of common and soprano pipistrelle bats recorded.

In general bat activity was recorded across the entirety of the site with recordings concentrated along the central concrete track and scrub edges. Increased activity was identified close to the watercourse on the south of the site (See Appendix 4 - Heat maps).

The transect route has been mapped in Appendix 1 – Site plan. Further details of the transect survey results can be found in Appendix 3 – Transect survey data and Appendix 4 – Heat maps.

3.4 Static detector monitoring surveys

A minimum of seven bat species were recorded during the static detector surveys, conducted between April and October 2023: common pipistrelle, soprano pipistrelle, BLE, noctule, Leisler's, lesser horseshoe and *Myotis* sp.

Moderate levels of bat activity were recorded during the surveys with common pipistrelle, *Myotis* sp. and soprano pipistrelle (accounting for 46%, 28% and 21% of all static detector recordings respectively). Noctule (2.6%), BLE (0.5%) and Leisler bats (0.3%) were recorded to a lesser extent.

Based on the average number of recordings per month, across all species, the majority of activity was recorded in June (approximately 32% of all static detector recordings), July (approximately 25% of all static detector recordings), May (approximately 18% of all static data), the remaining months, April, August, September and October (approximately 4%, 4%,

7% and 6% respectively). There was an incomplete data set from both August and September due to technical issues. The lack of data from Static 2 in August and Static 1 in September is not thought to significantly have affected the results as a further two static detectors were deployed which recorded throughout the month. More than 5 consecutive nights was recorded for the remaining months.

Static 2 recorded the majority of all recordings, accounting for 70% of all static detector recordings. Significantly lower results from Static 1 and 3 (12% and 17% respectively) is likely due to the extremities of the site being subject to higher light and noise disturbance owing to its proximity to a road and neighbouring industrial sites. Common pipistrelles accounted for the largest proportion of activity of all static detectors (between 43% - 54% respectively). *Myotis* sp. accounted for the second highest activity from Static 2 (33%), with soprano pipistrelle accounting for (19%), whereas the Static 1 and 3 detectors found soprano pipistrelle were recorded second highest (25% and 26% retrospectively). Lesser horseshoes were recorded to a lesser extent on Static 2 and Static 3 detectors (2% and 0.2%) however there were no recordings from Static 1. Limited recordings of BLE were recorded on Static 1 and 2 (0.9% and 0.3%), no BLE were recorded on Static 3. Noctules were recorded on all static detectors (ranging from 1.8% - 7.2%). Further details of the static detector survey results can be found in Appendix 5 – Static detector monitoring survey data.

4 EVALUATION AND RECOMMENDATIONS

4.1 Evaluation of results

Across the transect and static detector surveys, a minimum of seven species of bat were recorded: common pipistrelle, soprano pipistrelle, BLE, noctule, lesser horseshoe, Leisler's and *Myotis* sp.

Overall, moderate levels of bat activity were recorded during the surveys, with bats exhibiting foraging and commuting behaviours. Bat activity was recorded across the entire site but was generally highest along the central path where there is a break in scrub habitat, and towards the south and southeast along the River Clywedog. The woodland and tree lines associated with the ponds within the site provide a hotspot of activity. These results are to be expected as these linear corridors provide good commuting routes that connect the site to larger areas of foraging habitat off-site. Furthermore, these features, particularly those associated with aquatic features, will support good sources of invertebrate prey in addition to the cover and linear features that they provide for commuting bats.

Common pipistrelles accounted for 46% of the transect survey data and 46% of the static detector data. Common pipistrelles were frequently recorded by all three static detectors, predominantly from the Static 2 which accounted for 70% of all recordings across the species. Low numbers recorded from the Static 1 and 3 detectors accounting for 12% and 17% retrospectively.

Soprano pipistrelles accounted for 42% of the transect survey data and 21% of the static detector data. Soprano pipistrelle activity was higher during the transect surveys; this is potentially due to the transects capturing higher levels of data from soprano pipistrelle bats using the southern half of the site around the ponds. Significantly higher levels of soprano pipistrelle activity were recorded on Static 2 detector, which is consistent with the level of activity in the three locations overall (in comparison to Statics 1 and 3). Static 2 was located on a mature tree in the centre of site which forms a focal point for commuting bats and connects to higher quality habitats, such as woodland and ponds.

Myotis sp. accounted for 1.1% of the transect survey data and 28% of the static detector data. *Myotis* sp. activity was significantly higher during the static detector surveys compared to the transect surveys. Significantly higher levels of *Myotis* sp. activity was recorded on Static 2 (in comparison to Statics 1 and 3). As with soprano pipistrelles, *Myotis* sp. are likely to be using the linear corridor which runs through the centre of site providing suitable foraging and commuting habitats, as well as the habitats associated with the off-site watercourse.

Noctule accounted for 8% of the transect survey data and 2.6% of the static detector data. Noctule were recorded across site with no affinity to a specific habitat.

BLE accounted for 0.3% of the static detector data. The low number of BLE recordings in comparison to other species may be due to their tendency to have reduced echolocating rates, their tendency to have quieter echolocation calls or may simply be due to a lower number of BLE using the survey area.

The seasonal usage of the site based on the static data generally follows the anticipated trend: Bat activity increased April to May, as would be expected due to bats reducing the amount of time spent in torpor and more time feeding as the temperature increases. High levels of bat activity was also recorded in June and July with a marked decline in August onwards as bats move towards mating sites. However, the transect surveys saw the highest number of

recordings from August with a gradual decline during September. Activity in September is likely due to the start of the mating period and bats feeding as regularly as possible to build up fat stores prior to the winter hibernation period. Bats were not observed swarming during the surveys.

4.2 Impacts

Any development on site will result in a reduction of foraging opportunities for bats. The impact on commuting routes is likely to be limited as most linear features such as watercourses, breaks within the dense scrub and tree lined boundaries are present at the site boundaries, particularly the southern boundary.

In terms of operational impacts, habitats could be degraded or fragmented as a result of increased light disturbance, which could deter bats from using foraging habitat and could sever commuting corridors.

4.3 Mitigation and recommendations

The development proposals should be designed to retain and incorporate linear features where possible and focus on providing connecting corridors at the site boundaries and across the development site. The pockets of higher quality habitat on site should be prioritised for retention where possible, including the woodland to the south which flanks the River Clywedog, in addition to ponds, which have been identified as hotspots for bat activity.

The scattered mature trees on site form focal points for foraging and commuting bats and should be incorporated into the proposed development plans where possible. Heat maps and activity data from the transect surveys and static detectors, highlight areas of key importance for bats and their foraging and commuting behaviour on site.

If suitable foraging habitats are lost to facilitate the development proposals, they should be compensated for, however the loss of dense scrub could be compensated for through the enhancement of retained sections of the site by increasing structural and floristic diversity through species-rich wildflower grassland and additional planting.

External lighting guidance has been provided (see Appendix 7 – External lighting guidance) which should be used to create a bat friendly lighting plan to ensure that light spillage is minimised where possible. The scheme should be designed to avoid overspill onto the ecological corridors at the site boundaries and any retained areas of high-quality bat foraging or commuting habitat.

5 CONCLUSION

The site provides mostly moderate quality habitat for foraging and commuting bats in the form of scrub and rough grassland, with smaller areas of high-quality habitat such as woodland and ponds to the south of the site. Watercourses at the site boundaries also provide high quality foraging and commuting habitat.

During the surveys, a minimum of seven species of bat were recorded: common pipistrelle, soprano pipistrelle, BLE, noctule, lesser horseshoe, Leisler's and a Myotis species. Of these, common, soprano pipistrelles and *Myotis sp.* were the most abundant. Overall, moderate levels of bat activity were recorded during the surveys, with bats exhibiting foraging and commuting behaviours. Bat activity was recorded across the entire site but was generally highest along the woodland and tree lines, to the south and breaks in the scrub along the central concrete pathways. The woodland and tree lines associated with the ponds and watercourses provided hotspots of activity.

The development proposals should be designed to retain and incorporate linear features where possible and focus on providing connecting corridors at the site boundaries and across the development site. The pockets of higher quality habitat on site should be prioritised for retention where possible, including the woodland to the south which flanks the River Clywedog, in addition to ponds, which have been identified as hotspots for bat activity. If suitable foraging habitats are lost to facilitate the development proposals, they should be compensated for, however the loss of dense scrub could be compensated for through the enhancement of retained sections of the site by increasing structural and floristic diversity through species-rich wildflower grassland and additional planting.

A wildlife friendly lighting plan should be implemented to ensure that potential operational impacts of the development on bats is reduced to the lowest practicable level and to ensure that retained foraging habitats and commuting corridors across the site remain undisturbed and functional.

6 REFERENCES

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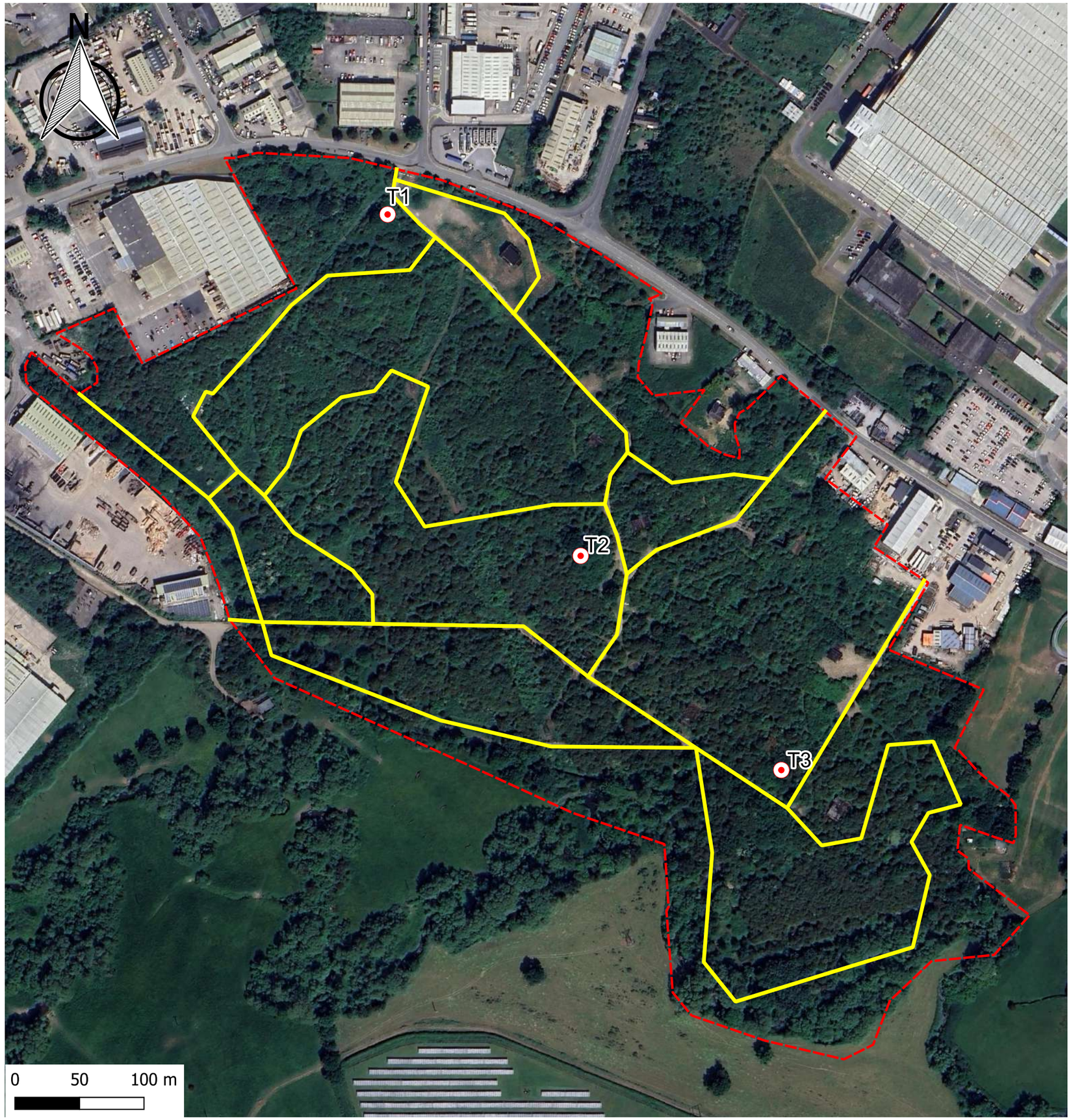
Welsh Government (2024). Planning Policy Wales. 12th Edition

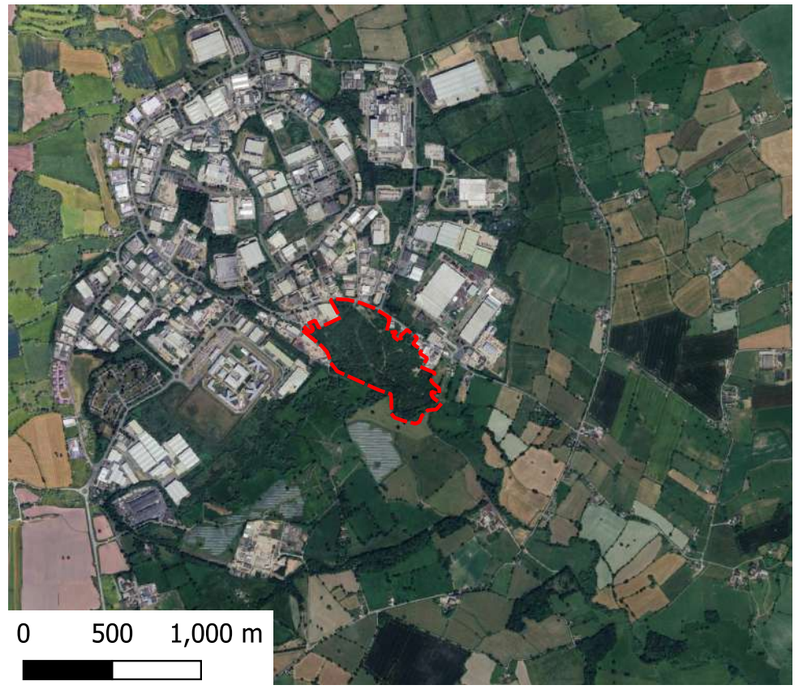
APPENDICES

Appendix 1 – Site plan

Bat Activity Survey

Site: The Oaks Site, Wrexham Industrial Estate, Wrexham, LL13 9RG
NGR: SJ 38806 49238
Author: Ben Cowell
Date: 21/11/2024





Key

- Survey Boundary
- Transect Route
- Target Notes
- T1 - Static Detector 1
- T2 - Static Detector 2
- T3 - Static Detector 3

MAP DATA © 2024 GOOGLE, IMAGERY 2024 GOOGLE.

THIS PLAN IS ISSUED BY UNITED ENVIRONMENTAL SERVICES LTD SUBJECT TO THE CONDITION THAT IT IS NOT COPIED EITHER IN WHOLE OR IN PART OR DISCLOSED TO THIRD PARTIES UNLESS PRIOR WRITTEN AUTHORISATION IS GIVEN.

Appendix 2 – Aerial photographs

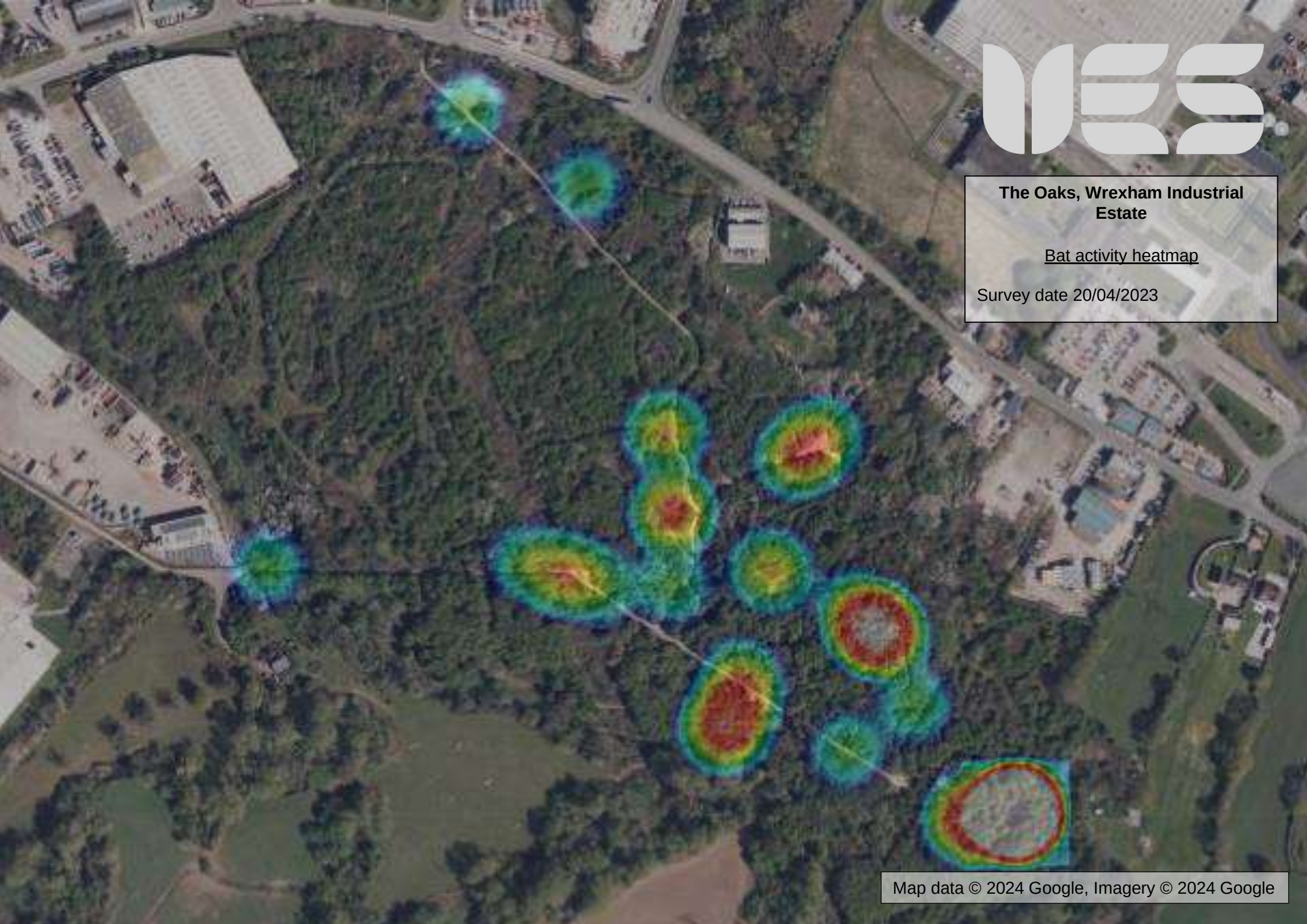

The Oaks – Wrexham Industrial Estate
Close aerial photograph
Survey boundary
Map data © 2024 Google, Imagery © 2024 Google

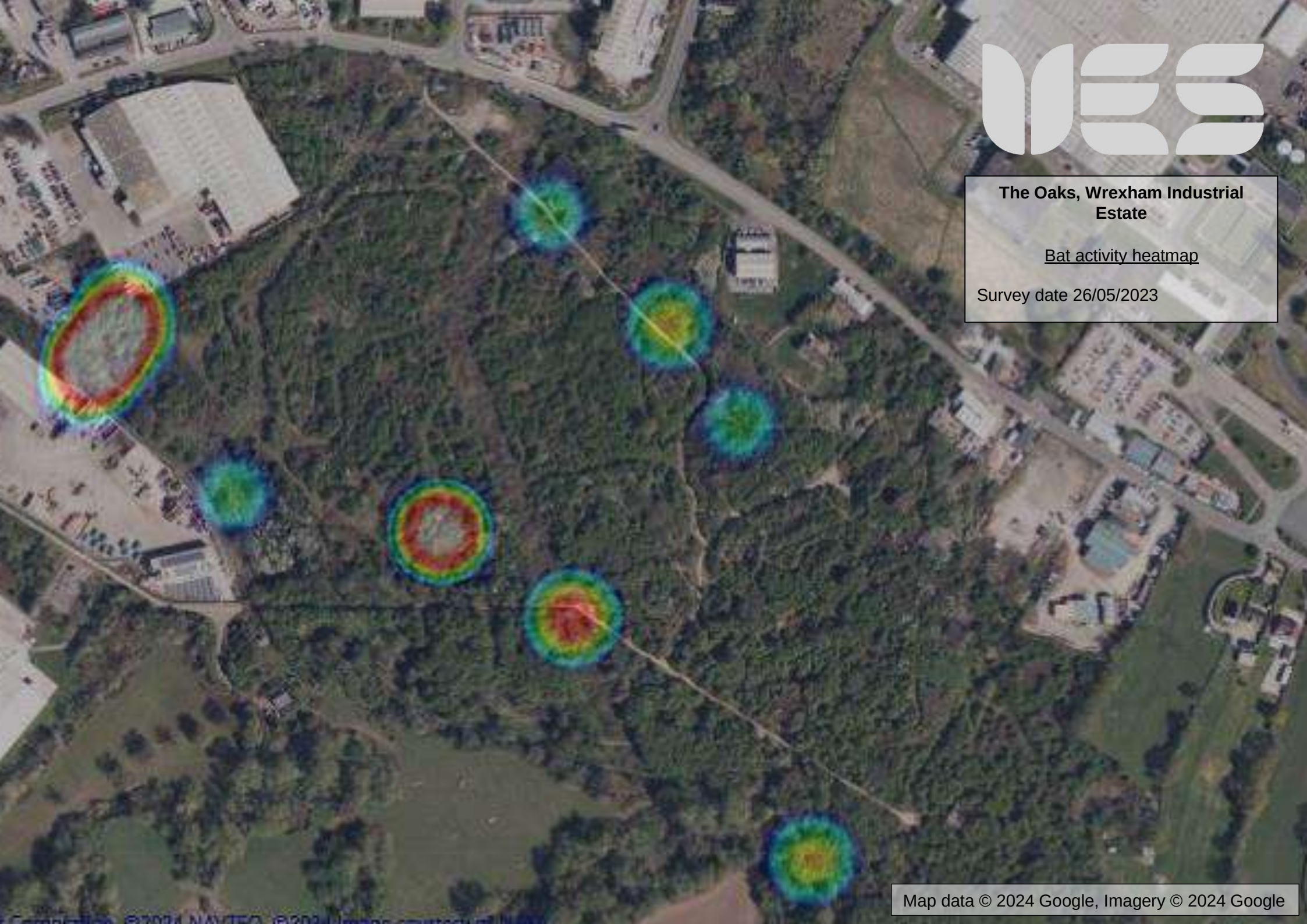

The Oaks – Wrexham Industrial Estate
Wide aerial photograph
Site location
Map data © 2024 Google, Imagery © 2024 Google

Appendix 3 – Transect survey data

TRANSECT SURVEY DATA				
Date	**Species**	**Number of recordings**	**Number of calls**	**Total number of calls**
20/04/2023	*Pipistrellus pipistrellus*	12	218	691
	Pipistrellus pygmaeus	21	356	
	Nyctalus noctula	5	18	
	Rhinolophus hipposideros	10	99	
26/05/2023	*Pipistrellus pipistrellus*	22	621	1595
	Pipistrellus pygmaeus	48	917	
	Nyctalus noctula	8	57	
04/07/2023	*Pipistrellus pipistrellus*	19	188	408
	Pipistrellus pygmaeus	25	218	
	Nyctalus noctula	1	2	
16/07/2023	*Pipistrellus pipistrellus*	8	122	451
	Pipistrellus pygmaeus	20	293	
	Nyctalus noctula	11	36	
09/08/2023	*Pipistrellus pipistrellus*	46	616	2490
	Pipistrellus pygmaeus	85	1647	
	Nyctalus noctula	69	227	
10/08/2023	*Pipistrellus pipistrellus*	31	411	600
	Pipistrellus pygmaeus	14	146	
	Nyctalus noctula	3	18	
	Myotis sp.	6	25	
10/09/2023	*Pipistrellus pipistrellus*	15	N/A	N/A
	Pipistrellus pygmaeus	8	N/A	
	Nyctalus noctula	8	N/A	
	Myotis sp.	3	N/A	
25/10/2023	*N/A*	N/A	N/A	N/A
Total		**498**	**6235**	**6235**

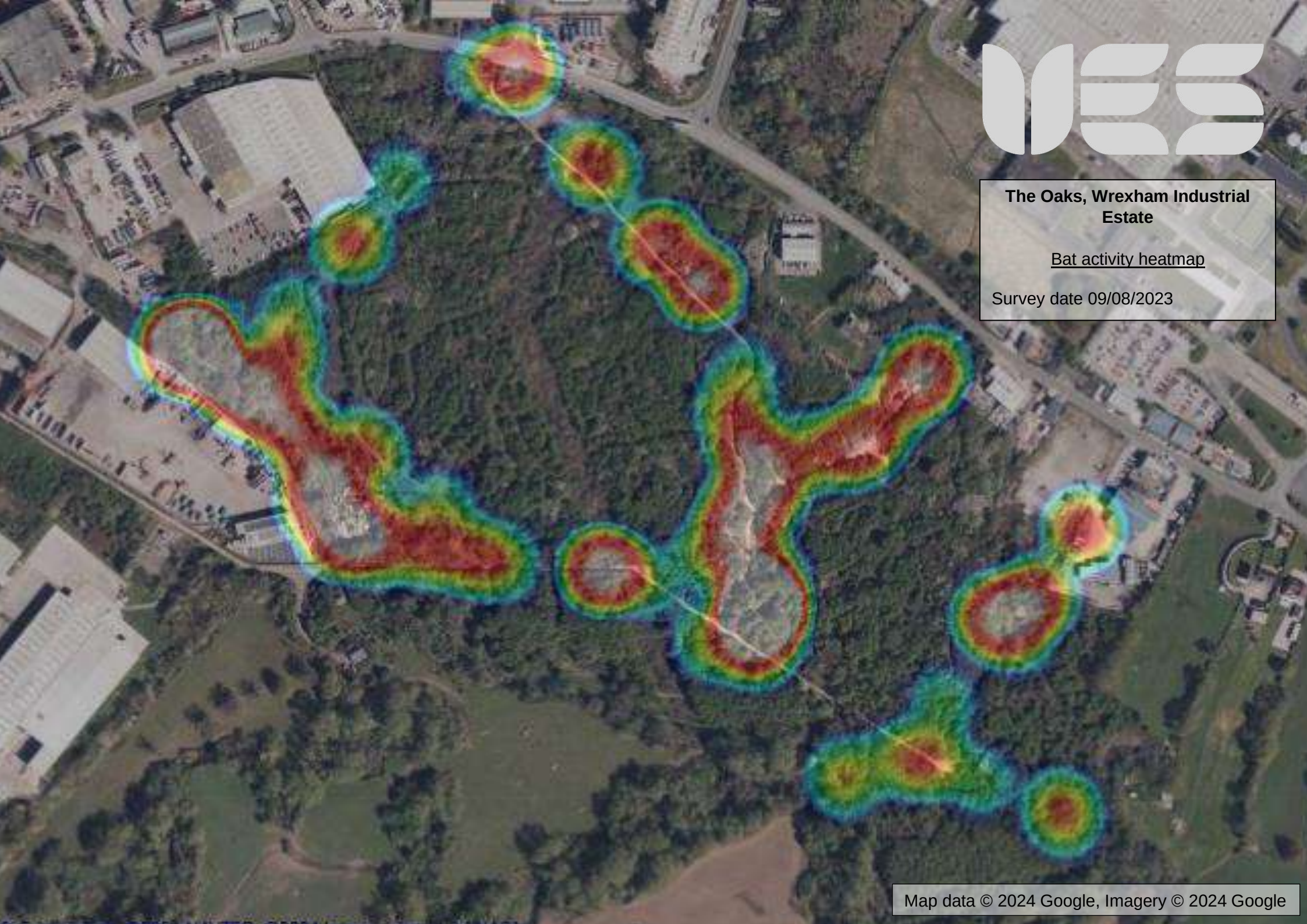
Appendix 4 – Heat maps


The Oaks, Wrexham Industrial Estate
Bat activity heatmap
Survey date 20/04/2023
Map data © 2024 Google, Imagery © 2024 Google


The Oaks, Wrexham Industrial Estate
Bat activity heatmap
Survey date 26/05/2023
Map data © 2024 Google, Imagery © 2024 Google


The Oaks, Wrexham Industrial Estate
Bat activity heatmap
Survey date 04/07/2023
Map data © 2024 Google, Imagery © 2024 Google


The Oaks, Wrexham Industrial Estate
Bat activity heatmap
Survey date 16/07/2023
Map data © 2024 Google, Imagery © 2024 Google


The Oaks, Wrexham Industrial Estate
Bat activity heatmap
Survey date 09/08/2023
Map data © 2024 Google, Imagery © 2024 Google

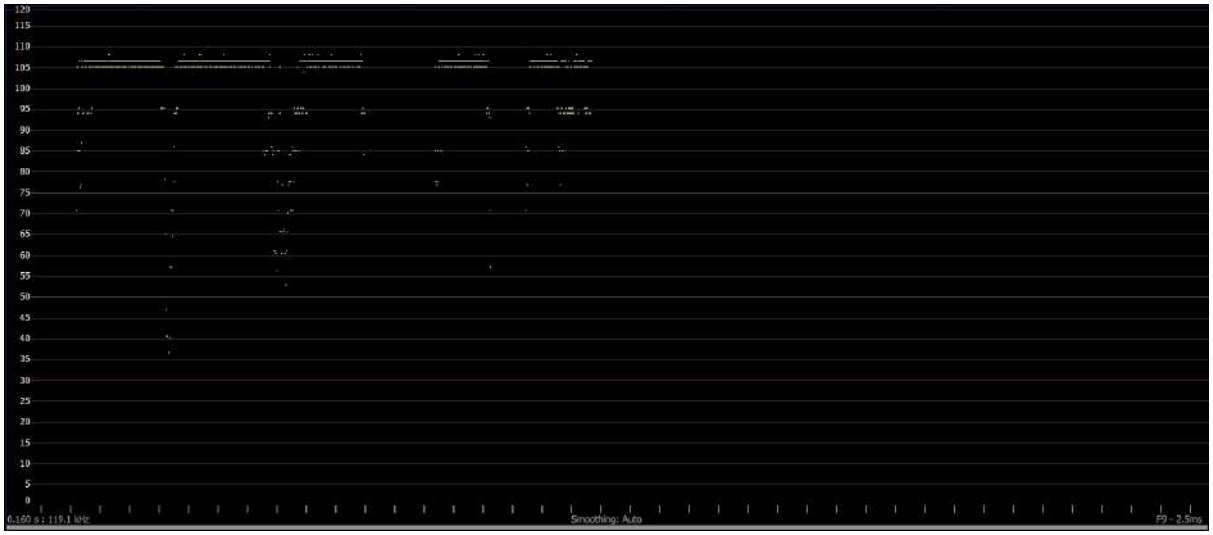

The Oaks, Wrexham Industrial Estate
Bat activity heatmap
Survey date 10/08/2023
Map data © 2024 Google, Imagery © 2024 Google

Appendix 5 – Static detector monitoring survey data

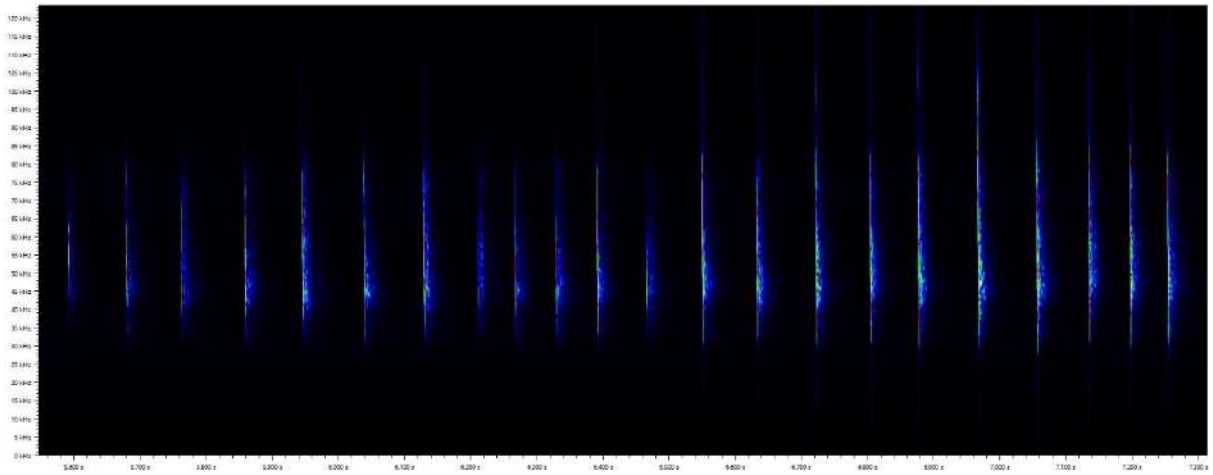
Static Detector Monitoring Surveys			
Species	**Total number of recordings over survey period**	**Average number of recordings per night over survey period**	**Percentage of total number of recordings**
Myotis sp.	4179	45.42	28.38
Nyctalus leisleri	64	0.70	0.43
Nyctalus noctula	392	4.26	2.66
Pipistrellus pipistrellus	6783	73.73	46.06
Pipistrellus pygmaeus	3187	34.64	21.64
Plecotus auritus	50	0.54	0.34
Rhinolophus hipposideros	72	0.78	0.49
All Species	14727	160.08	100.00
Central Static Total			
Myotis sp.	3493	37.97	33.76
Nyctalus leisleri	20	0.22	0.19
Nyctalus noctula	189	2.05	1.83
Pipistrellus pipistrellus	4526	49.20	43.75
Pipistrellus pygmaeus	2066	22.46	19.97
Plecotus auritus	32	0.35	0.31
Rhinolophus hipposideros	20	0.22	0.19
All Species	10346	112.46	100.00
Northwest Static Total			
Myotis sp.	195	2.12	10.69
Nyctalus leisleri	0	0.00	0.00
Nyctalus noctula	132	1.43	7.24
Pipistrellus pipistrellus	998	10.85	54.71
Pipistrellus pygmaeus	481	5.23	26.37
Plecotus auritus	18	0.20	0.99
Rhinolophus hipposideros	0	0.00	0.00
All Species	1824	19.83	100.00
Southeast Static Total			
Myotis sp.	491	5.34	19.20
Nyctalus leisleri	44	0.48	1.72
Nyctalus noctula	71	0.77	2.78
Pipistrellus pipistrellus	1259	13.68	49.24
Pipistrellus pygmaeus	640	6.96	25.03
Plecotus auritus	0	0.00	0.00
Rhinolophus hipposideros	52	0.57	2.03
All Species	2557	27.79	100.00

Average number of recordings per night each month			
Month	**Central Static**	**Northwest Static**	**Southeast Static**
April	99.40	29.20	15.80
May	386.60	38.40	129.00
June	729.60	111.60	112.20
July	541.80	102.00	103.40
August	0.00	78.20	51.80
September	168.20	0.00	61.20
October	143.60	5.40	38.00

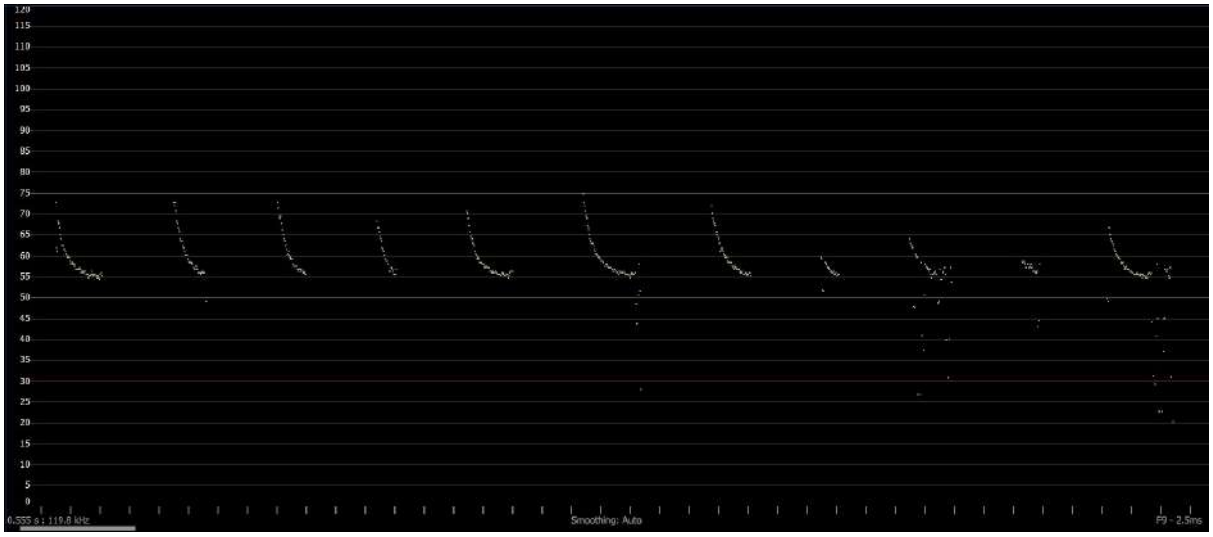
Appendix 6 – Sonograms



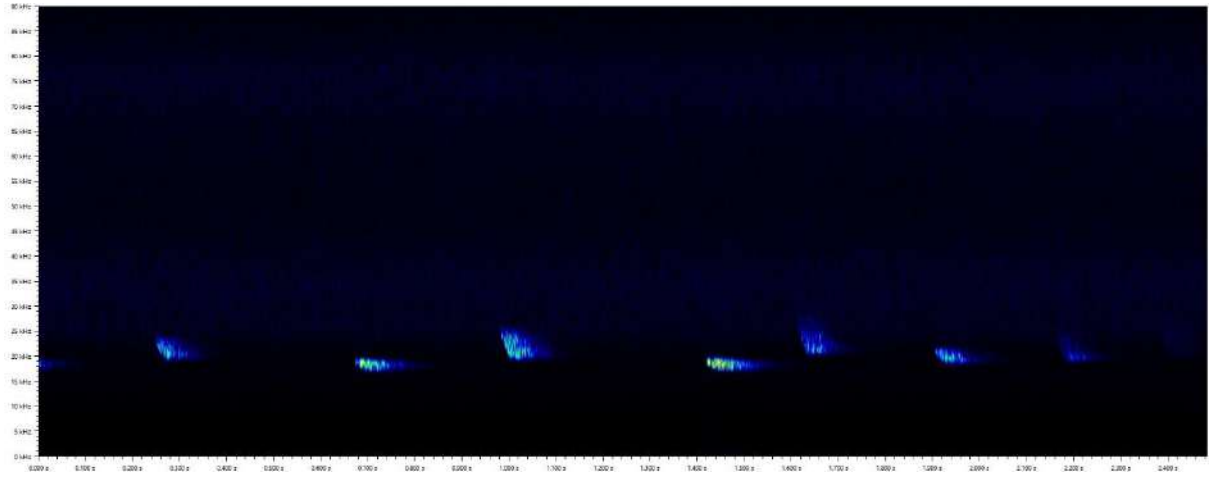
Sonogram 1 – Lesser Horseshoe echolocation calls recorded at 19:44 on 18th April 2023.



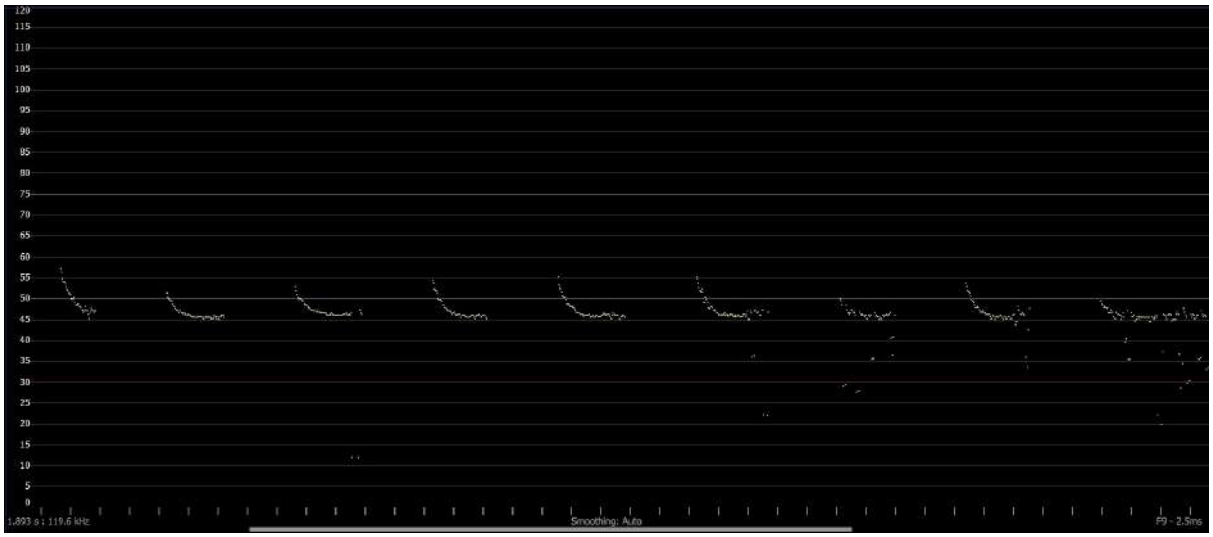
Sonogram 2 – *Myotis sp*. echolocation calls recorded at 23:49 on 17th May 2023.



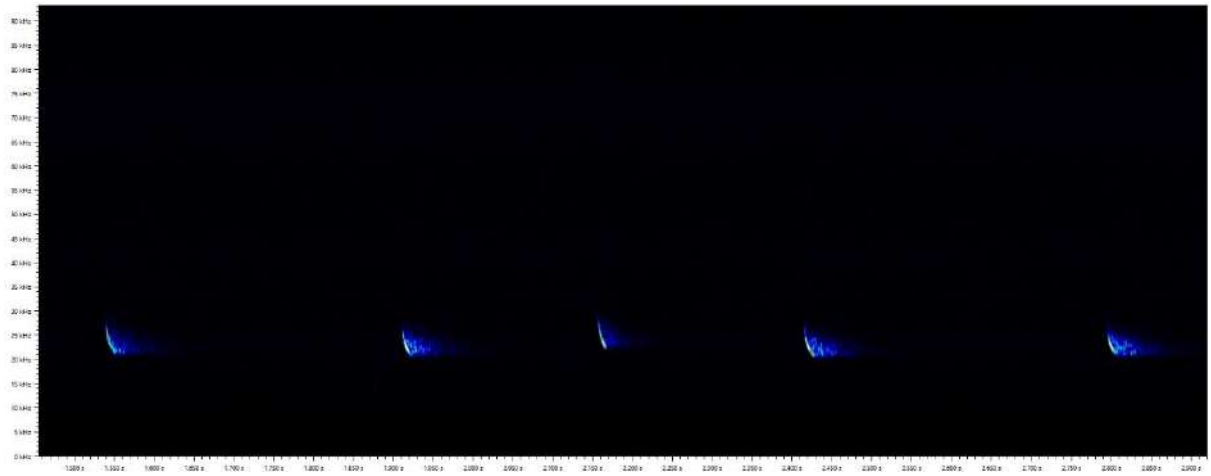
Sonogram 3 – Soprano pipistrelle echolocation calls recorded at 22:02 on 7th June 2023.



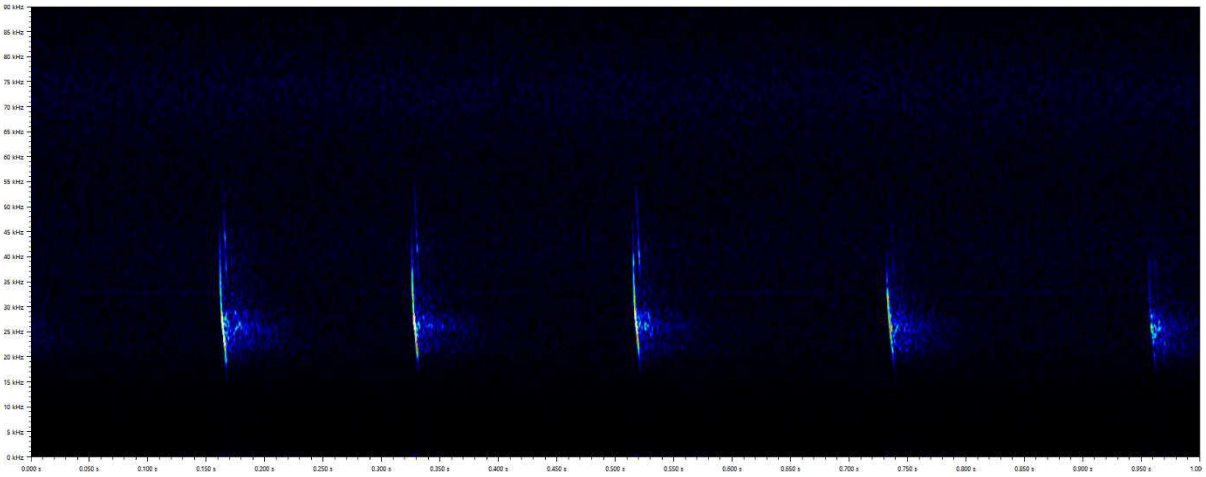
Sonogram 4 – Noctule echolocation calls recorded at 21:46 on 18th July 2023.



Sonogram 5 – Common pipistrelle echolocation calls recorded at 02:05 on 8th August 2023.



Sonogram 6 – Leisler's echolocation calls recorded at 00:46 on 24th September 2023.



Sonogram 7 – Brown long-eared echolocation calls recorded at 01:30 on 10th October 2023.

Appendix 7 – External lighting guidance

Lighting scheme in relation to bats

The two most important features of street and security lighting with respect to bats are:

1. The UV component. Low or zero UV installations are preferred to reduce attraction of insects to lighting and therefore to reduce the attraction of foraging bats to these areas.

2. Restriction of the area illuminated. Lighting must be shielded to maintain dark areas, particularly above lighting installations, and in many cases, land adjacent to the areas illuminated. The aim is to maintain dark commuting corridors for foraging and commuting bats. Bats avoid well lit areas, and these create barriers for flying bats between roosting and feeding areas.

UV characteristics:

Low

- Low pressure Sodium Lamps (SOX) emit a minimal UV component.
- High pressure Sodium Lamps (SON) emit a small UV component.
- White SON, though low in UV, emit more than regular SON.

High

- Metal Halide lamps emit more UV than SON lamps, but less than Mercury lamps
- Mercury lamps (MBF) emit a high UV component.
- Tungsten Halogen, if unfiltered, emit a high UV component
- Compact Fluorescent (CFL), if unfiltered, emit a high UV component.
- Variable
- Light Emitting Diodes (LEDs) have a range of UV outputs. Variants are available with low or minimal UV output.
- Glass glazing and UV filtering lenses are recommended to reduce UV output.

Street lighting

- Low-pressure sodium or high-pressure sodium must be used instead of mercury or metal halide lamps. LEDs must be specified as low UV. Tungsten halogen and CFL sources must have appropriate UV filtering to reduce UV to low levels.
- Lighting must be directed to where it is needed and light spillage avoided. Hoods must be used on each lamp to direct light and contain spillage. Light leakage into hedgerows and trees must be avoided.
- If possible, the times during which the lighting is on overnight must be limited to provide some dark periods. If the light is fitted with a timer this must be adjusted to reduce the amount of 'lit time' and provide dark periods.

Security and domestic external lighting

The above recommendations concerning UV output and direction apply. In addition:

- Lighting should illuminate only ground floor areas. Light should not leak upwards to illuminate first floor and higher levels.
- Lamps of greater than 2000 lumens (150 W) must not be used.
- Movement or similar sensors must be used. They must be carefully installed and aimed, to reduce the amount of time a light is on each night.
- Light must illuminate only the immediate area required, by using as sharp a downward angle as possible. Light must not be directed at or close to bat roost access points or flight paths from the roost. A shield or hood can be used to control or restrict the area to be lit.
- Wide angle illumination must be avoided as this will be more disturbing to foraging and commuting bats as well as people and other wildlife.
- Lighting must not illuminate any bat bricks and boxes placed on buildings, trees or other nearby locations.

Taken from the Bat Conservation Trust

Appendix 8 – Statutory and planning context

Ecological assessments

Ecological assessments play an important part within the planning context; they include an initial assessment which highlights any specific interests of a site. From the initial site assessment, the surveyor assesses the suitability of habitats within the site to support protected species and makes recommendations for further survey works if required. The following paragraphs provide a brief interpretation of the legislative protection that is relevant to the findings of this report.

Bats

In the United Kingdom, all species of bat and their roosts are afforded full protection under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2017 (known as the "Habitats Regulations"). The Wildlife and Countryside Act is the domestic implementation of the Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention) and was amended by the Countryside and Rights of Way Act 2000. This makes it an offence to:

- Deliberately, intentionally or recklessly kill, injure or capture a bat
- Deliberately, intentionally or recklessly disturb a bat while it is occupying a structure or place that it uses for shelter or protection
- Deliberately, intentionally or recklessly damage, destroy or obstruct access to any place that a bat uses for shelter or protection (even if the bat is not present at the time)
- Keep, transport, sell or exchange, or offer for sale or exchange any live or dead bat, any part of a bat or anything derived from a bat

Under UK law, a bat roost is *any structure or place which any wild [bat] … uses for shelter or protection*. As bats often reuse the same roosts, legal opinion is that a roost is protected whether or not the bats are present at the time of the activity taking place.

Penalties for offences include fines of up to £5000, plus up to six months imprisonment, for each offence committed.

If an activity is likely to result in any of the above offences, a licence can be applied for to derogate from the protection afforded. These licences must provide appropriate mitigation and are issued by National Resources Wales (NRW).

The Natural Environment and Rural Communities (NERC) Act 2006 lists the following bat species as species of principle importance under Section 41:

- Barbastelle *Barbastella barbastellus*
- Bechstein's bat *Myotis bechsteinii*
- Noctule *Nyctalus noctula*
- Soprano pipistrelle *Pipistrellus pygmaeus*
- Brown long-eared bat *Plecotus auritus*
- Greater horseshoe *Rhinolophus ferrumequinum*
- Lesser horseshoe *Rhinolophus hipposideros*

Section 40 requires every public body in the exercising of its functions 'have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity' (all biodiversity and not just section 41 species and habitats); therefore making these bats a material consideration in the planning process and requiring a detailed ecological bat survey before planning permission can be granted.

Planning Policy

National planning guidance is issued in the form of Planning Policy Wales (PPW - 2018). The most relevant sections are included in Chapter 6: Distinctive and Natural Places. This chapter details the policies on issues such as the protection of trees, woodlands, species, and designated sites. The document is free and available to view online.