

Bat Assessment Lissnagroagh Wind Farm, Manorhamilton, Co. Leitrim

Report Revision History

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1. Summary

Project Name & Location: Lissinagroagh Wind Farm, Manorhamilton, Co. Leitrim.

Proposed work: Wind farm development.

Bat Survey Results - Summary

Bat Species	Roosts	Foraging	Commuting
Common pipistrelle <i>Pipistrellus pipistrellus</i>	√	√	√
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	√	√	√
Nathusius' pipistrelle <i>Pipistrellus nathusii</i>			
Leisler's bat <i>Nyctalus leisleri</i>		√	√
Brown long-eared bat <i>Plecotus auritus</i>	√	√	√
Daubenton's bat <i>Myotis daubentonii</i>		√	√
Natterer's bat <i>Myotis nattereri</i>	√	√	√
Whiskered bat <i>Myotis mystacinus</i>		√	√
Lesser horseshoe bat <i>Rhinolophus hipposideros</i>			

Bat Survey Duties Completed (Indicated by red shading)

Tree PBR Survey	<input checked="" type="checkbox"/>	Daytime Building Inspection	<input checked="" type="checkbox"/>
Static Detector Survey	<input checked="" type="checkbox"/>	Daytime Bridge Inspection	<input checked="" type="checkbox"/>
Dusk Bat Survey	<input checked="" type="checkbox"/>	Dawn Bat Survey	<input checked="" type="checkbox"/>
Walking Transect	<input checked="" type="checkbox"/>	Driving Transect	<input checked="" type="checkbox"/>
Trapping / Mist Netting	<input type="checkbox"/>	NVA filming	<input checked="" type="checkbox"/>
Endoscope Inspection	<input checked="" type="checkbox"/>	Other	<input type="checkbox"/>

Citation: Bat Eco Services (2025) Bat assessment of proposed wind farm development at Lissinagroagh, Manorhamilton, Co. Leitrim. Unpublished report prepared for Future Energy Ireland (Coillte).

In summary, the survey area is deemed to have a Low to Medium landscape favourability for Irish bat species.

During bat surveys seven species of bat were recorded within the survey area and this is a high level of bat biodiversity. The level of bat activity recorded in 2024 was, in general, Low to Moderate but some Moderate to High levels were recorded on specific static units during surveillance, particularly for common pipistrelle, soprano pipistrelle and Leisler's bat.

Fourteen turbines are proposed as part of this wind farm development. Bat activity was recorded at all or in vicinity of the proposed turbine locations. Additional bat activity was recorded along much of the walking and driven transect routes while a lower level was recorded in open areas of bog compared to forest tracks and the local road network. But this is also a reflection of restricted survey locations during the hours of darkness.

One building, located within the proposed development area, was recorded as a bat Daytime roost for soprano pipistrelles (Building 4). This bat species is considered to be High Risk bat species in relation to wind farms. However, this roost is a Daytime Roost with a small number of bat roosting within the structure. Additional buildings were also recorded as bat roosts (5 buildings) but these were located outside the proposed development area. No roosts were confirmed in trees but PBRs were identified in vicinity of Turbine 9. These results were taken into consideration as part of the Risk Assessment for each proposed turbine location.

The result of the impact assessment for each of the turbine locations indicated that there are four High Risk turbines (T6, T7, T11 and T13) and three Medium Risk turbines (T9, T10 and T12).

The location of wind turbines is important in relation to their potential impact on local bat populations. To reduce impact on High-Risk species such as common pipistrelle, soprano pipistrelles and Leisler's bats, it is important to ensure that turbines are not located adjacent to the linear habitat features and habitat considered important for foraging bats. The proposed development will impact on local bat populations, particularly common pipistrelle, soprano pipistrelle and Leisler's bat. These three bat species are High Risk species in relation to wind farms. Therefore, bat mitigation measures are required.

The mitigation measures recommended in this report require strict implementation to reduce the long-term impact of the proposed wind farm on local bat populations. The proposed wind farm is likely to have an overall Moderate impact on local bat populations. The implementation of mitigation measures will potentially reduce this to a Low Impact on local bat populations.

Monitoring (including acoustic surveillance and carcass surveys) is essential to determine that mitigation measures recommended are reducing the potential impacts on local bat populations. The operation of the wind farm should be flexible to implement changes, if recommended, by the monitoring results.

2. Introduction

Bat Eco Services Ltd. was commissioned by Future Energy Ireland to undertake a bat survey of Lissinagroagh, Manorhamilton, Co. Leitrim. Bat surveys were completed in 2021 and 2024 and this comprised of static surveillance, daytime inspections, dusk and dawn surveys and walking transects. All surveys, collation and analysis of audio files was completed by Bat Eco Services Ltd.

Site Location

The proposed wind farm site is located within the townlands of Lisdarush, Shasmore, Faughary, Boleyboy, Cashelaveela, Tawnafeacle, Lissinagroagh and Tawnylust in north County Leitrim between the villages of Kiltyclogher to the northeast and Manorhamilton to the southwest. The closest turbine is located approximately 3 km northeast of Manorhamilton and approximately 4 km southwest of Kiltyclogher.

Please refer to Chapter 2, EIAR for further information.

Details of Proposed Development

The proposed project comprises:

- A wind farm containing fourteen (14) wind turbines, an on-site 110kV electrical substation and other ancillary infrastructure including access roads and drainage;
- A 110kV underground grid connection to connect the wind farm to the National Grid at the existing ESN Srananagh substation in Co. Sligo;
- Accommodations required along the public road network between Killybegs, Co. Donegal and the site to facilitate turbine and construction material delivery.

For a more detailed description, please consult Volume II EIAR (Chapter 2 Description of the Proposed Project).

In the case of wind farm developments, many elements of final engineering design, for example foundation solutions, hardstands, internal service roads, are reliant upon the choice of wind turbines. There are several turbine models which are expected to be suitable for this site, however the final choice of turbine that will be installed will be subject to a competitive tendering procedure. Therefore, such decisions cannot be finalised either prior to or at the time of the planning application. As a result, this bat assessment has been undertaken based on a specified “range” for individual development components. Accordingly, the descriptive discussion on these project components, as set out in this EIAR, provides for an anticipated range of physical characteristics and various options as appropriate. In this EIAR, fourteen (14) candidate wind turbines with a blade tip height of 180-185 metres (m) and a rotor diameter of 149-163 m have been considered.

Purpose of this Report

The purpose of this bat survey report is to document the bat species and their utilisation of the proposed development area and to determine the potential impact of the proposed development on local bat populations.

3. Methods

Scope

The following is the scope of works:

- Document the level of bat usage and number of bat species within the proposed development site (i.e. the red line boundary as illustrated by Figure 1).
- Document the distribution of local bat species in a wider area surrounding the proposed development site as determined by safe accessible tracks and local roads for night-time surveying.
- Determine the level of bat activity of recorded bat species in vicinity of the proposed turbine locations through static surveillance over a minimum of three surveillance periods as per NaturScot (2021) guidelines.
- Complete bat surveys according to Collins (2023) bat survey guidelines.
- Provide an assessment of the potential impact of the proposed development on local bat populations using a similar method to EcoBat Tool and according to NaturScot (2021) guidelines.
- Provide bat mitigation measures, where required, according to NaturScot (2021) and Marnell *et al.* (2022) guidelines.

Desk Study

3.1.1 Bat Conservation Ireland Database

Bat Conservation Ireland acts as the central depository for bat records for the Republic of Ireland. Its' bat database is comprised of >100,000 bat records. A 10km radius search was requested for the Irish Grid Reference G9201842724 in November 2025.

3.1.2 Bat Conservation Landscape Favourability

Bat Conservation Ireland produced a landscape conservation guide for Irish bat species using their database of species records collated during the 2000 - 2009 survey seasons. An analysis of the habitat and landscape associations of all bat species deemed resident in Ireland was undertaken and reported in Lundy *et al.*, 2011. The geographical area suitable for individual species was used to identify the core favourable areas of each species. This was produced as a GIS layer for local authorities and planners to provide a guide to the consideration of bat conservation. The island is divided into 5km squares and the landscape favourability of each 5km square for each species of bat was modelled. A caveat is attached to the model and it is that the model is based on records held on the BC Ireland database, while core areas have been identified, areas outside the core area should not be discounted as unimportant as bats are a landscape species and can travel many kilometres between roosts and foraging areas nightly and seasonally. This model was used as part of the desktop study for this report.

3.1.3 Underground Structures

Due to the fact that there are many caves and underground structures in Co. Leitrim, a desktop search was undertaken to compile a list (and location) of known underground structures within a 10km radius of the proposed development site. The following sources were consulted:

- gsi.geodata.gov.ie
- grottomap.org

Field Surveys

3.1.4 Daytime Inspections

3.1.4.1 Building & Structure Inspection

A number of buildings were assessed for potential bat usage in 2024. Evidence of bat usage is in the form of actual bats (visible or audible), bat droppings, urine staining, grease marks (oily secretions from glands present on stonework) and claw marks. In addition, the presence of bat fly pupae (bat parasite) also indicated that bat usage of a crevice, for example, has occurred in the past. Inspections are undertaken visually with the aid of a strong torch beam (LED Lenser P14.2) and endoscope (General DC5660A Wet / Dry Scope). These structures were also assessed to determine their suitability as a bat roost and described using the parameters Negligible, Low, Moderate or High suitability according to Collins (2023). Please see Appendix IV for more information (Table A). Daytime inspections were completed on numerous dates in 2021 and 2024 (Please see results section for more details).

3.1.4.2 Tree Potential Bat Roost (PBRs) Inspection

Deciduous trees located adjacent to buildings within the survey area were inspected (21/12/2022) to determine if they provide a roosting space for bats using the Bat Tree Habitat Key (BTHK, 2018) and the classification system adapted from Collins (2023). The Potential Roost Features (PRFs) listed in BTHK (2018) were used to determine the PBR value of trees. Evidence of bat usage is in the form of actual bats (visible or audible), bat droppings, urine staining, grease marks (oily secretions from glands present) and claw marks. In addition, the presence of bat fly pupae (bat parasite) also indicated that bat usage of a crevice, for example, has occurred in the past. A Phase 1 inspection was undertaken visually with the aid of a strong torch beam (LED Lenser P14.2) during the daytime searching for PRFs, if visible. Please see Appendix IV for more information (Table B).

3.1.5 Bat Detector Surveys

3.1.5.3 Dusk Bat Surveys – Walking and Driving Transects

Dusk Surveys were completed from 15 minutes before sunset to 110 minutes post sunset. Dawn surveys were completed from 110 minutes prior to sunrise to 15 minutes post sunrise. Surveys completed in 2024 were on the following dates: 17/6/2024, 18/6/2024, 19/6/2024, 1/7/2024, 22/7/2024 and 19/8/2024.

Walking transects involved the surveyor(s) walking in survey area along tracks and safe accessible points, noting the time, location and bat species encountered. Local roads were also driven to collate data from a wider area and methodology follows that of car transect methodology following by the Irish Bat Monitoring Programme (Bat Conservation Ireland). Mapping of bat encounters was undertaken using QGIS and an excel file produced for mapping purposes (ITM Irish grid reference co-ordinates). Validation of bat records was completed by the principal bat surveyor prior to mapping.

Walking and driving transects were undertaken to gather information on local bat populations within and adjacent to the proposed development area. Transects were undertaken on the following dates: 16/4/2021, 9/5/2021, 10/5/2021, 17/6/2021, 19/6/2021, 27/6/2021, 28/6/2021, 9/8/2021, 10/8/2021, 11/8/2021 and 12/8/2021.

All bat encounters were noted during surveys.

The following equipment was used:

- Surveyor 1 (Principal surveyor): Anabat Walkabout Full Spectrum Bat Detector and Petersson D200 Heterodyne Bat Detector.
- Surveyor 2: Bat Logger M2 Full Spectrum Bat Detector and Petersson D200 Heterodyne Bat Detector.
- Surveyors 3 & 4: Anabat Scout Full Spectrum Bat Detectors

The Night Vision Aids (NVAs) were used to support dusk and dawn surveys. The following NVAs were used:

- A Guide TrackIR Pro25 thermal imagery scope
- A Guide TrackIR Pro19 thermal imagery scope
- HikMicro thermal imagery scope
- Flir Scion OTM255 thermal imaging scope
- Sony FDR camcorder with night-shot capability coupled with IR illuminator (Dedolight)

Bat detectors were attached to the filming units to aid species identified: Anabat Scout Full Spectrum Bat Detector and Pettersson D200 Heterodyne Bat Detector.

3.1.5.4 Passive Static Bat Detector Survey

Static bat surveys involved leaving a static bat detector unit (with ultrasonic microphone) in a specific location, set to record for a specified period of time (i.e. a bat detector is left in the field, there is no observer present and bats which pass near enough to the monitoring unit are recorded and their calls are stored for analysis post surveying). The bat detector was effectively used as a bat activity data logger. This results in a far greater sampling effort over a shorter period of time and increases the opportunity to record less common bat species as the units are set to continuously record ultrasonic noise, when triggered, from 30 minutes for sunset to 30 minutes after sunrise. Bat detectors with ultrasonic microphones were used as the ultrasonic calls produced by bats cannot be heard by human hearing.

The microphone of the unit was positioned horizontally to reduce potential damage from rain. The static units deployed use Real Time recording as a technique to record bat echolocation calls and using specific software, the recorded calls are identified. It is these sonograms (2-d sound pictures) that are digitally stored on the SD card (or micro-SD cards depending on the model) and downloaded for analysis. These results are depicted on a graph showing the number of bat passes per species per night. Each bat pass does not correlate to an individual bat but is representative of bat activity levels. Some species such as the pipistrelles will continuously fly around a habitat and therefore it is likely that a series of bat passes within a similar time frame is one individual bat. On the other hand, Leisler's bats tend to travel through an area quickly and therefore an individual sequence or bat pass is more likely to be indicative of individual bats.

Recordings were analysed using Wildlife Acoustics Kaleidoscope Pro. Manual validation was undertaken by the principal bat specialist and the following rules were followed:

- Validation that the auto-id function was checked for at least 20% of *Pipistrellus* spp. and Leisler's bat calls apart from Nathusius' pipistrelle calls.
- All Nathusius' pipistrelles calls were manually verified. The reasoning for this is due to frequent misidentification of low 40kHz calls, by auto-id tools, as this species, which may in fact be low frequency common pipistrelle calls.
- All brown long-eared bat calls were manually verified. The reasoning for this due to frequent misidentification of social calls of *Pipistrellus* spp. frequently identified as this bat species.
- Manual verification of *Myotis* spp., where possible, to species level in order to increase the accuracy of the dataset. Where such calls cannot be identified to species level, they are reported as *Myotis* spp.
- Manual validation was undertaken for all "Unidentified" calls and for approximately 20% proportion of "Noise" calls.

Each audio file was noted as a bat pass to indicate level of bat activity for each species recorded. This was expressed as the average number of bat passes per survey night (no. of nights was the total number successful nights of deployment).

The following static units were deployed during this static bat detector survey:

Table 1: Static Bat Detectors deployed during Static Bat Detector Surveys.

Static Unit Code	Bat Detector Type	Recording Function	Microphone
SM4 Units	Wildlife Acoustics SongMeter 4 Bat FS	Passive Full Spectrum	SMM-U2, 4m cable
SM Mini Bat Units	Wildlife Acoustics SongMeter Mini Bat FS	Passive Full Spectrum	SMM-U2

Bats produce different types of echolocation calls and each bat species family have a characteristic bat echolocation call depending largely on their morphology and preferred habitat

type. The different types of echolocation calls (i.e. CF or Constant Frequency call verses a FM or Frequency Modulated call) provides different types of information and therefore are used to detect prey items or for orientation in different habitat types. These can be broadly defined as in the table below.

3.1.6 Summary Statistics, Mapping & Analysis

Summary statistics of data collated from static surveillance, walking and driven transects and dusk and dawn surveys were completed. All data collected was collated into excel files for each bat species to produce distribution maps.

In addition, the nightly number of bat passes recorded per species on the statics units were proposed to be analysed using the website-based tool EcoBat (<http://www.ecobat.org.uk/>). However, the tool was down for maintenance at the time of reporting and analysis. Therefore, analysis was undertaken using average number of bat passes per static unit location (as represented by the proposed turbine location) and compared relatively to all result per static surveillance period.

3.1.6.5 Bat Habitats & Bat Activity Analysis

All 2024 static recording locations sampled are also classed according to their favourability as a bat habitat within 200m radius of the static location. Four classifications are used:

- Open – for example, open peat bog. Typically, there is little, tall vegetation in this category which is generally required for bat species to forage and commute along (exception to this is Leisler's bats). This category would be considered to have a low potential for most bat species.
- Edge – for example, hedgerows, treelines and woodland edge. Bat species such as *Pipistrellus* species have a preference to fly along linear habitat features. This category would be considered to have a high potential for most bat species.
- Closed – for example woodland. Bat species such a brown long-eared bats have a preference to foraging within woodland habitats. This category would be considered to have a high potential for most bat species.
- Water – while an open habitat, due to the insect resource associated with water, these habitat types are often favoured by foraging bats, especially Daubenton's bat.

Roche *et al.* (2014) and Lundy *et al.* (2011) reported on the habitats consider favourable for each Irish bat species. Using the habitat maps (QGIS map layers) produced by Tobin examined to aid analysis for this report. Habitats deemed by the author, under guidance of Roche *et al.* (2014) and Lundy *et al.* (2011), as "Bat Habitat" are as follows:

- Mixed broad-leaved woodland
- Water bodies
- Linear habitat
- Bog Woodland

- Mosaic
- Scrub
- Conifer plantation

Consequently, the “Habitat” shapefile provided by TOBIN Consulting Engineers was used to represent “Bat Habitats” for analysis.

Additional QGIS layers were created to aid analysis for this report. Each bat encounter was mapped and bat encounters within 1km of the proposed turbine locations was extracted to represent the bat encounters of the principal proposed development area. As bats echolocation calls can be detected some distance from where the actual bat is flying, a 50m fly zone was created around each bat encounter to represent the general area that individual bat recorded could be located at that point in time. This was named the **“Buffered Bat Encounters”** and represents the potential distance that bat echolocation calls can be detected by an ultrasonic microphone (i.e. bat detector zone).

To further facilitate analysis, all turbine locations were buffered to 200m. This layer was named “Buffered Turbine Locations” and represents the potential area/zone directly around the turbine locations that may impact on local bat populations.

3.1.7 Internal Wind Farm Access Tracks

To facilitate the construction of the proposed wind turbine, internal wind farm access tracks are required. This may result in the removal of habitats and the potential impact of this is investigated using the **“Habitat”** layer, **“Buffered bat Encounters”** layer and the **“Buffered Turbine Locations”** layer produced.

3.1.8 Core Sustainance Areas

Bat Conservation Trust (BCT) defines Core Sustainance Zones (CSZs) for different bat species and this is based on an extensive literature review (www.bats.org.uk). A CSZ refers to the area surrounding a communal bat roost within which habitat availability and quality will have a significant influence on the resilience and conservation status of the colony using the roost. With reference to development, the CSZ could be used to indicate:

- The area surrounding a communal roost within which development work may impact the commuting and foraging habitat of bats using that roost.
- The area within which it may be necessary to ensure no net reduction in the quality and availability of foraging habitat for the colony.

Project Team

Licensed Bat Specialist: Dr Tina Aughney (tina@batecoservices.com, 086 4049468)

NPWS licence C047/2026 (Licence to handle bats, expires 31st December 2026);

NPWS licence 014/2026 (Licence to photograph/film bats, expires 31st December 2026);

NPWS licence DER/BAT 2026-119 (Survey licence, expires 31st December 2026).

Statement of Authority: Dr Aughney has worked as a Bat Specialist since 2000 and has undertaken extensive survey work for all Irish bat species including large scale development projects, road schemes, residential developments, wind farm developments and smaller projects in relation to building renovation or habitat enhancement. She was a monitoring co-ordinator and trainer for Bat Conservation Ireland for 20 years. She is a co-author of the 2014 publication *Irish Bats in the 21st Century*. This book received the 2015 CIEEM award for Information Sharing. Dr Aughney is a contributing author for the Atlas of Mammals in Ireland 2010-2015. She is a trained bat handler, bat ringer and radio-telemetry project manager. She is a member of the Nathusius' Pipistrelle Working Group and the Cavan Bat Group.

All analysis and reporting is completed by Dr Tina Aughney. Data collected and surveying is completed with the assistance of trained field assistants. Mr. Shaun Boyle and Ms. Eva Boyle (Field Assistants) survey under NPWS licence DER/BAT 2026-119 (Survey licence, expires 31st December 2026). Both field assistants have received in-house training to undertake all elements of bat surveying according to Collins (2023).

Limitations

The proposed development area is primarily upland heath and conifer plantation with limited safe access points for night-time bat surveys. Therefore, a larger area within vicinity of the proposed development area was surveyed to supplement the local bat population knowledge by walking and driving transects. Overall the data that was gathered is reliable to inform the impact assessment.

4. Results

4.1.1 Bat Conservation Ireland Database

A 10km radius search was requested for the Irish Grid Reference redline boundary of the proposed development site in November 2025. The data search provided data for 35 roosts, three transects and 54 Ad Hoc records. The majority of roost records is the result of bridge surveys in the data search area and as a result the roost records are of bat species that typically roost in bridges (i.e. Daubenton's bat and Natterer's bat).

Table 3a: Bat Conservation Ireland Bat Records for 10km radius search.

Bat Species	Records	Roost Records	Transect Records	Ad Hoc Records
Brown long-eared bat	3	1	1	1
Common pipistrelle	23	0	1	22
Daubenton's bat	41	20	2	19
Leisler's bat	23	5	1	17
Lesser horseshoe bat	0	0	0	0
Nathusius' pipistrelle	0	0	0	0
Natterer's bat	15	13	1	1
Soprano pipistrelle	31	1	1	29
Whiskered bat	2	1	0	1
Pipistrellus species	1	0	0	1
Myotis species	4	0	1	3

The nearest BCIreland database recorded is within the boundary of the proposed development site (500m NE of proposed T11 location) and this is an Ad Hoc record for Leisler's bat, soprano pipistrelle and common pipistrelle. A second Ad Hoc record is located 1km west of proposed T3 location for Leisler's bat, soprano pipistrelle and common pipistrelle. There is a roost record for Leminea Bridge over the Owenmore River (G911396) where a Daubenton's bat was noted to be roosting.



Figure 2a: Bat Conservation Ireland Database – bat records for 10km data search.

4.1.2 Bat Conservation Landscape Favourability

Figure 2b depicts the BC Ireland Bat Landscape Favourability Model (Lundy *et al.*, 2011) for all bat species (individual species values are presented in the table below) for the two 5km squares that the proposed development is located within. The county is divided into 5km squares and the darker the shading of the square, the higher favourability of the 5km square for bats. This GIS layer is hosted on the NBDC website www.biodiversityireland.ie.

The 5km squares within which the proposed development is located have a Low to Medium favourability for bats. For the bat species recorded during this bat survey, the 5km Square A has a Medium favourability value for four recorded bat species and a Medium to High for soprano pipistrelle. 5km Square B has a lower favourability for bat species recorded compared to 5km Square A.



Figure 2b: Bat Landscape Favourability Model (All Bats) (Source: NBDC) – Blue Box = approximate location of proposed development area.

Table 3b: Bat Conservation Ireland Bat Landscape Favourability Model – 5km Square value.

Bat species	5km Square A	5km Square B
Common pipistrelle	24% (Medium)	19% (Medium)
Soprano pipistrelle	32% (Medium to High)	28% (Medium)
Nathusius' pipistrelle	1% (Low)	0% (Low)
Leisler's bat	26% (Medium)	19% (Medium)
Brown long-eared bat	26% (Medium)	24% (Medium)
Daubenton's bat	25% (Medium)	22% (Medium)
Natterer's bat	18% (Low to Medium)	11% (Low)
Whiskered bat	9% (Low)	4% (Low)
Lesser horseshoe bat	1% (Low)	0% (Low)

4.1.3 Caves & Underground Structures

It has been reported that there are at least 113 underground structures known for Co. Leitrim. The map below presents the results of the data search for caves and underground structures within a 10km radius of the proposed development site. This data set also includes two underground sites listed in habitats mapped by TOBIN (located adjacent to proposed T7 and T8). This list was cross-referenced with known roosts on the Bat Conservation Ireland database and no bat data is currently available for any of these underground structures. A full list of these is presented in the Appendices.

The two underground structures located within the survey area appear to be dolines (stream flows to the underground karst landscape which typically are vertical shafts through the karst into the ground water network). The underground portion of the structures were not investigated for health and safety reasons.



Figure 2c: Underground sites within 10km radius of proposed development area.

Bats will roost in underground structures, particularly during the swarming period (mating season – late August to mid-October) and during the colder months. However, the usage of such sites depends on the ambient temperatures and the degree of water flow, with the later reducing use by bats during flood conditions.

Field Surveys

The results of the different types of surveys are presented below and summarised at the end of the section. It is important that the whole section is read in order to gain a full impression of the potential bat value of the survey area.

4.1.4 Daytime Inspections

4.1.4.1 Building & Structure Inspection

A series of buildings, in conjunction with Coillte local staff, was surveyed in 2021. In 2024, the survey area was re-assessed to determine what buildings to survey. Using the proposed turbine locations (2024 layout), a 500m buffer zone was created around each turbine location and any buildings located within these buffers were compiled using the criteria: buildings surveyed in 2021 located within the buffer areas, buildings surveyed in 2021 considered to be important to resurvey and additional buildings not surveyed in 2021 but located within the buffers. 2024 daytime inspections were undertaken on 17/6/2024, 18/6/2024, 1/7/2024 and 19/6/2024 of the buildings and the results of these inspections are presented in the table below.

In addition, TOBIN Consulting Engineers requested a survey of a bridge over the Owenmore River (Bridge 1) located further south of the survey area. This was inspected during the daytime on 19/6/2024 and 1/7/2024.

Therefore, in 2024, 17 buildings (or sets of buildings) and one bridge was inspected during the daytime to determine the potential bat roosting value. Based on these daytime assessments, dusk and dawn surveys were undertaken.

Please note that the numerical numbering of buildings takes into consideration of additional buildings surveyed in 2021 but not resurveyed in 2024. These additional buildings are presented in the appendices.

Table 4a: Buildings / Structures inspection results - 2024.

Building Code (Location)	Description	Daytime Inspection / Suitability	Bat species
Building 1 ITM 590467 842350	Modern agricultural barns located in a farmyard Located in 500m buffer of T11	Daytime inspection: 18/6/2024 Suitability as a roost: Negligible	No evidence of bat usage Conifer treeline along boundary that provides foraging and commuting habitat
Building 2 ITM 590692 842883	Farmyard with modern agricultural barn and series of natural stone ruins	Daytime inspection: 18/6/2024 Suitability as a roost: Negligible (barn)	No evidence of bat usage Treelines and hedgerow linear habitats adjacent to the farmyard that provide

	Located in 500m buffer of T11	Low (ruins)	commuting and foraging habitat
Building 3 ITM 591492 842880	Farm cottage with corrugated roof and natural stone walls. Located in adjacent to T9	Daytime inspection: 17/6/2024 & 18/6/2024 Suitability as a roost: Low to Moderate	No evidence of bat usage Located in a valley with treeline connectivity that provides commuting and foraging habitat
Building 4 ITM 591607 843149	Derelict cottage along local road (asbestos tile roof, natural stone walls with plaster render) Modern stables with corrugated iron roof (concrete walls) Located within 500m of T9	Daytime inspection: 17/8/2024 Suitability as a roost: Moderate (cottage) Negligible (stables)	Bat droppings on front door and adjacent walls (<i>Pipistrellus</i> spp.) Treeline to rear of buildings that provide cover and foraging habitat
Building 6 ITM 592139 840562	2 buildings Agricultural shed with corrugate roof (single storey) Agricultural shed (2 storey) with corrugated roof and natural stone walls Located outside 500m zone, west of T14	Daytime inspection: 18/6/2024 Suitability as a roost: Moderate: 2-storey agricultural shed Low to Moderate: Single storey shed	Small scatter of bat droppings on floor (<i>Pipistrellus</i> spp.) of 2-storey shed No evidence in single storey shed Extensive treelines and woodland in vicinity of this building.
Building 7 ITM 592396 840535	Farmyard with an extensive array of buildings from modern agricultural sheds to derelict cottages and loft natural stone/slate buildings. Located outside 500m zone, west of T14	Daytime inspection: 18/6/2024 Suitability as a roost: Derelict cottage: High Loft building: Moderate Array of other buildings: Negligible to Low	Derelict cottage: extensive bat droppings at entrance hall of building Loft building: dropping on loft floor Extensive treelines and woodland in vicinity of this farmyard
Building 8 ITM 593078 840622	Single storey agricultural shed (corrugate roof)	Daytime inspection: 18/6/2024	No evidence of bat usage but extensive suitable

	constructed with natural stone Located outside 500m zone, south-west of T14	Suitability as a roost: Moderate	crevices in internal walls of shed. Located adjacent to forestry
Building 12 ITM 592300 840518	Bungalow (private residence) Located outside 500m zone, south-west of T14	Indirectly surveyed while surveying Building 7 (dusk survey). Daytime inspection: 18/6/2024 Suitability as a roost: Low	No evidence of bat usage. Extensive treelines and woodland in vicinity of adjacent farmyard
Building 13 ITM 593052 840867	Derelict agricultural building, mixed construction and roofing material. Located within 500m zone of T13	Daytime inspection: 18/6/2024 Suitability as a roost: Low	No evidence of bat usage but extensive suitable crevices in internal walls of structure. Surrounded by mature trees. Located adjacent to forestry
Building 14 ITM 591626 843463	Modern substation building (single storey, PVC fascia, plastered concrete construction) Located within 500m of T6	Daytime inspection (18/6/2024) Suitability as a roost: Negligible	No evidence of bat usage. Located along road to existing turbines. Open landscape with no linear habitats in vicinity of structure
Building 15 ITM 593678 840116	Agricultural buildings – modern and stone ruins Located outside 500m zone, south of T14	Daytime inspection (18/6/2024) Suitability as a roost: Modern barn: Negligible Stone ruins: Low	No evidence of bat usage but some suitable crevices in walls of stone ruins considered to be suitable for individual bats. Located adjacent to woodland and forestry
Building 17 ITM 590484 843150	Agricultural buildings – modern Located outside 500m zone, north of T11	Daytime inspection (18/6/2024) Suitability as a roost: Modern barn: Negligible	No evidence of bat usage. Located in open landscape. Limited tall vegetation connected to structure.
Building 19 ITM 590085 842182	Stables – modern concrete walls with corrugate roof, fascia/soffit Derelict cottage – standing walls only	Daytime inspection from roadway only (18/6/2024) – private Suitability as a roost: Stables: Low	Located adjacent to forestry

	(natural stone with plaster) Located outside 500m zone, south-west of T11	Cottage: Low	
Building 20 ITM 592082 843470	Stone ruins Located adjacent to T6	Daytime inspection: 18/6/2024 Suitability as a roost: Low	No evidence of bat usage but some suitable crevices in walls of ruins considered to be suitable for individual bats. Located adjacent to forestry
Building 21 ITM 591305 843076	Stone ruins / walls Located along local road. Located within 500m of T9	Daytime inspection: 18/6/2024 Suitability as a roost: Negligible	No evidence of bat usage crevices in walls of ruins not considered to be suitable as they are low to the ground, damp and vegetation filled. Located along local road with some mature trees adjacent
Building 22 ITM 590391 842922	Modern agricultural building Located outside 500m zone, north-west of T11	Daytime inspection: 17/6/2024 Suitability as a roost: Negligible	No evidence of bat usage. Located in open landscape. No linear habitat connected to structure.
Building 23 ITM 592882 840977	Stone ruins Located within 500m of T13	Daytime inspection: 19/6/2024 Suitability as a roost: Low	No evidence of bat usage but some suitable crevices in walls of ruins considered to be suitable for individual bats. Located in open landscape but adjacent to forestry
Bridge 1 ITM 590987 839553	Single arch stone bridge over the Owenmore River Located to the south of proposed development area	Daytime inspection: 19/6/2024, 1/7/2024 Suitability as a roost: Low	No evidence of bat usage. But deep water, so limited inspection completed. Located in lowland agricultural landscape with high linear habitat connectivity

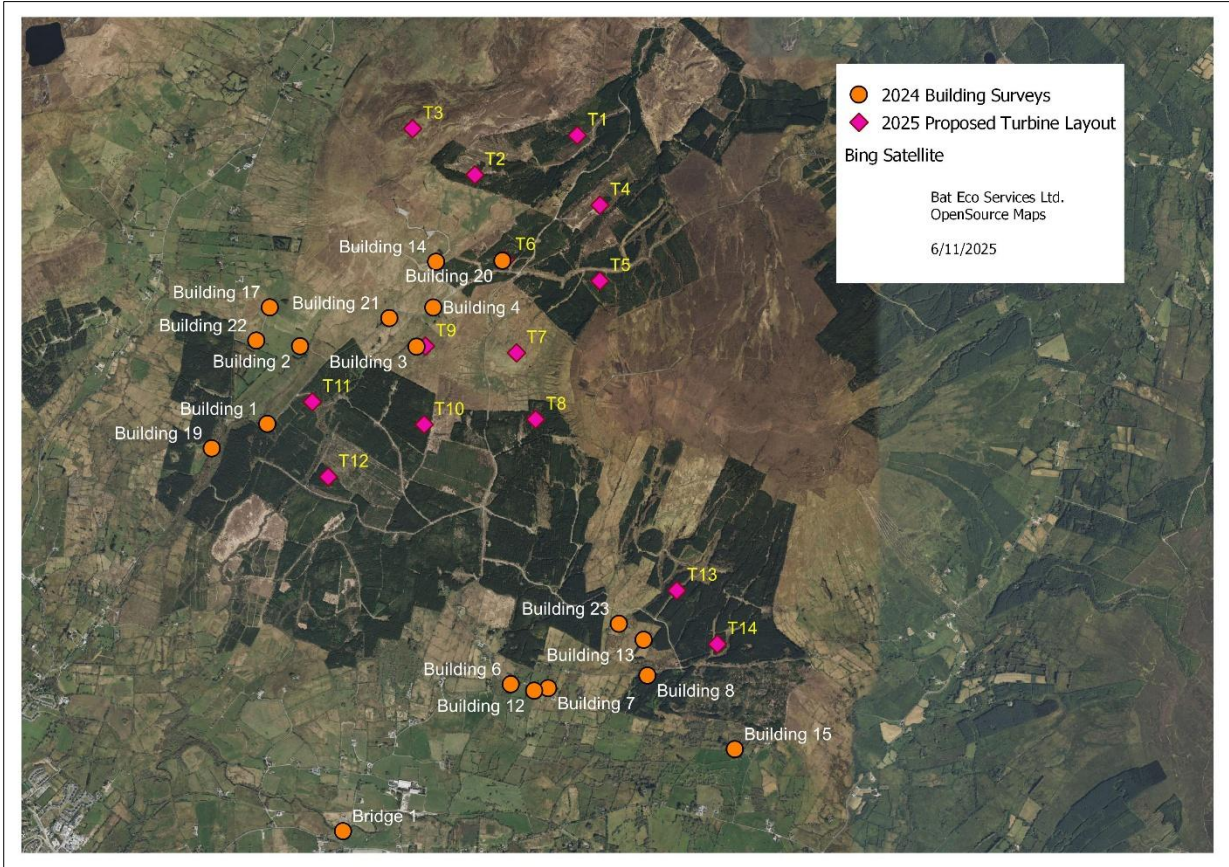


Figure 3a: Location of buildings surveyed in 2024.

4.1.5 Tree Potential Bat Roost (PBRs) Inspection

During the 2024 daytime inspections of buildings, any mature trees adjacent to such structures were inspected:

- Building 3
 - o Treeline of deciduous trees: x8 trees with PRFs suitable for single roosting bats (PRF-M – Moderate value)
- Building 4
 - o Ash trees located along road verge: No PBRs
 - o Conifer trees located to the rear of building: No PBRs
- Building 21
 - o Conifer trees located adjacent to structure: No PBRs
 - o Deciduous trees along road verge (Sycamore, Ash and Hawthorn): No PBRs
- Building 2
 - o Deciduous trees in vicinity (Sycamore, Ash and Hawthorn): No PBRs

Bat Detector Surveys

4.1.6 Dusk & Dawn Bat Surveys, Walking & Driving Transects

The bat encounters recorded for these surveys (completed on 18/6/2021, 27/6/2021, 9/8/2021, 10/8/2021, 11/8/2021, 12/8/2021, 17/6/2024, 18/6/2024, 19/6/2024, 1/7/2024, 22/7/2024 and 19/8/2024) are reported as part of overall summary maps for each of the bat species. The following bat species were recorded during dusk surveys and transects: soprano pipistrelle, common pipistrelle, Leisler's bat, Natterer's bat, Nathusius' pipistrelle, Daubenton's bat, *Myotis* species and brown long-eared bat. This information provides distribution results for the bat species recorded which are presented in Section 4.1.8. Full breakdown of the nightly data is provided in the appendices.

4.1.6.2 Dusk & Dawn Surveys

Dusk and Dawn Surveys were undertaken in 2024 on the following dates: 17/6/2024, 18/6/2024, 19/6/2024, 1/7/2024, 22/7/2024 and 19/8/2024 of fourteen buildings and structures. Additional surveys were completed in 2021. Six building/structure locations were confirmed to be bat roosts, five in 2024 (Building 4, Building 6, Building 7, Building 8 and Building 19) with one additional structure confirmed as a bat roost in 2021 but not in 2024 (Building 12). One of these buildings was confirmed as a maternity roost for Natterer's bats while all other roosts were daytime roosts for the following bat species: common pipistrelle, soprano pipistrelle and brown long-eared bat.

Table 4b: Buildings / Structures inspection results - 2024.

Building Code (Location)	Description	Survey Details	Results
Building 1 ITM 590467 842350	Modern agricultural barns located in a farmyard Located in 500m buffer of T11	Dawn survey: 18/6/2024 Dusk survey: 9/8/2021	No bats were recorded returning to roost in the structure. Commuting/Foraging bats: soprano pipistrelle
Building 2 ITM 590692 842883	Farmyard with modern agricultural barn and series of natural stone ruins Located in 500m buffer of T11	Dawn survey: 18/6/2024 Dawn survey: 12/8/2021	No bats were recorded returning to roost in the stone structures during both surveys. Commuting/Foraging bats: soprano pipistrelle and Daubenton's bat
Building 3 ITM 591492 842880	Farm cottage with corrugated roof and natural stone walls. Located in adjacent to T9	Dusk survey (thermal imagery filming): 17/6/2024, 19/8/2024	No bats were recorded emerging from building during both dusk surveys.

			Commuting/Foraging bats: none recorded during dusk surveys.
Building 4 ITM 591607 843149	Derelict cottage along local road (asbestos tile roof, natural stone walls with plaster render) Modern stables with corrugated iron roof (concrete walls) Located within 500m of T9	Dusk survey: 17/6/2024 Dawn survey: 12/8/2021	CONFIRMED ROOST: x3 soprano pipistrelles (2024) Commuting/Foraging bats: soprano pipistrelle
Building 6 ITM 592139 840562	2 buildings Agricultural shed with corrugate roof (single storey) Agricultural shed (2 storey) with corrugated roof and natural stone walls Located outside 500m zone, west of T14	Dusk survey (thermal imagery): 18/6/2024 Dusk survey: 11/8/2021	CONFIRMED ROOST: Single storey Agri shed: common pipistrelle DAYTIME – single bat (2024) 2-storey Agri shed: Soprano pipistrelles DAYTIME – x4 individuals (2021) Commuting/Foraging bats: soprano pipistrelle, common pipistrelle, Nathusius' pipistrelle, Natterer's bat
Building 7 ITM 592396 840535	Farmyard with an extensive array of buildings from modern agricultural sheds to derelict cottages and loft natural stone/slate buildings. Located outside 500m zone, west of T14	Dusk survey (thermal imagery filming): 18/6/2024 Dusk Survey: 11/8/2021	CONFIRMED ROOST: Derelict cottage: Natterer's roost MATERNITY – 135 individuals (2024) Loft agri building: Soprano pipistrelles DAYTIME – 3 individuals (2024), 4 individuals (2021) Brown long-eared bat DAYTIME – 4 individuals (2021) Commuting/Foraging bats: common pipistrelle, Leisler's bat
Building 8 ITM 593078 840622	Single storey agricultural shed (corrugate roof) constructed with natural stone Located outside 500m zone, south-west of T14	Dusk survey (thermal imagery filming): 18/6/2024 Dusk survey: 10/8/2021	CONFIRMED ROOST: Common pipistrelle DAYTIME – 1 individual (2024) Commuting/Foraging bats: soprano pipistrelle and common pipistrelle

Building 12 ITM 592300 840518	Bungalow (private residence) Located outside 500m zone, south-west of T14	Dusk survey: 18/6/2024 Dusk survey: 11/8/2021	No bats were recorded emerging from building during dusk survey (2024). CONFIRMED ROOST: Common pipistrelle DAYTIME – 3 individuals (2021)
Building 13 ITM 593052 840867	Derelict agricultural building, mixed construction and roofing material. Located within 500m zone of T13	Dusk survey (thermal imagery filming): 19/8/2024	No bats were recorded from building during both dusk surveys. Commuting/Foraging bats: none recorded during dusk surveys.
Building 15 ITM 593678 840116	Agricultural buildings – modern and stone ruins Located outside 500m zone, south of T14	Dusk survey (thermal imagery filming): 19/8/2024	No bats were recorded from building during both dusk surveys. Commuting/Foraging bats: soprano pipistrelle
Building 19 ITM 590085 842182	Stables – modern concrete walls with corrugate roof, fascia/soffit Derelict cottage – standing walls only (natural stone with plaster) Located outside 500m zone, south-west of T11	Dawn survey (thermal imagery filming): 18/6/2024	CONFIRMED ROOST: Stables: Soprano pipistrelle roost DAYTIME Commuting/Foraging bats: soprano pipistrelle and common pipistrelle
Building 20 ITM 592082 843470	Stone ruins Located adjacent to T6	Dusk Survey (thermal imagery filming): 17/6/2024	No bats were recorded emerging from structures. Commuting/Foraging bats: Natterer's bat, soprano pipistrelle
Building 23 ITM 592882 840977	Stone ruins Located within 500m of T13	Dusk Survey (thermal imagery filming): 19/6/2024	No bats were recorded emerging from structures. Commuting/Foraging bats: none recorded during dusk surveys.
Bridge 1 ITM 590987 839553	Single arch stone bridge over the Owenmore River Located to the south of proposed development area	Dusk Survey (thermal imagery filming): 1/7/2024 & 22/7/2024	No bats were recorded emerging from structure. Commuting/Foraging bats: Daubenton's bat, soprano

			pipistrelle and common pipistrelle
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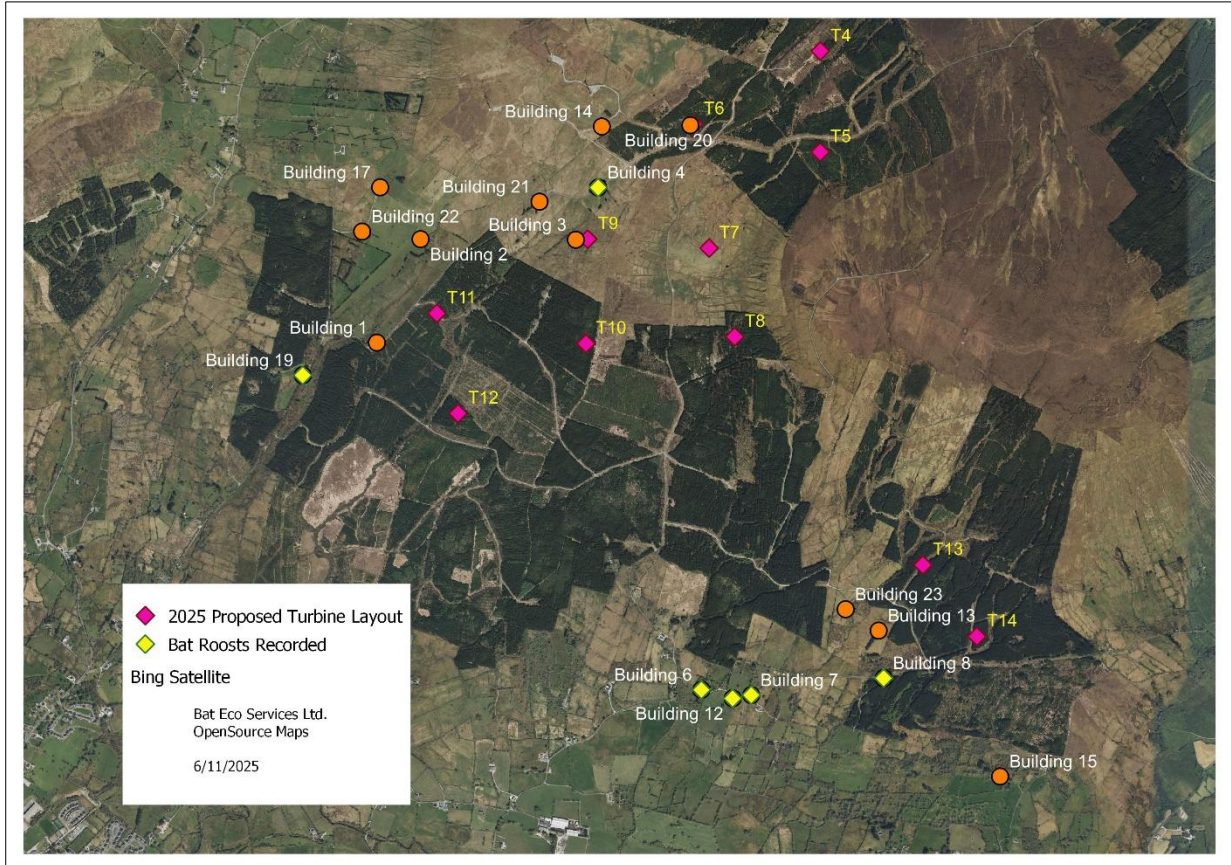


Figure 3b: Location of buildings recorded as bat roosts.

As part of the analysis, a 500m buffer was created around each recorded bat roost to determine if there is a proposed turbine located near a recorded bat roost. This is to assist with the Site Risk Assessment later in the report. Each bat species has a “Risk” value in relation to wind turbines (See Table 7, Section). This is also represented in the table below for the bat species recorded roosting in the list building. Proposed location of T9 is within 500m of Building 4 while proposed location of T14 is outside but adjacent to the 500m buffer for Building 8.

Table 4c: Results of assessment to determine if a proposed turbine is located within 500m of a recorded bat roost.

Building Code (Location)	Bat Species & Roost Type	Turbine Location	Distance (approx)	Bat Species Risk Level
Building 4	Soprano pipistrelle – Daytime Roost	Turbine 9	270m	High
Building 6	Soprano pipistrelle – Daytime Roost Common pipistrelle – Daytime Roost	None	Not applicable	Soprano pipistrelle – High Common pipistrelle – High
Building 7	Natterer’s bat – Maternity Roost Soprano pipistrelle – Daytime Roost Brown long-eared bat – Daytime Roost	None	Not applicable	Natterer’s bat – Low Soprano pipistrelle – High Brown long-eared bat - Low
Building 8	Common pipistrelle – Daytime Roost	None but adjacent to T14	550m	Common pipistrelle – High
Building 12	Common pipistrelle – Daytime Roost	None	Not applicable	Common pipistrelle – High
Building 19	Soprano pipistrelle – Daytime Roost	None	Not applicable	Soprano pipistrelle – High

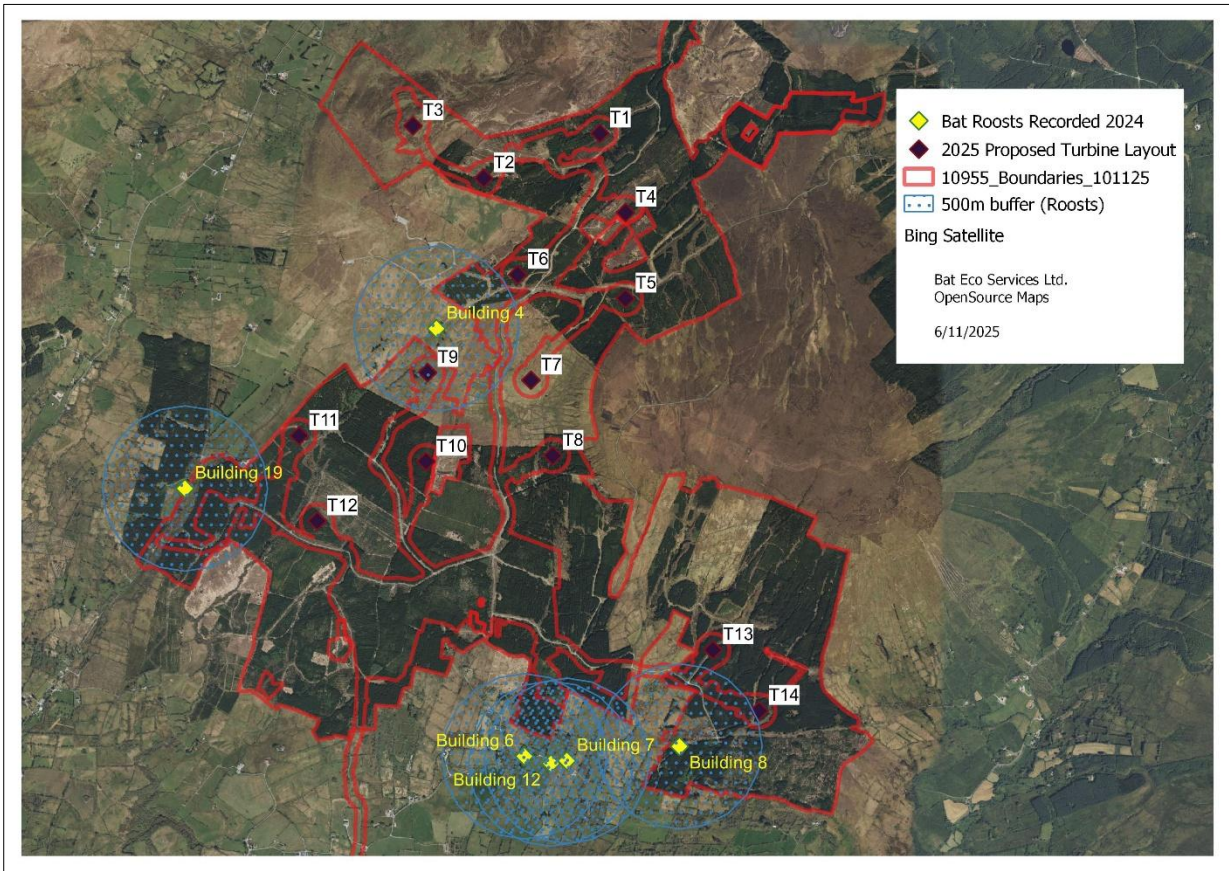


Figure 3c: Location of buildings recorded as bat roosts (500m buffer) relative to proposed turbine locations.

4.1.7 Passive Static Bat Detector Survey

The following tables summarises the results recorded on the static units deployed over three surveillance periods (Spring, Summer and Autumn 2024). Figures are provided to show the location of each of the static unit in relation to the current proposed 14 turbine locations. The location of static units was determined by the proposed location of turbines in 2024 (according to layout of 16 turbines proposed in 2024). All static units were deployed for a minimum of 10 days and therefore meet the level of surveillance recommended by guidance documents.

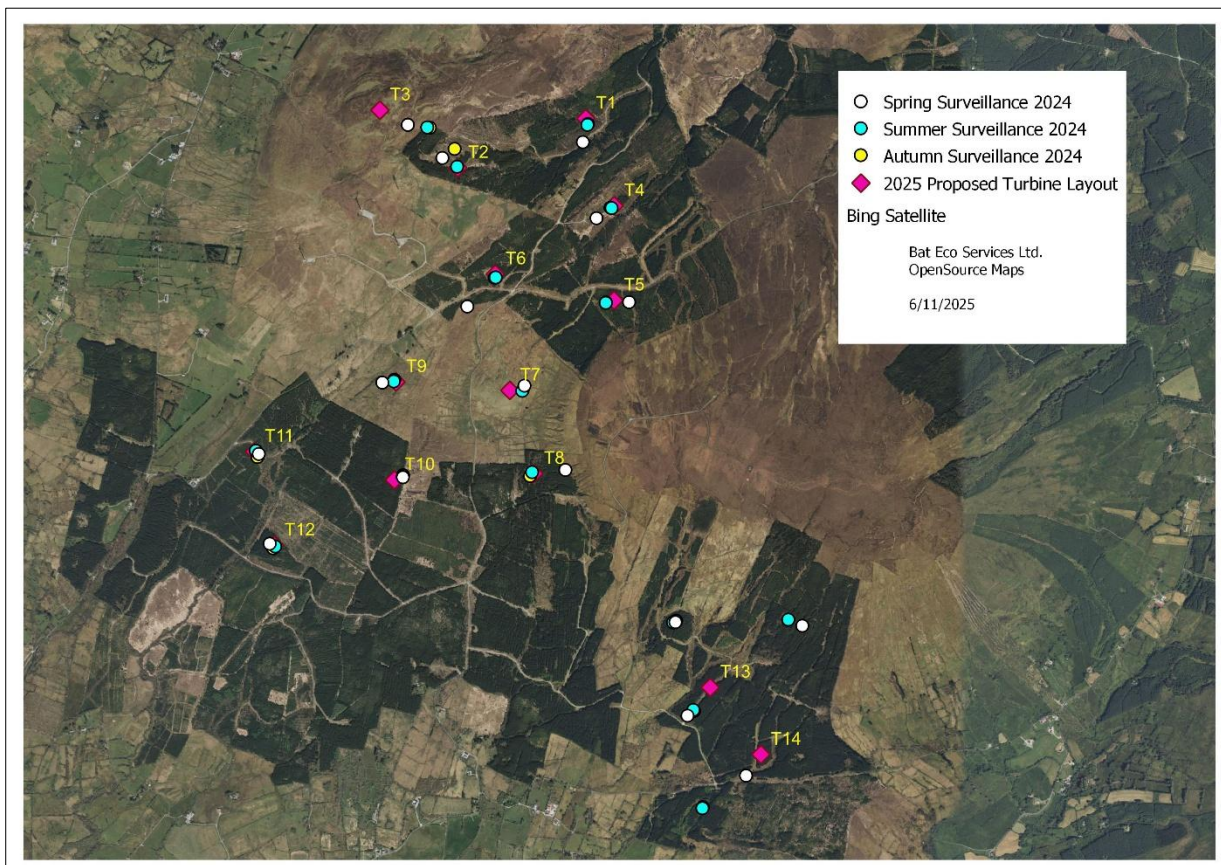


Figure 4a: Location of 2024 static units deployed during static surveillance relative to proposed turbine locations.

The following bat species were recorded during the static surveillance: soprano pipistrelle, common pipistrelle, Leisler's bat, Natterer's bat, Daubenton's bat, *Myotis* species and brown long-eared bat. These records were also used to prepare distribution maps for the individual bat species recorded.

Table 5a: Results of Static Bat Detectors deployed during Spring 2024.

Static Code	Grid Reference (ITM)	Closest Turbine No.	Survey Period	Bat Species Recorded
Spring 1	592580 844201	T1	12/4/2024 to 24/4/2024 (13 nights)	Common pipistrelle Soprano pipistrelle Leisler's bat Brown long-eared bat Natterer's bat Daubenton's bat Myotis species
Spring 2	592259 842863	T7	10/4/2024 to 22/4/2024 (12 nights)	Common pipistrelle Soprano pipistrelle Leisler's bat Brown long-eared bat Daubenton's bat
Spring 3	591618 844296	T3	12/4/2024 to 21/4/2024 (10 nights)	Leisler's bat Daubenton's bat
Spring 4	593155 841050	T13	11/4/2024 to 21/4/2024 (10 nights)	Common pipistrelle Soprano pipistrelle Leisler's bat Natterer's bat Daubenton's bat
Spring 5	592789 843285	NE of T13	10/4/2024 to 20/4/2024 (10 nights)	Common pipistrelle Soprano pipistrelle Leisler's bat Natterer's bat
Spring 6	591945 843298	T6	11/4/2024 to 23/4/2024 (12 nights)	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat
Spring 7	593477 840721	T14	11/4/2024 to 21/4/2024 (10 nights)	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat
Spring 8	591591 842360	T10	11/4/2024 to 23/4/2024 (12 nights)	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat
Spring 9	593089 841564	NW of T13	11/4/2024 to 23/4/2024	Common pipistrelle Soprano pipistrelle

			(12 nights)	Leisler's bat Daubenton's bat Natterer's bat Myotis species
Spring 10	592655 843783	T4	12/4/2024 to 27/4/2024 (15 nights)	Soprano pipistrelle Leisler's bat Daubenton's bat Brown long-eared bat
Spring 11	590799 842488	T11	11/4/2024 to 27/4/2024 (16 nights)	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species Brown long-eared bat
Spring 12	591808 844114	T2	12/4/2024 to 27/4/2024 (15 nights)	Common pipistrelle Leisler's bat Daubenton's bat Natterer's bat
Spring 13	592484 842400	T8	11/4/2024 to 27/4/2024 (16 nights)	No bats recorded
Spring 14	591478 842880	T9	11/4/2024 to 27/4/2024 (16 nights)	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species Nathusius' pipistrelle
Spring 15	592834 843322	T5	11/4/2024 to 27/4/2024 (16 nights)	Common pipistrelle Leisler's bat Daubenton's bat Natterer's bat
Spring 16	590859 841995	T12	11/4/2024 to 27/4/2024 (16 nights)	Leisler's bat

Table 5b: Results of Static Bat Detectors deployed during Summer 2024.

Static Code	Grid Reference (ITM)	Closest Turbine No.	Survey Period	Bat Species
Summer 1	592605 844296	T1	18/6/2024 to 30/6/2024 12 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Nathusius' pipistrelle
Summer 2	591889 844066	T2	18/6/2024 to 30/6/2024 12 nights	Common pipistrelle Leisler's bat Daubenton's bat Natterer's bat
Summer 3	591725 844282	Habitat (close to T3)	18/6/2024 to 30/6/2024 12 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species
Summer 4	592738 843839	T4	18/6/2024 to 29/6/2024 11 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat
Summer 5	592706 843318	T5	18/6/2024 to 29/6/2024 11 nights	Common pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species
Summer 6	592101 843458	T6	18/6/2024 to 30/6/2024 12 nights	Common pipistrelle Soprano pipistrelle Myotis species
Summer 7	591618 844296	T7	18/6/2024 to 1/7/2024 13 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species Brown long-eared bat
Summer 8	592301 842388	T8	18/6/2024 to 1/7/2024 13 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Natterer's bat
Summer 9	593237 840542	T9	18/6/2024 to 1/7/2024	Common pipistrelle Soprano pipistrelle

			13 nights	Leisler's bat Daubenton's bat Natterer's bat Myotis species Brown long-eared bat
Summer 10	591590 842362	T10	18/6/2024 to 1/7/2024 13 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species
Summer 11	590783 842506	T11	18/6/2024 to 28/6/2024 10 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat
Summer 12	590889 841980	T12	18/6/2024 to 30/6/2024 12 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species
Summer 13	593076 841562	T13	19/6/2024 to 1/7/2024 13 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat
Summer 14	593709 841578	T14	19/6/2024 to 29/6/2024 10 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat
Summer 15	592247 842835	T3	8/7/2024 to 22/7/2024 14 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat Brown long-eared bat
Summer 16	591541 842887	T14	8/7/2024 to 22/7/2024 14 nights	No bats recorded

Table 5c: Results of Static Bat Detectors deployed during Autumn 2024 period.

Static Code	Grid Reference (ITM)	Closest Turbine No.	Survey Period	Bat Species
Autumn 1	592608 844301	T1	19/8/2024 to 5/9/2024 17 nights	Common pipistrelle Soprano pipistrelle Nathusius' pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species Brown long-eared bat
Autumn 2	591875 844164	T2	19/8/2024 to 5/9/2024 17 nights	Common pipistrelle
Autumn 3	591618 844296	T3	19/8/2024 to 5/9/2024 17 nights	Common pipistrelle Soprano pipistrelle Nathusius' pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species Brown long-eared bat
Autumn 4	592732 843841	T4	19/8/2024 to 5/9/2024 17 nights	No bats recorded
Autumn 5	592707 843320	T5	19/8/2024 to 5/9/2024 17 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species Brown long-eared bat
Autumn 6	592095 843457	T6	19/8/2024 to 5/9/2024 17 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species
Autumn 7	592249 842838	T7	19/8/2024 to 5/9/2024 17 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat

				Myotis species Brown long-eared bat
Autumn 8	592290 842367	T8	19/8/2024 to 5/9/2024 17 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species Brown long-eared bat
Autumn 9	591544 842895	T9	19/8/2024 to 5/9/2024 17 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species Brown long-eared bat
Autumn 10	591592 842371	T10	19/8/2024 to 5/9/2024 17 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species Brown long-eared bat
Autumn 11	590792 842471	T11	19/8/2024 to 5/9/2024 17 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species
Autumn 12	590878 841970	T12	19/8/2024 to 5/9/2024 17 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Natterer's bat Brown long-eared bat
Autumn 13	593093 841577	Habitat (habitat close to T13)	19/8/2024 to 5/9/2024 17 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species Brown long-eared bat
Autumn 14	593191 841076	Habitat (habitat close to T13)	19/8/2024 to 5/9/2024	Common pipistrelle Soprano pipistrelle Leisler's bat

			17 nights	Daubenton's bat Natterer's bat Myotis species
Autumn 15	593239 840547	T13	19/8/2024 to 5/9/2024 17 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species Brown long-eared bat
Autumn 16	591739 844280	T14	19/8/2024 to 5/9/2024 17 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species
Autumn 17	591730 844280	Habitat (habitat close to T3)	19/8/2024 to 5/9/2024 17 nights	Common pipistrelle Soprano pipistrelle Leisler's bat Daubenton's bat Natterer's bat Myotis species Brown long-eared bat

In summary, in 2024 a total of 18,742 bat passes were recorded on all the static locations sampled. The total number of common pipistrelles bat passes recorded during all three static surveillance periods was 9,844 (54.5%) and this was the most frequently recorded bat species. Soprano pipistrelles (4,245 bat passes = 23.5%) and Leisler's bats (1,900 bat passes = 10.5%) were the second and third most frequently recorded bat species, respectively.

Table 5d: Total number of bat passes recorded for each bat species during the 2024 Static Bat Surveillance.

Bat Species	Spring 2024 (211 nights)	Summer 2024 (195 nights)	Autumn 2024 (280 nights)	Total (686 nights)
Common pipistrelle	358	2756	6730	9844
Soprano pipistrelle	703	216	3326	4245
Nathusius' pipistrelle	1	1	8	10
Leisler's bat	794	315	791	1900
Daubenton's bat	65	354	244	663
Natterer's bat	66	139	315	520
Myotis species	13	458	260	731
Brown long-eared bat	11	8	124	143
TOTAL	2,011	4,247	11,798	18,056

A higher level of bat passes was recorded in the Autumn Static Surveillance compared to Spring and Summer. But this is to be expected as there was a greater number of survey nights during the Autumn Static Surveillance. Therefore, the following table and figure presents the average number of bat passes to allow a more accurate comparison between the static surveillance periods.

Table 5e: Total number of bat passes recorded for each bat species divided by the total number of nights of static surveillance during the 2024 Static Bat Surveillance.

Bat Species	Spring 2024 (211 nights)	Summer 2024 (195 nights)	Autumn 2024 (280 nights)	Total (686 nights)
Common pipistrelle	1.7	14.1	24.0	14.3
Soprano pipistrelle	3.3	1.1	11.9	6.2
Nathusius' pipistrelle	0.00	0.01	0.03	0.01
Leisler's bat	3.8	1.6	2.8	2.8
Daubenton's bat	0.3	1.8	0.9	1.0
Natterer's bat	0.3	0.7	1.1	0.8
Myotis species	0.1	2.3	0.9	1.1
Brown long-eared bat	0.1	0.04	0.4	0.2

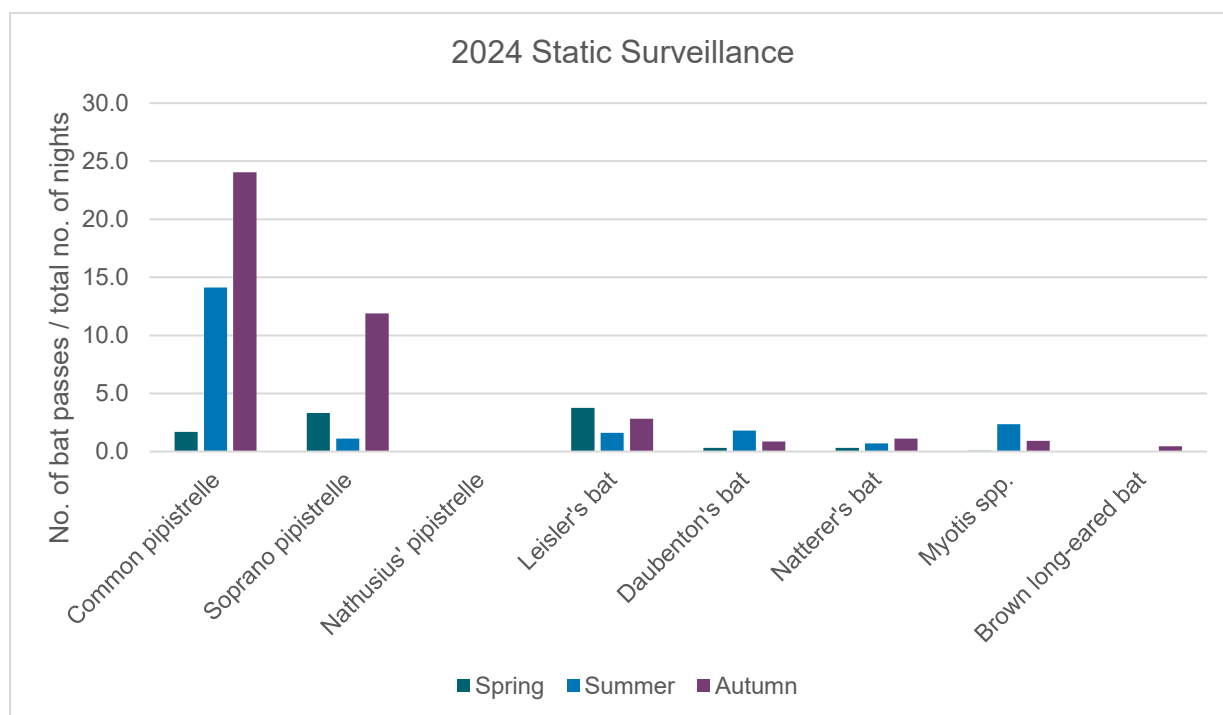


Figure 4b: Average number of bat passes for each bat species recorded during the 2024 Surveillance.

Using the average number of bat passes overall for 2024, the following are the results:

- Common pipistrelles were recorded at a higher level in the Autumn Static Surveillance period;
- Soprano pipistrelles were recorded at a higher level in the Autumn Static Surveillance period;

- Nathusius pipistrelles was recorded at a low level overall but the average number of bat passes was greatest during the Autumn Static Surveillance period;
- Leisler's bats were recorded at a higher level in the Spring Static Surveillance period, but the level during the Autumn Static Surveillance period was the same as the average overall for 2024;
- Daubenton's bats were recorded at a low level overall but the average number of bat passes was greatest during the Summer Static Surveillance period;
- Natterer's bats were recorded at a low level overall but the average number of bat passes was greatest during the Autumn Static Surveillance period;
- Brown long-eared bats were recorded at a low level overall but the average number of bat passes was greatest during the Autumn Static Surveillance period;

4.1.7.3 Distribution of Bat Species

The distribution of the bat species recorded, with reference to the proposed turbine locations, is presented in this section, separately for each static surveillance and then combined for 2024. Only data from static units representing a proposed turbine locations is presented.

During the Spring Static Surveillance Period, the following table presents the total number of bat passes recorded for each proposed turbine location. The average number of bat passes for each bat species is also presented and is used as a guide to determine which proposed turbine locations recorded above average number of bat passes. These are highlighted in Yellow for the common bat species (in preparation for analysis later in the section).

Table 5f: Total number of bat passes recorded for each bat species during the 2024 Spring Static Bat Surveillance for each proposed turbine location.

Turbine No.	EcoBat Code	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Leisler's bat	Daubenton's bat	Natterer's bat	Myotis spp.	Brown long-eared bat
T1	Spring 1	5	1	0	10	2	1	2	5
T2	Spring 12	2	0	0	13	4	4	0	0
T3	Spring 3	0	0	0	1	1	0	0	0
T4	Spring 10	0	2	0	30	2	0	0	2
T5	Spring 15	3	0	0	66	3	8	0	0
T6	Spring 6	3	6	0	20	3	0	0	0
T7	Spring 2	3	1	0	46	1	0	0	2
T8	Spring 13	0	0	0	0	0	0	0	0
T9	Spring 14	71	555	1	6	2	41	2	0
T10	Spring 8	34	2	0	1	4	5	0	0
T11	Spring 11	68	119	0	5	29	3	8	1
T12	Spring 16	0	0	0	4	0	0	0	0
T13	Spring 4	84	6	0	3	9	2	0	1
T14	Spring 7	22	3	0	1	4	0	0	0
Average		21.1	49.6	0.07	14.7	4.6	4.6	0.9	0.8

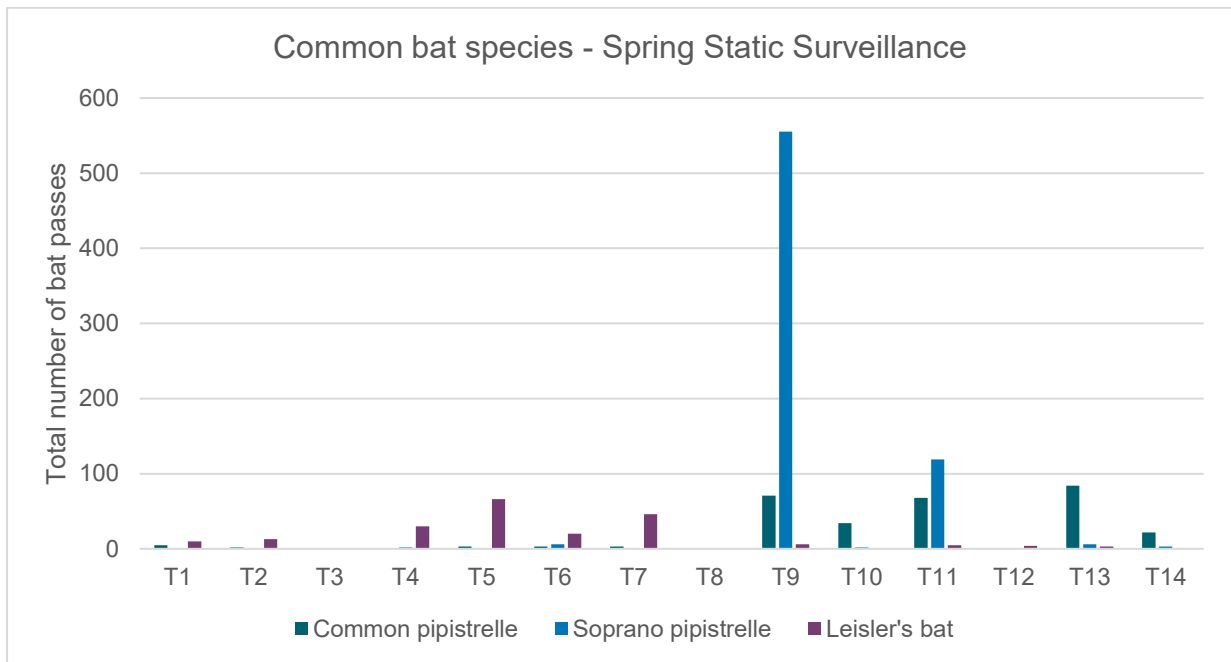


Figure 4c: Total number of bat passes for each common bat species recorded during the 2024 Spring Static Surveillance.

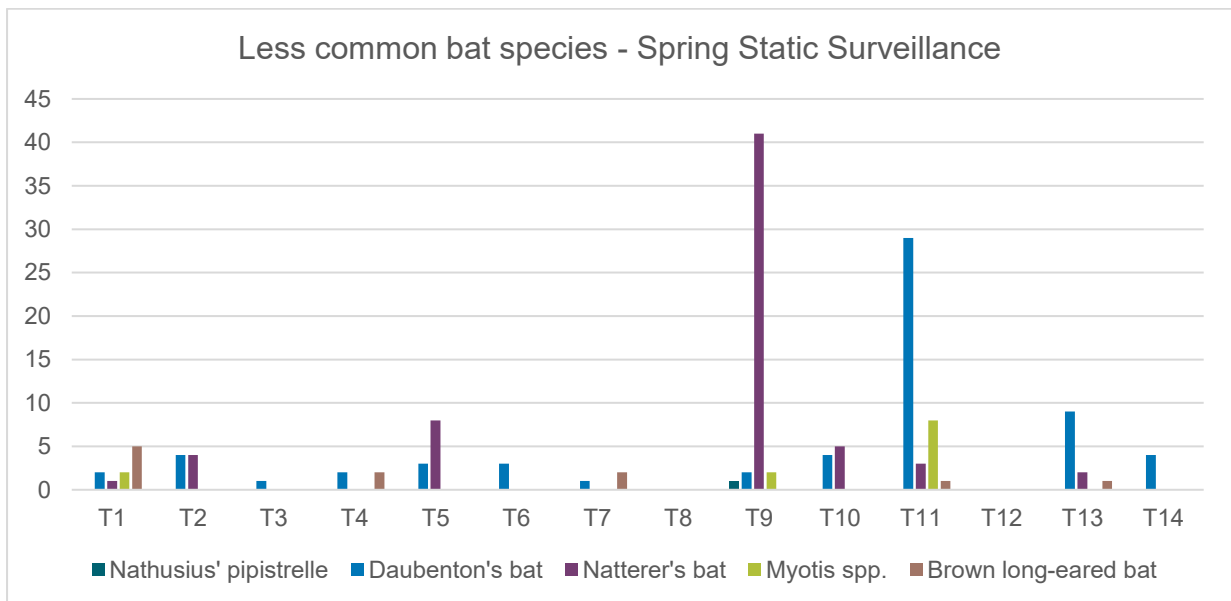


Figure 4d: Total number of bat passes for each less common bat species recorded during the 2024 Spring Static Surveillance.

The principal summary points from the graphs above are as follows:

- Common pipistrelles were recorded at an above average level at T9, T10, T11, T13 and T14.
- Soprano pipistrelle were recorded at an above average level at T9 and T11.
- Leisler's bats were recorded at an above average level at T4, T5, T6 and T7.

During the Summer Static Surveillance Period, the following table presents the total number of bat passes recorded for each proposed turbine location. The average number of bat passes for each bat species is also presented and is used as a guide to determine which proposed turbine locations recorded above average number of bat passes. These are highlighted in Yellow for the common bat species (in preparation for analysis later in the section).

Table 5g: Total number of bat passes recorded for each bat species during the 2024 Summer Static Bat Surveillance for each proposed turbine location.

Turbine No.	EcoBat Code	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Leisler's bat	Daubenton's bat	Natterer's bat	Myotis spp.	Brown long-eared bat
T1	Summer 1	59	2	1	7	0	0	0	0
T2	Summer 2	66	0	0	23	2	3	0	1
T3	Summer 15	23	13	0	9	8	12	0	3
T4	Summer 4	8	1	0	7	1	0	0	0
T5	Summer 5	24	0	0	3	3	2	2	0
T6	Summer 6	6	1	0	0	0	0	1	0
T7	Summer 7	449	29	0	86	11	9	5	3
T8	Summer 8	890	39	0	15	0	2	0	0
T9	Summer 9	276	33	0	19	240	11	404	1
T10	Summer 10	393	35	0	40	49	58	26	0
T11	Summer 11	334	43	0	19	15	14	0	0
T12	Summer 12	41	11	0	44	14	11	17	0
T13	Summer 13	48	1	0	28	10	3	0	0
T14	Summer 16	0	0	0	0	0	0	0	0
Average		186.9	14.9	0.07	21.4	25.2	8.9	32.5	0.6

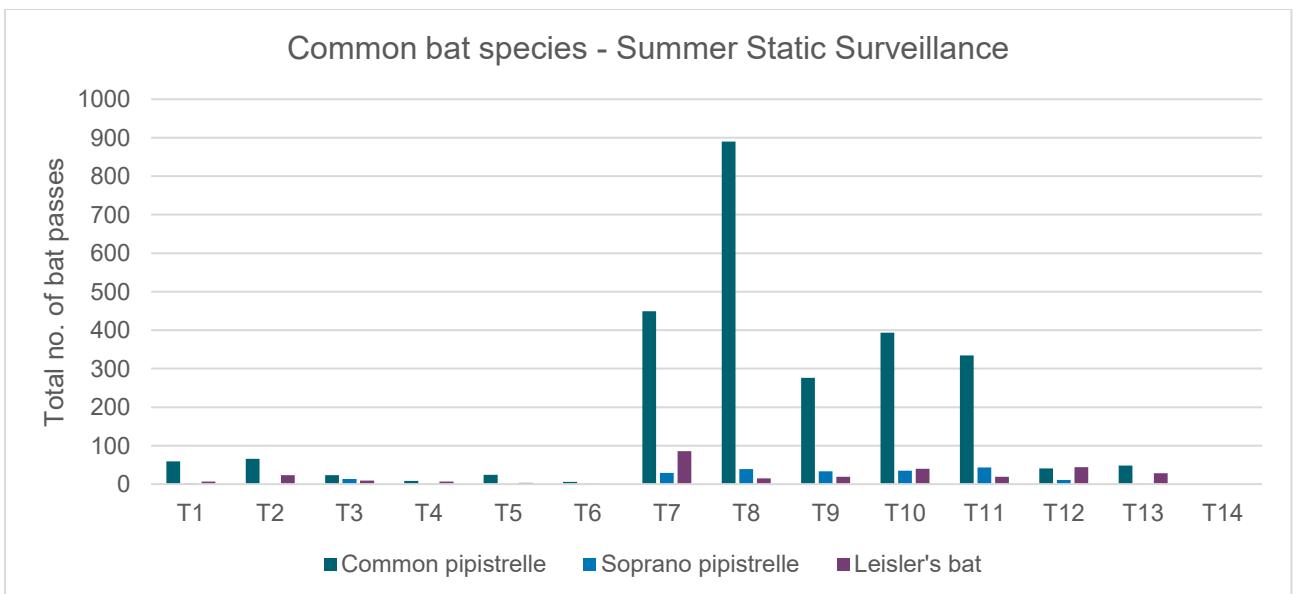


Figure 4e: Total number of bat passes for each common bat species recorded during the 2024 Summer Static Surveillance.

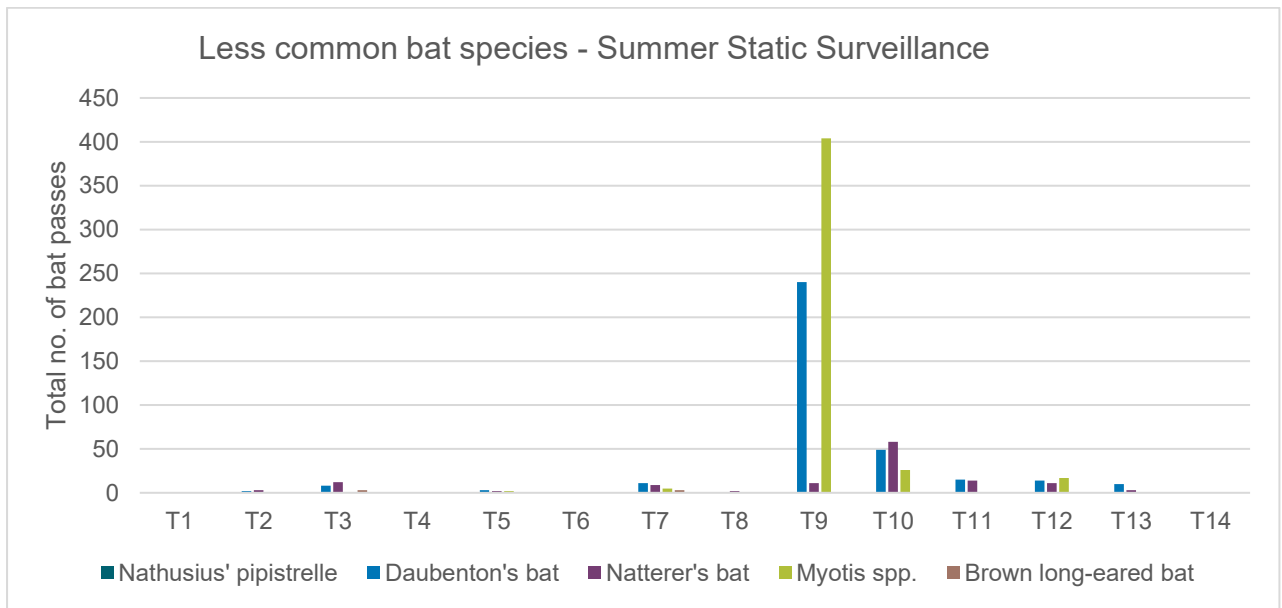


Figure 4f: Total number of bat passes for each less common bat species recorded during the 2024 Summer Static Surveillance.

The principal summary points from the graphs above are as follows:

- Common pipistrelles were recorded at an above average level at T7, T8, T9, T10 and T11.
- Soprano pipistrelle were recorded at an above average level at T7, T8, T9, T10 and T11.
- Leisler's bats were recorded at an above average level at T2, T7, T10, T12 and T13.

During the Autumn Static Surveillance Period, the following table presents the total number of bat passes recorded for each proposed turbine location. The average number of bat passes for each bat species is also presented and is used as a guide to determine which proposed turbine locations recorded above average number of bat passes. These are highlighted in Yellow for the common bat species (in preparation for analysis later in the section).

Table 5h: Total number of bat passes recorded for each bat species during the 2024 Autumn Static Bat Surveillance for each proposed turbine location.

Turbine No.	EcoBat Code	Common pipistrelle	Soprano pipistrelle	Nathusius' pipistrelle	Leisler's bat	Daubenton's bat	Natterer's bat	Myotis spp.	Brown long-eared bat
T1	Autumn 1	33	68	1	55	10	6	3	4
T2	Autumn 2	1	0	0	0	0	0	0	0
T3	Autumn 3	533	168	3	119	63	103	19	92
T4	Autumn 4	0	0	0	0	0	0	0	0
T5	Autumn 5	18	10	0	49	6	4	6	1
T6	Autumn 6	43	50	0	32	6	26	6	0
T7	Autumn 7	551	267	0	290	12	14	22	4
T8	Autumn 8	384	108	0	31	21	26	3	1
T9	Autumn 9	833	1384	2	44	30	46	28	12
T10	Autumn 10	676	312	0	31	24	27	69	2
T11	Autumn 11	46	52	0	10	11	10	6	0
T12	Autumn 12	2	1	0	18	0	3	0	1
T13	Autumn 15	2209	286	1	63	15	13	11	5
T14	Autumn 16	195	125	0	3	38	9	78	0
Average		394.5	202.2	0.5	53.2	16.9	20.5	17.9	8.7

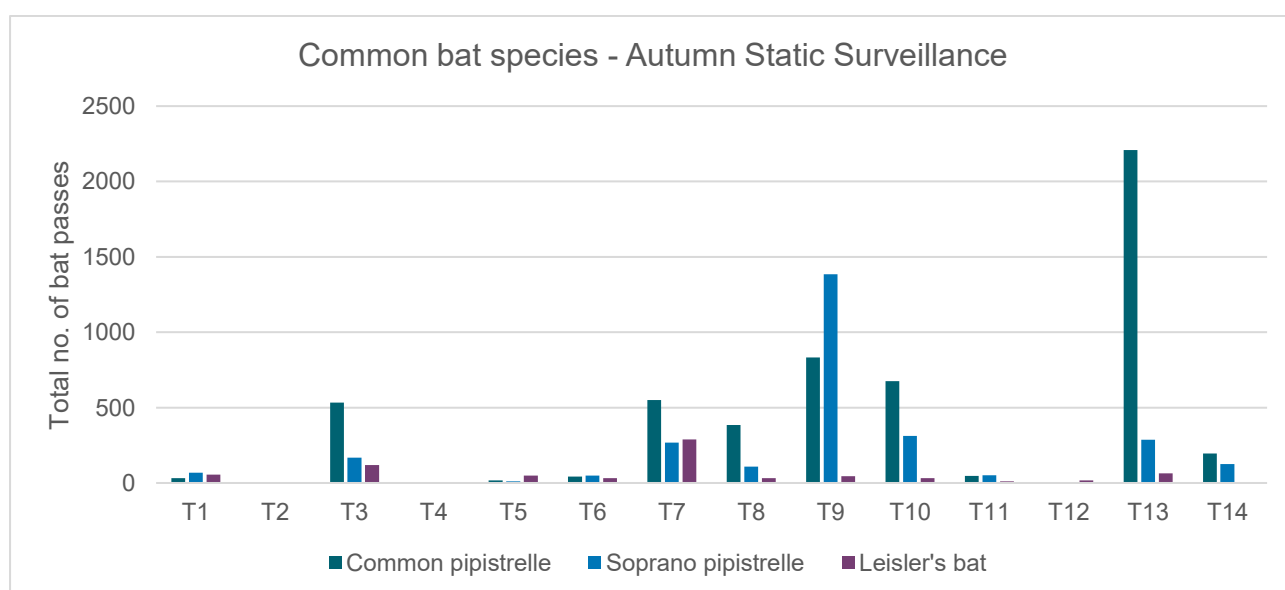


Figure 4g: Total number of bat passes for each common bat species recorded during the 2024 Autumn Static Surveillance.

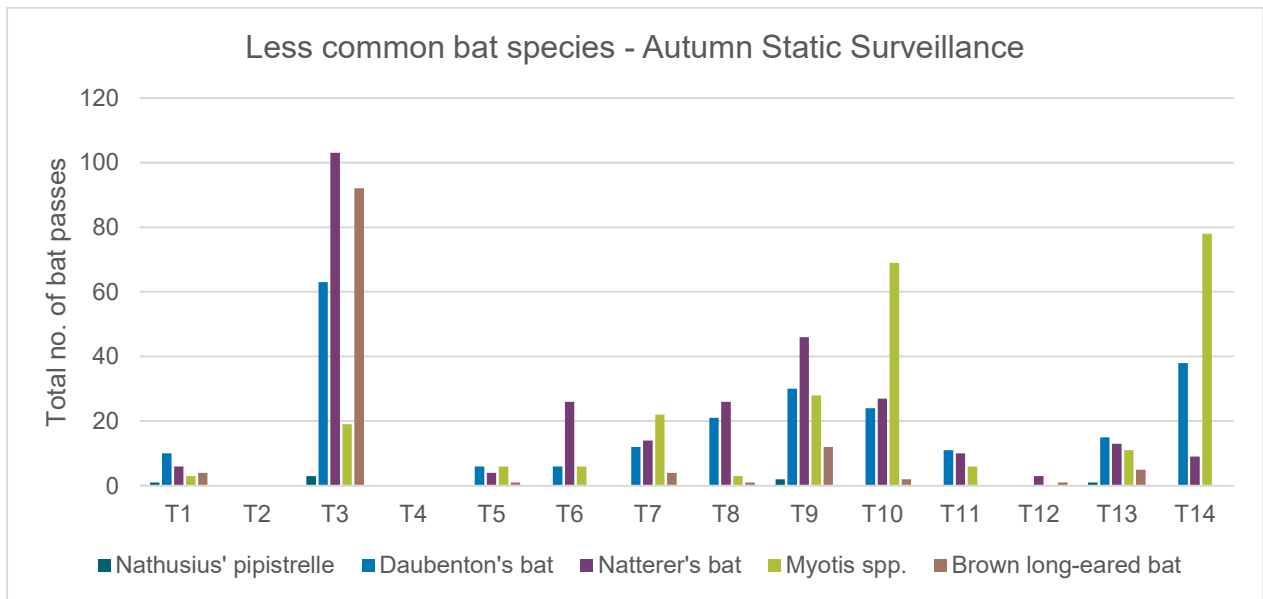


Figure 4h: Total number of bat passes for each less common bat species recorded during the 2024 Autumn Static Surveillance.

The principal summary points from the graphs above are as follows:

- Common pipistrelles were recorded at an above average level at T3, T7, T9, T10 and T13.
- Soprano pipistrelle were recorded at an above average level at T7, T9, T10 and T13.
- Leisler's bats were recorded at an above average level at T3 and T7.
- This period of surveillance coincides with the time when species tend to swarm during the mating season (e.g. *Myotis* species). Swarming is associated with underground sites. The level of activity of *Myotis* species is low and therefore not indicative of local swarming, particularly in vicinity of two underground sites identified within the proposed development area (>100m from T7 and T8).

Therefore, in summary, the proposed turbine locations with an above average level of common pipistrelle bat passes are highlighted on the following map:

- a) Common pipistrelle
- Spring Static Surveillance Period: T9, T10, T11, T13 and T14 RED CIRCLE
- Summer Static Surveillance Period: T7, T8, T9, T10 and T11 BLUE CIRCLE
- Autumn Static Surveillance: T3, T7, T9, T10 and T13 ORANGE CIRCLE

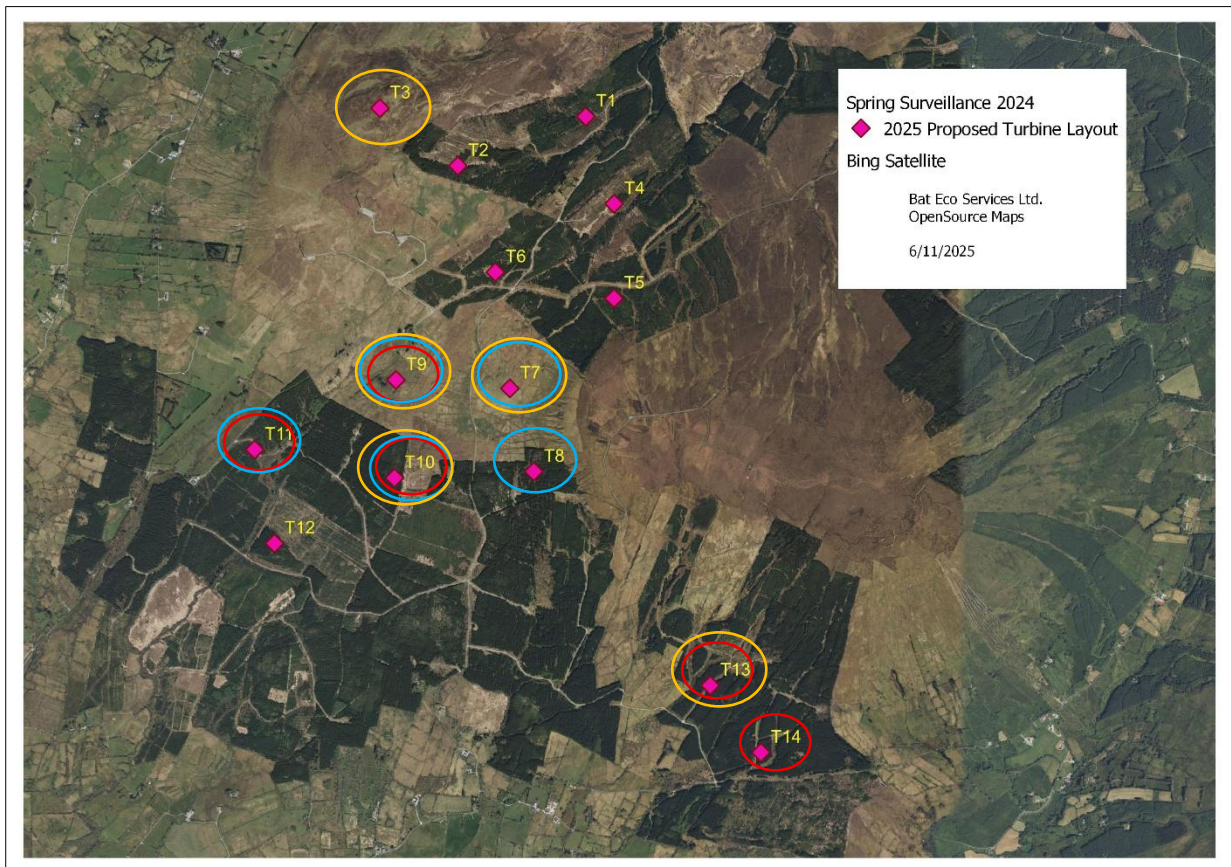


Figure 4i: Distribution of proposed turbine locations with above average Common pipistrelle bat activity.

Therefore, in summary, the proposed turbine locations with an above average level of soprano pipistrelle bat passes are highlighted on the following map:

- b) Soprano pipistrelle
- Spring Static Surveillance Period: T9 and T10 RED CIRCLE
- Summer Static Surveillance Period: T7, T8, T9, T10 and T11 BLUE CIRCLE
- Autumn Static Surveillance: T7, T9, T10 and T13 ORANGE CIRCLE

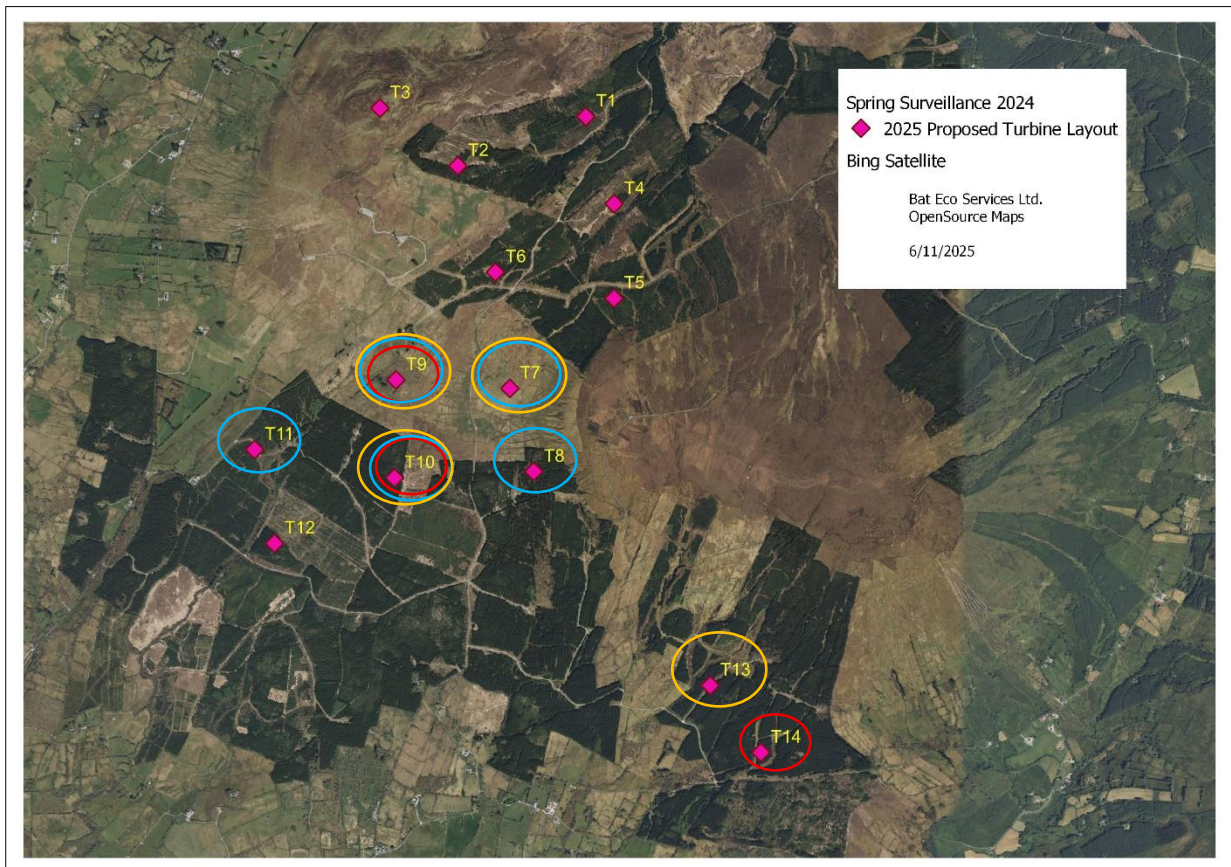


Figure 4j: Distribution of proposed turbine locations with above average Soprano pipistrelle bat activity.

Therefore, in summary, the proposed turbine locations with an above average level of Leisler's bat passes are highlighted on the following map:

- c) Leisler's bat
- Spring Static Surveillance Period: T4, T5, T6 and T7 RED CIRCLE
- Summer Static Surveillance Period: T2, T7, T10, T12 and T13 BLUE CIRCLE
- Autumn Static Surveillance: T3 and T7 ORANGE CIRCLE

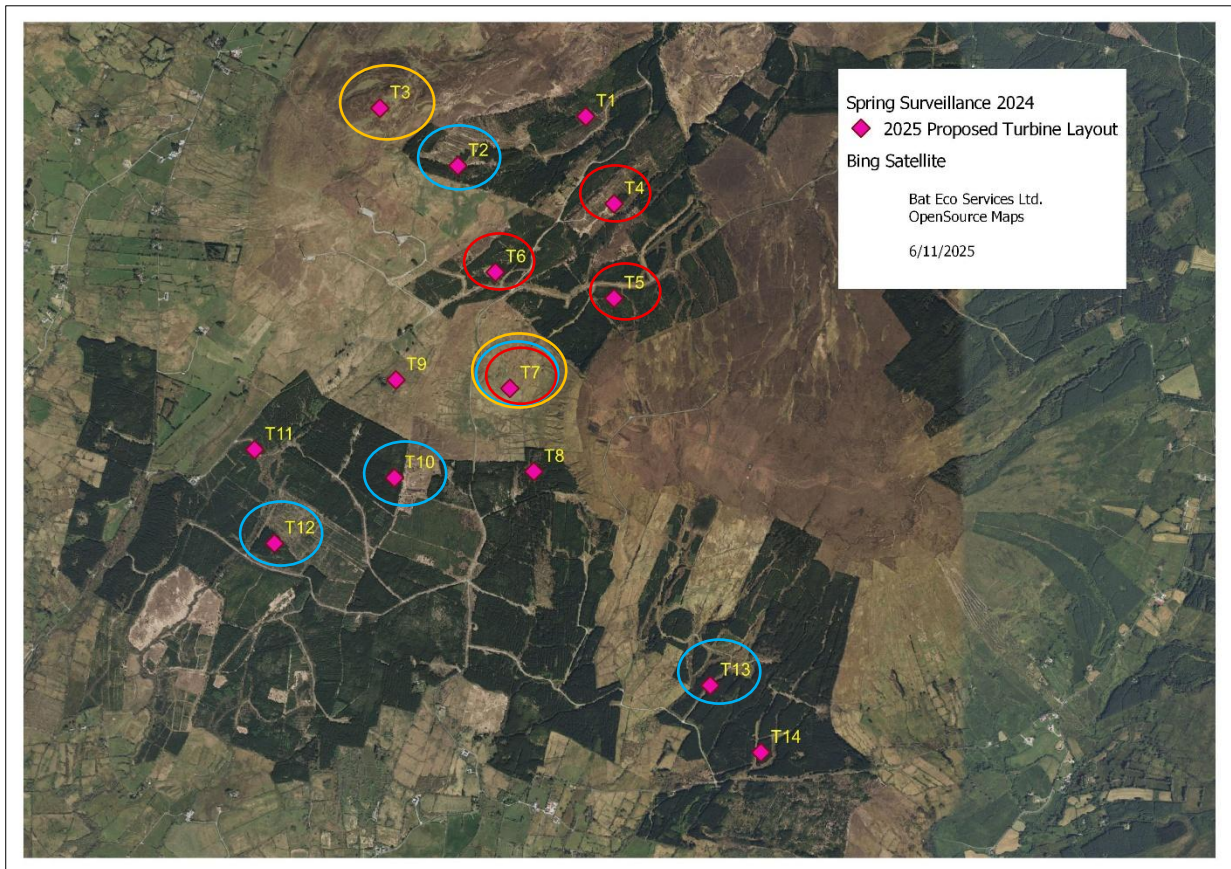


Figure 4k: Distribution of proposed turbine locations with above average Leisler's bat activity.

Therefore, in summary, the proposed turbine locations with an above average level of bat passes for the common bat species represented above are highlighted on the following map:

- Spring Static Surveillance Period: T4, T5, T6, T7, T9, T10, T11, T13, T14 RED CIRCLE
- Summer Static Surveillance Period: T2, T7, T9, T10, T11, T12 and T13 BLUE CIRCLE
- Autumn Static Surveillance: T3, T7, T9, T10, T13 ORANGE CIRCLE

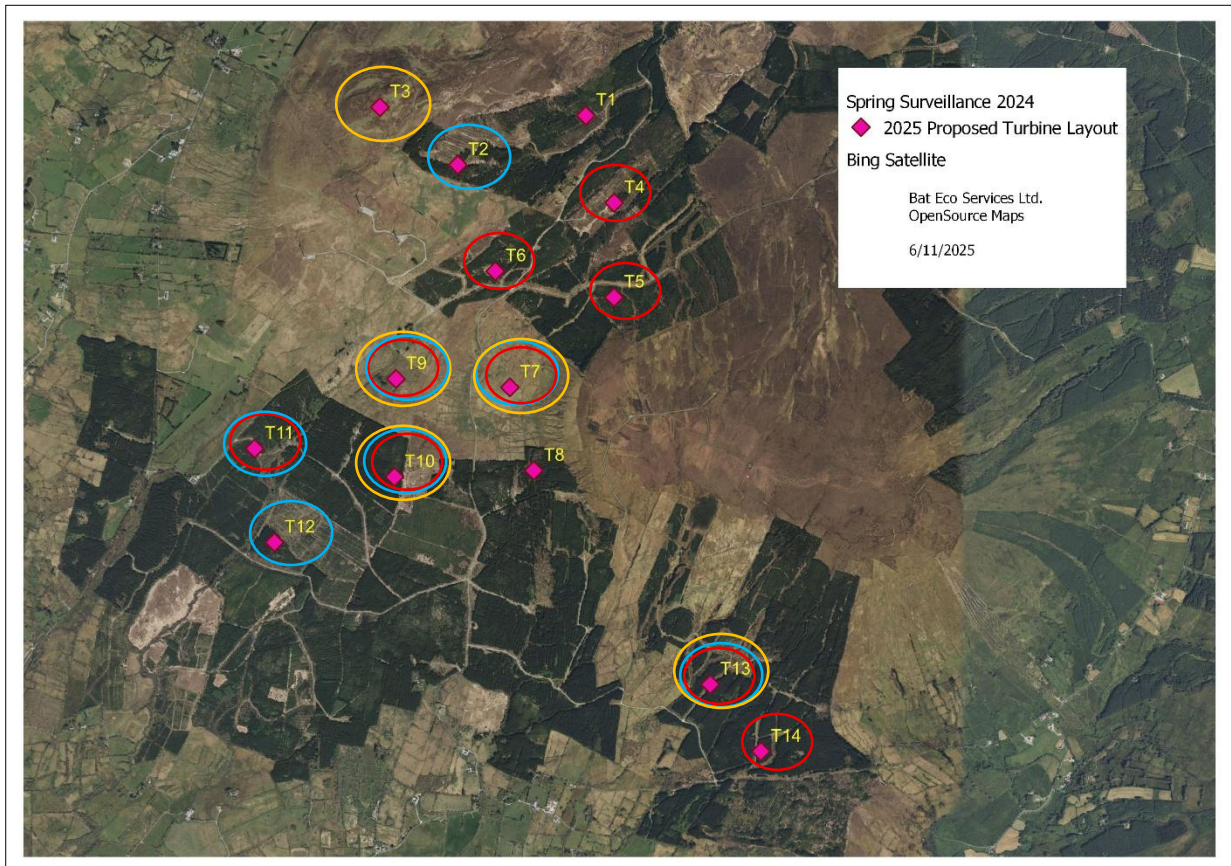


Figure 4I: Distribution of proposed turbine locations with above average for High Risk bat species bat activity.

4.1.7.4 2020/2021 Static Surveillance

Static surveillance was also conducted in Autumn 2020, Spring 2021 and Summer 2021. The data from this static surveillance period has been added to the excel files prepared to present the distribution of bat species recorded within the survey area. The following bat species were recorded: Daubenton's bat, Natterer's bat, Leisler's bat, Nathusius' pipistrelle, common pipistrelle, soprano pipistrelle and brown long-eared bat. This is the same species list of bat species recorded in the 2024 static surveillance. A summary of the data is also presented in the Appendices.

4.1.8 Bat Distribution Records

The following maps present the bat encounters collated for each bats species during all bat surveys completed. A total of 1,526 bat encounters were recorded because of all bat surveys completed within the survey area.

4.1.8.5 Common pipistrelle

There are 515 (33.7%) Common pipistrelle bat encounters recorded because of all bat surveys completed within the survey area. These are distributed throughout the proposed development area and along local roads south of the proposed development area.

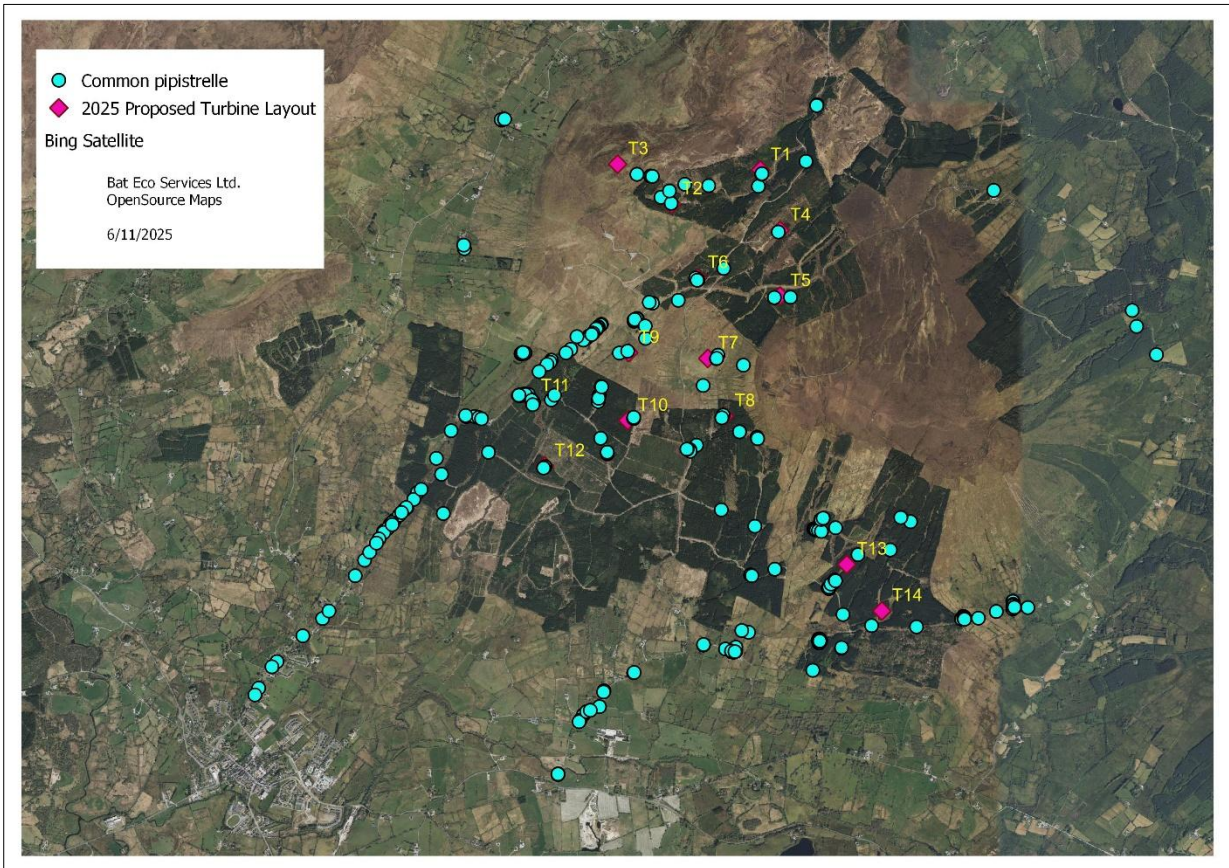


Figure 5a: Distribution of Common pipistrelle bat encounters within the survey area.

4.1.8.6 Soprano pipistrelle

There are 441 (28.9%) Soprano pipistrelle bat encounters recorded because of all bat surveys completed within the survey area. These are distributed throughout the proposed development area and along local roads south of the proposed development area.

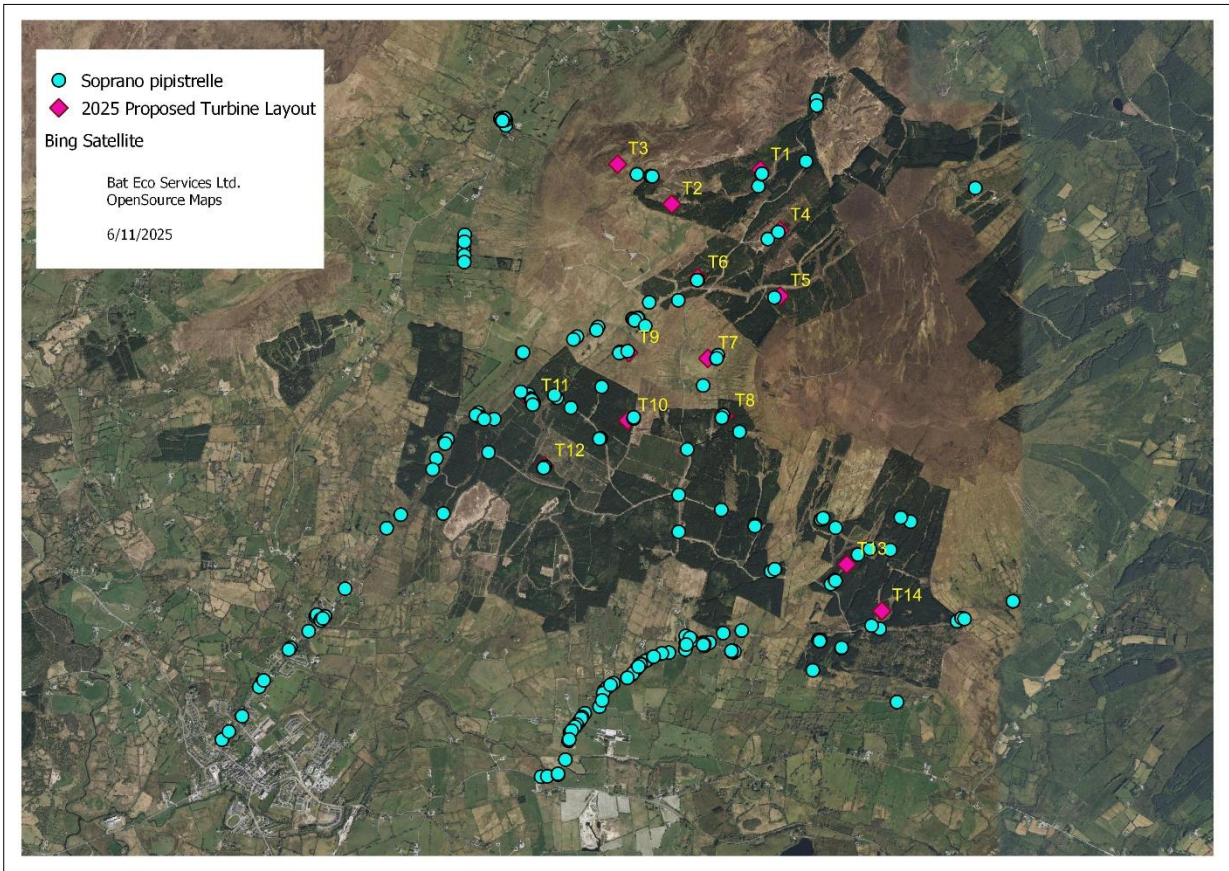


Figure 5b: Distribution of Soprano pipistrelle bat encounters within the survey area.

4.1.8.7 Leisler's bat

There are 173 (11.3%) Leisler's bat encounters recorded because of all bat surveys completed within the survey area. These are distributed throughout the proposed development area and along local roads south of the proposed development area.

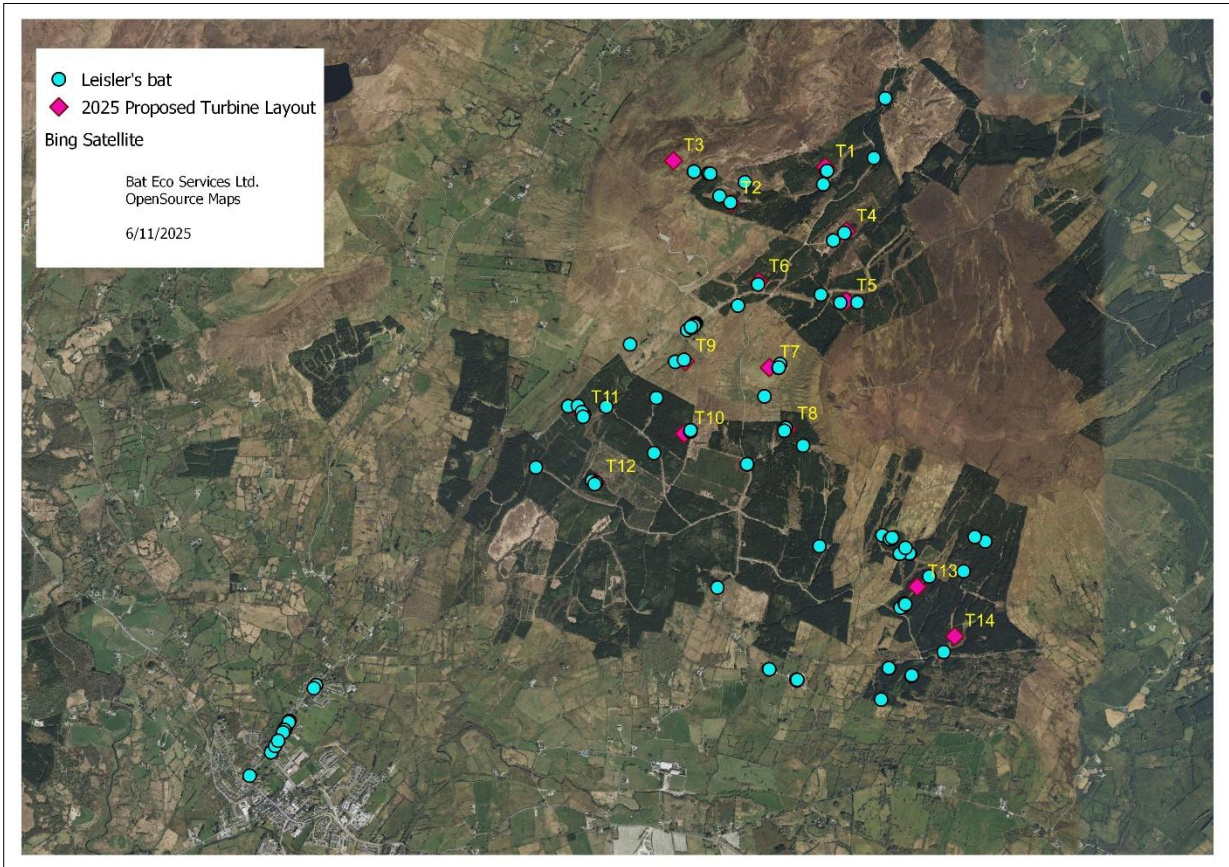


Figure 5c: Distribution of Leisler's bat encounters within the survey area.

4.1.8.8 Daubenton's bat

There are 72 (4.7%) Daubenton's bat encounters recorded because of all bat surveys completed within the survey area while an additional 73 Myotis species bat encounters were

also recorded. These are distributed throughout the proposed development area and were recorded primarily as a result of the static surveillance locations of 2024 and 2021.

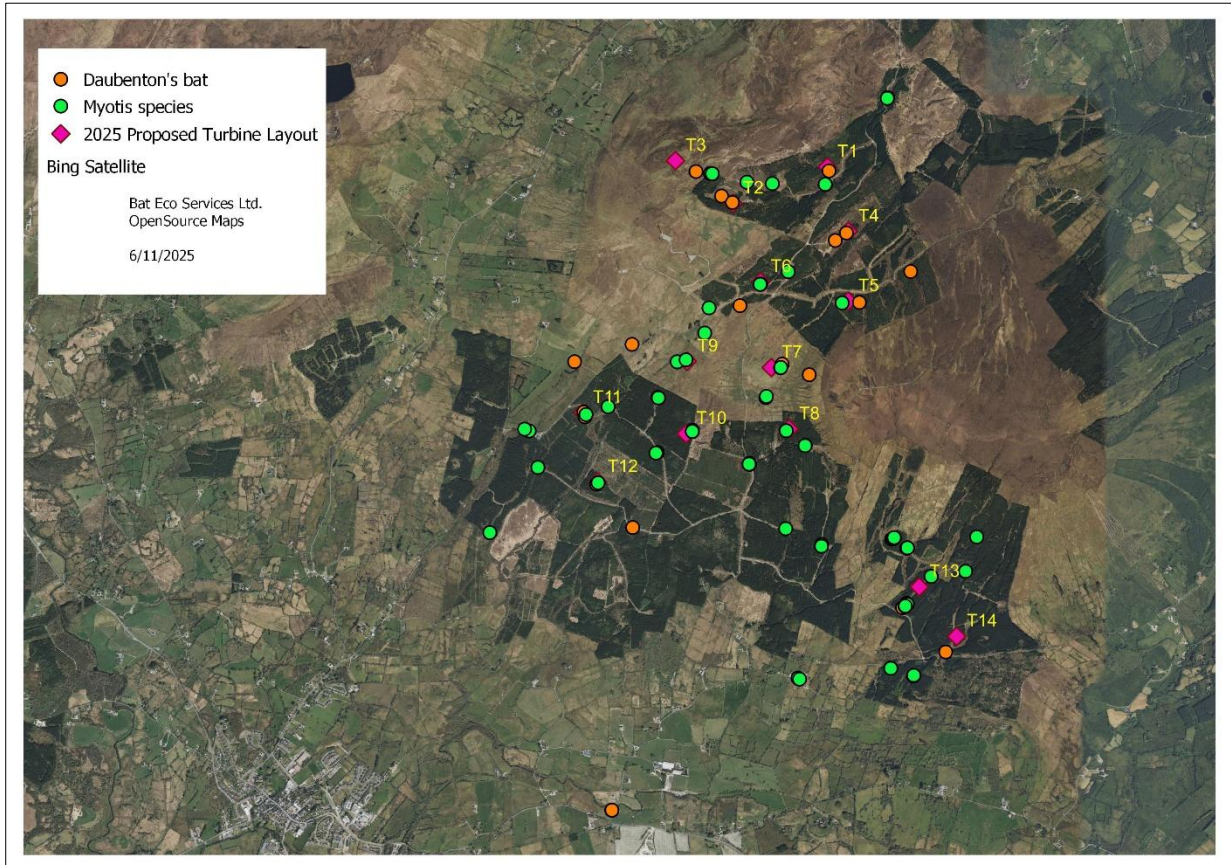


Figure 5d: Distribution of Daubenton's bat encounters and *Myotis* species bat encounters within the survey area.

4.1.8.9 Natterer's bat

There are 194 (12.7%) Natterer's bat encounters recorded because of all bat surveys completed within the survey area while an additional 73 *Myotis* species bat encounters were also recorded. These are distributed throughout the proposed development area and were recorded primarily as a result of the static surveillance locations of 2024 and 2021. The Natterer's bat maternity roosts (Building 7) located to the south of the proposed development area also contributed to the high level of bat activity recorded for this species of bat.

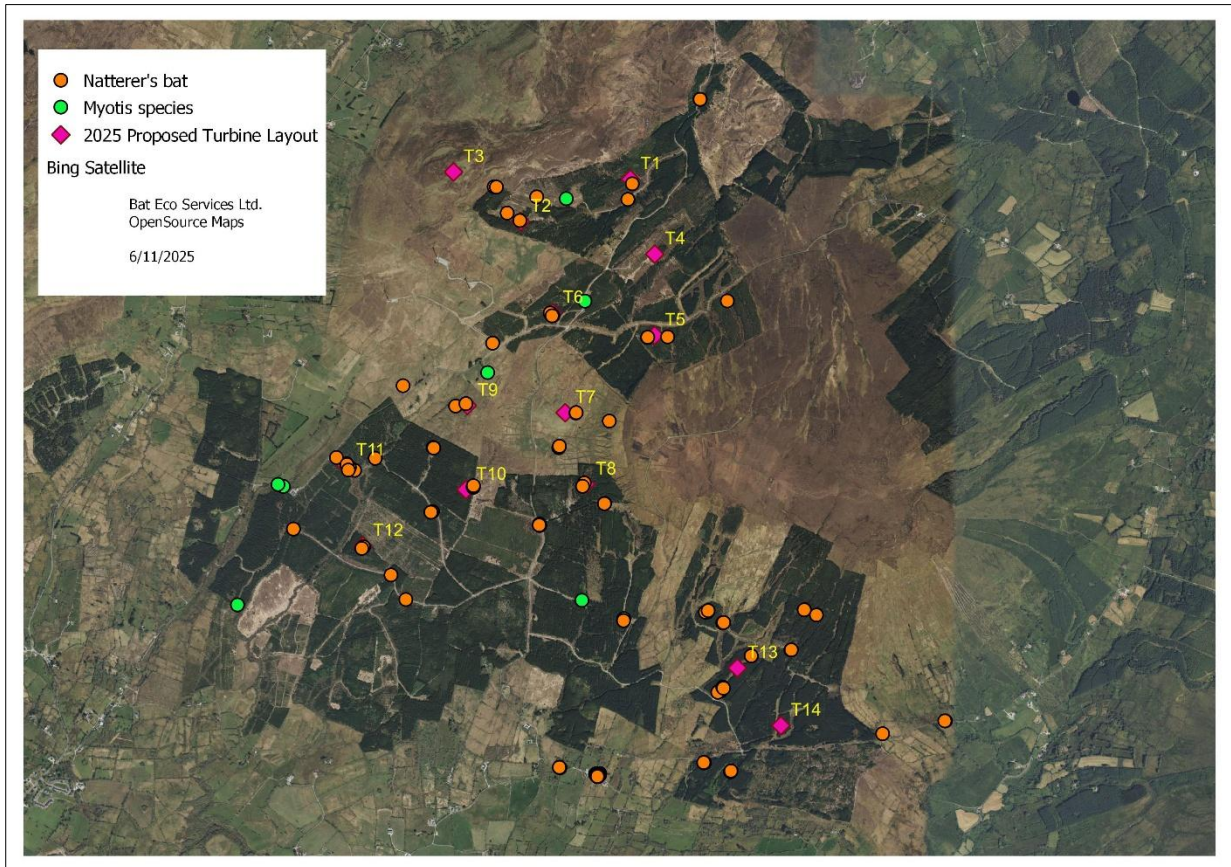


Figure 5e: Distribution of Natterer's bat encounters and *Myotis* species bat encounters within the survey area.

There are 42 (2.8%) brown long-eared bat encounters recorded because of all bat surveys completed within the survey area. These are distributed throughout the proposed development area and were recorded primarily as a result of the static surveillance locations of 2024 and 2021.

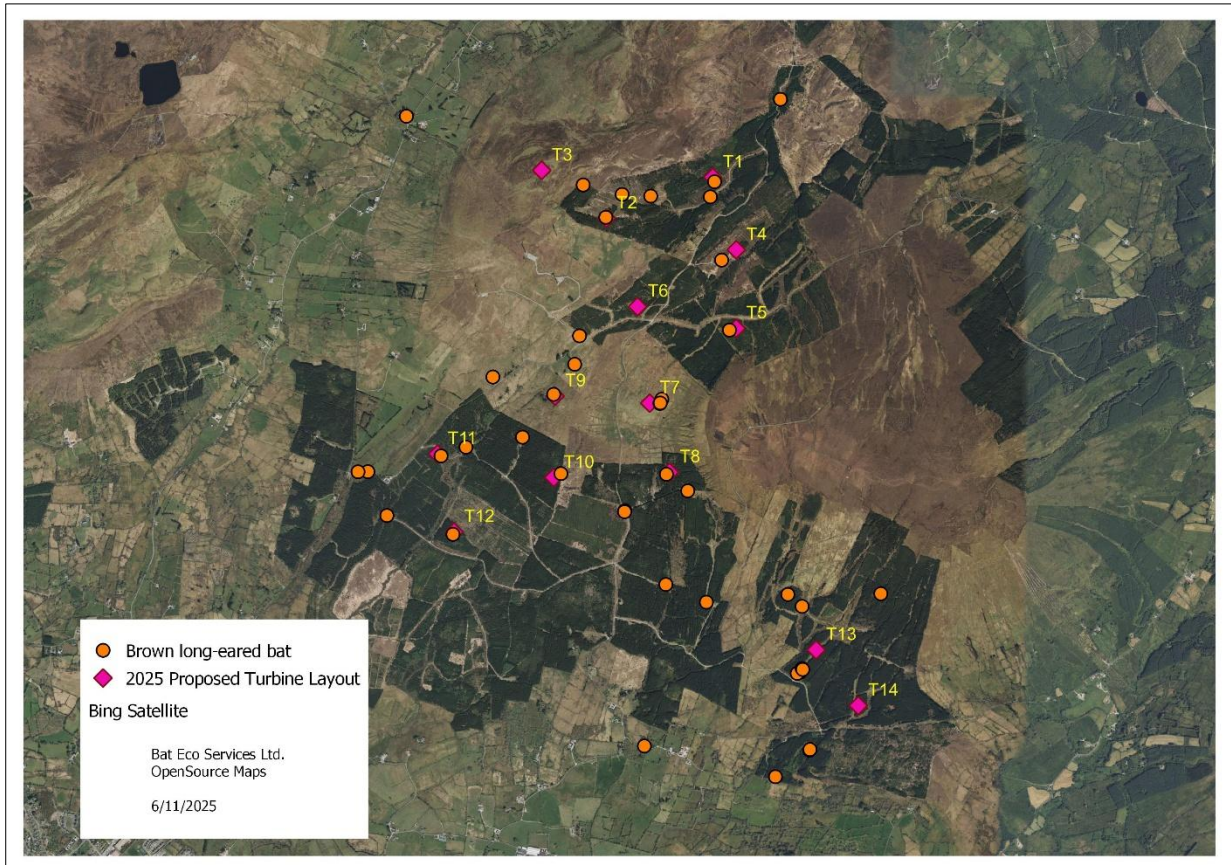


Figure 5f: Distribution of Brown long-eared bat encounters within the survey area.

4.1.8.11 Nathusius' pipistrelle

There are 16 (1%) Nathusius' pipistrelle bat encounters recorded because of all bat surveys completed within the survey area. These have a limited distributed throughout the proposed development area and were recorded primarily as a result of the static surveillance locations of 2024 and 2021.

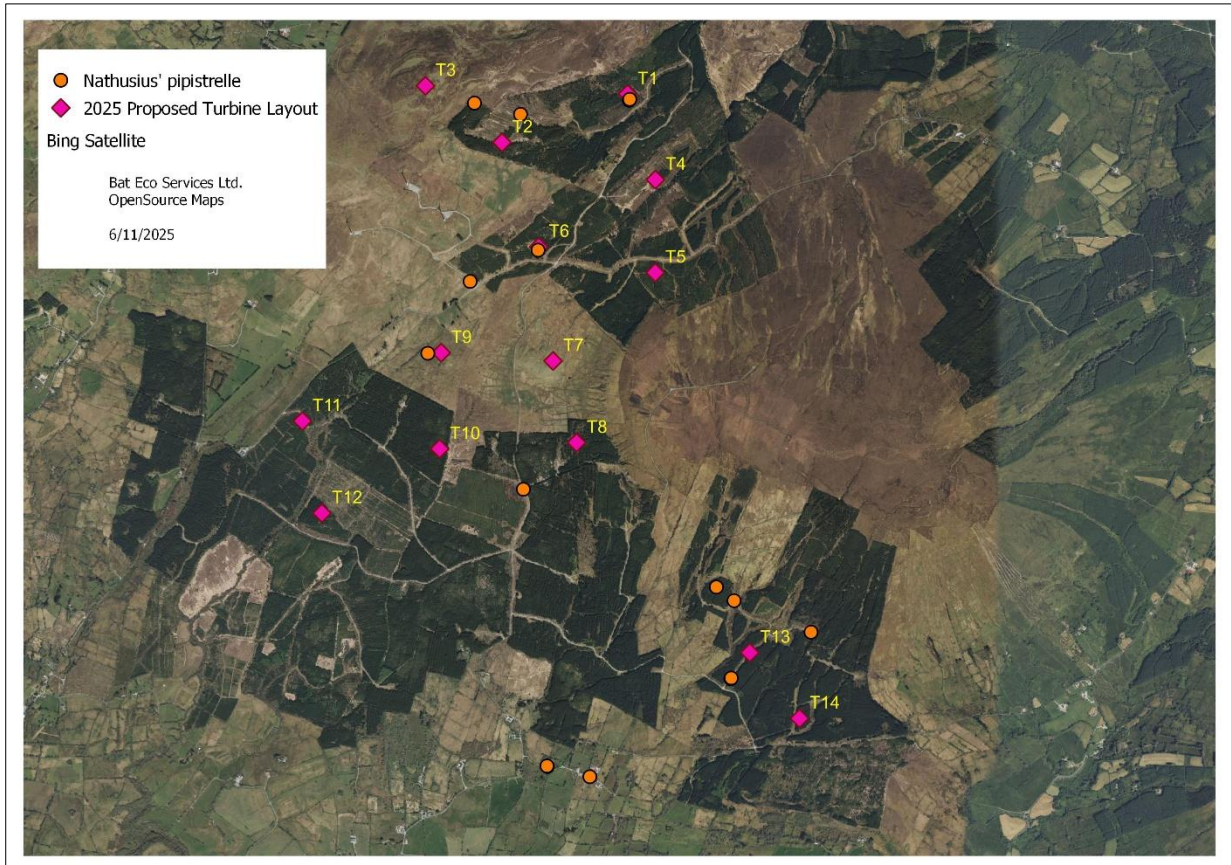


Figure 5g: Distribution of Nathusius' pipistrelle bat encounters within the survey area.

4.1.9 EcoBat Tool Analysis

All the static surveillance data collected in 2024 for each individual bat species recorded was examined to complete analysis in absence of the EcoBat Tool. Taking the average number of bat passes for the three High Risk Bat Species (i.e. Leisler’s bat, soprano pipistrelle and common pipistrelle) for each of the static surveillance periods, the number of nights greater than the average was collated and presented in the tables below. The analysis completed in Section 4.1.7.3, where proposed turbine locations that were highlighted are used (i.e. where above average number of bat passes were recorded for the named bat species) were examined further. Therefore, this analysis was undertaken for the following proposed turbine locations: T2, T3, T5, T6, T7, T9, T10, T11, T13, T14.

Table 6b: Summary table showing the number of nights recorded bat activity fell was >average band for High Risk Bat Species only for Spring Surveillance.

Turbine No.	No. of Nights > average bat passes	No. of Nights of Surveillance	Percentage	Activity Level
Common pipistrelle				
T9	3	16	19%	Low
T10	3	12	25%	Low to Moderate
T11	4	8	50%	Moderate
T13	1	10	10%	Low
T14	1	10	10%	Low
Soprano pipistrelle				
T9	1	16	6%	Low
T11	5	8	62.5%	Moderate to High
Leisler’s bat				
T5	2	16	12.5%	Low
T6	5	12	41.7%	Moderate
T7	5	12	41.7%	Moderate

Table 6b: Summary table showing the number of nights recorded bat activity fell was >average band for High Risk Bat Species only for Summer Surveillance.

Turbine No.	No. of Nights > average bat passes	No. of Nights of Surveillance	Percentage	Activity Level
Common pipistrelle				
T7	4	13	31%	Low to Moderate
T8	2	13	15%	Low
T9	5	13	38.5%	Low to Moderate
T10	5	13	38.5%	Low to Moderate
T11	5	10	50%	Moderate
Soprano pipistrelle				
T7	5	13	38.5%	Low to Moderate
T8	2	13	15%	Low
T9	3	13	23%	Low to Moderate

T10	4	13	31%	Low to Moderate
T11	4	10	40%	Low to Moderate
Leisler's bat				
T2	2	12	17%	Low
T7	3	13	23%	Low to Moderate
T10	5	13	38.5%	Low to Moderate
T12	4	12	33%	Low to Moderate
T13	4	13	31%	Low to Moderate

Table 6c: Summary table showing the number of nights recorded bat activity fell was >average band for High Risk Bat Species only for Autumn Surveillance.

Turbine No.	No. of Nights > average bat passes	No. of Nights of Surveillance	Percentage	Activity Level
Common pipistrelle				
T3	3	17	18%	Low
T7	2	17	12%	Low
T9	5	17	29%	Low to Moderate
T10	1	17	6%	Low
T13	7	17	41%	Moderate
Soprano pipistrelle				
T7	2	17	12%	Low
T9	4	17	24%	Low to Moderate
T10	3	17	18%	Low
T13	7	17	41%	Moderate
Leisler's bat				
T3	3	17	18%	Low
T7	4	17	24%	Low to Moderate

Therefore, proposed turbine locations with Moderate or higher activity level are of concern in relation to local bat populations and are deemed as proposed turbine locations with a High level bat activity:

- T6 (Leisler's bat)
- T7 (Leisler's bat)
- T11 (Common pipistrelle & Soprano pipistrelle)
- T13 (Common pipistrelle & Soprano pipistrelle).

However, due to proximity to the proposed turbine locations list above and due to the activity level of two or more of the high risk bat species (i.e. common pipistrelle, soprano pipistrelle and Leisler's bat), additional proposed turbine locations where Low to Moderate bat activity was recorded are also highlighted as a potential concern for local bat populations and are deemed Medium level of bat activity locations:

- T9 (Common pipistrelle & Soprano pipistrelle)
- T10 (Common pipistrelle)

- T12 (Leisler's bat).

Therefore, the remaining proposed turbine location are deemed to be Low level of bat activity:
T1, T2, T3, T4, T5, T8 and T14.

5. Discussion / Interpretation

Bat Species Recorded & Sensitivity

Seven species of bat and additional records for *Myotis* species group were recorded during the 2024 and 2021 bat surveys. This represents seven of the eight bat species known to be resident in County Leitrim. Records are available on the Bat Conservation Ireland database (10km search) for the eighth bat species, Whiskered Bat, but this species was not recorded during this current set of bat surveys. The table below provides an ecological valuation of each the nine bat species and the collision risk factor in relation to wind farms. Three of the bat species recorded are considered to be High risk.

Table 7a: Evaluation of the bat species recorded during the bat survey.

Evaluation was carried out using CIEM (2016) Guidelines for ecological value, “Bat Risk” in relation to Wind Turbines (NaturScot, 2021) and with reference to Wray et al., 2010 (Table 2 in NaturScot, 2021) in relation to level of potential vulnerability of populations extrapolated for Irish bat species, Irish status according to Marnell et al., 2019 and population numbers and core area from Roche et al., 2014.

Yellow = low population vulnerability

Orange = medium population vulnerability

Red = high population vulnerability

Bat Species	Ecological Value / Geographical Scale of Importance	Irish Status	Bat Risk	Population Numbers / Core Area
Leisler's bat	International	Least Concern	High	Common
Natterer's bat	County	Least Concern	Low	Widespread
Whiskered bat	Regional	Least Concern	Low	Rare
Nathusius' pipistrelle	Regional	Least Concern	High	Rare
Daubenton's bat	County	Least Concern	Low	Common
Brown long-eared bat	County	Least Concern	Low	Widespread
Common pipistrelle	Local	Least Concern	High	Common
Soprano pipistrelle	Local	Least Concern	High	Common
Lesser horseshoe bat	National	Least Concern	Low	Rare

Evaluation

The static surveillance data collected 2024 was proposed to be analysed using the EcoBat Tool but, at the date of reporting and analysis, the EcoBat Tool website is currently under maintenance. Therefore, the author undertook analysis using the principals of the EcoBat Tool.

The following proposed turbine locations are deemed as High level of bat activity: T6, T7, T11 and T13. The following proposed turbine locations are deemed as Medium level of bat

activity: T9, T10 and T12. Therefore, the remaining proposed turbine locations are deemed to be Low level of bat activity: T1, T2, T3, T4, T5, T8 and T14.

QGIS Analysis

To facilitate the construction of the proposed wind turbine, internal wind farm access tracks are required. This may result in the removal of habitats and the potential impact of this is investigated using the **“Habitats”** layer, **“Buffered Bat Encounters”** layer and the **“Buffered Turbine Locations”** layer produced.

- “Habitats” layer – using aerial photograph
- “Buffered Bat Encounters” = all bat encounters within 1km of turbine locations (to represent the primary proposed development area) was extracted from full bat dataset. This new dataset was named “Bat Encounters within boundary” and each of these bat encounters were buffered to 50m.
- “Buffered Turbine Locations” = all turbine locations were buffered to 200m to aid analysis.

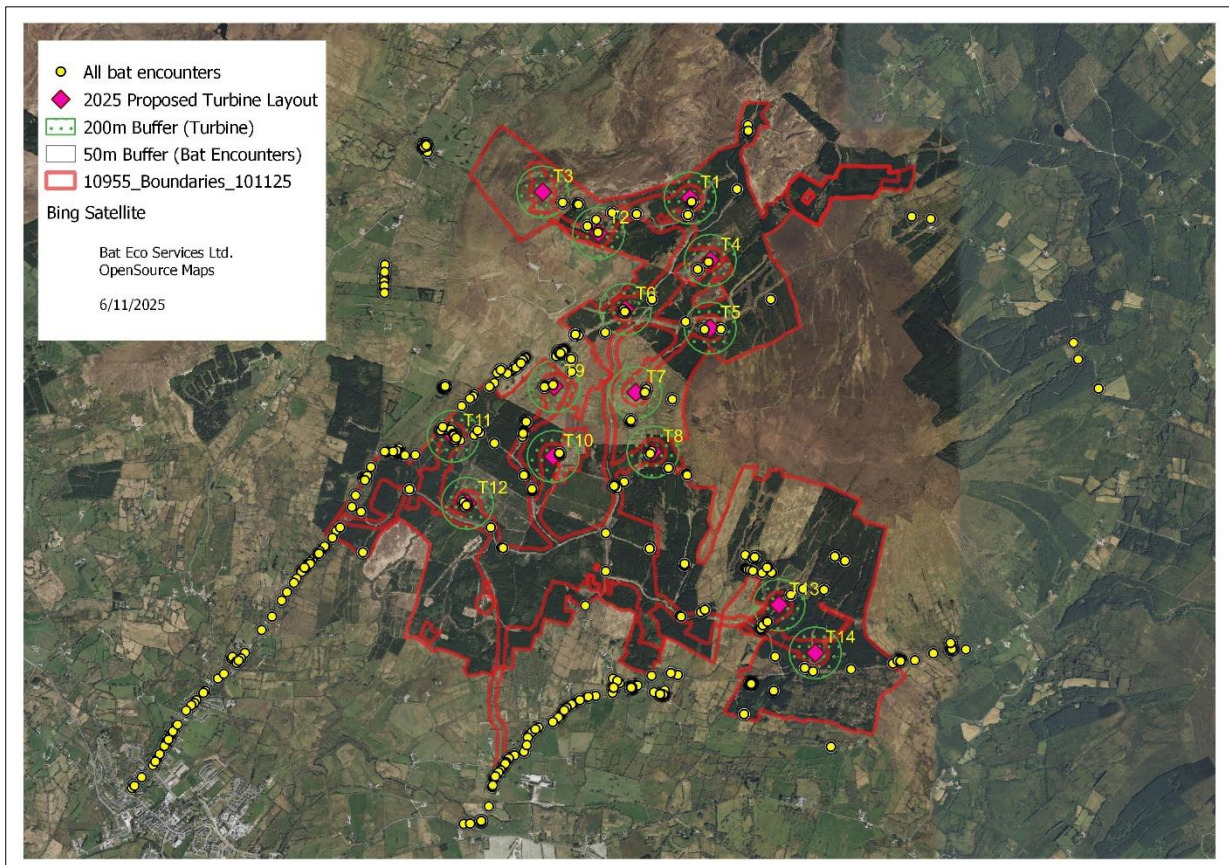


Figure 7a: QGIS analysis of bat encounters within 200m of turbine locations.

The predominant habitat type for each proposed location is as follows:

- T1: Conifer plantation
- T2: Conifer plantation
- T3: Upland blanket bog
- T4: Conifer plantation
- T5: Conifer plantation
- T6: Wet grassland, Conifer plantation & Mixed broadleaved woodland/conifer woodland
- T7: Wet grassland
- T8: Wet grassland & Conifer plantation
- T9: Wet grassland & Mixed broadleaved woodland/conifer woodland
- T10: Conifer plantation
- T11: Conifer plantation
- T12: Conifer plantation
- T13: Wet grassland & Conifer plantation
- T14: Wet grassland, dry meadows & Conifer plantation

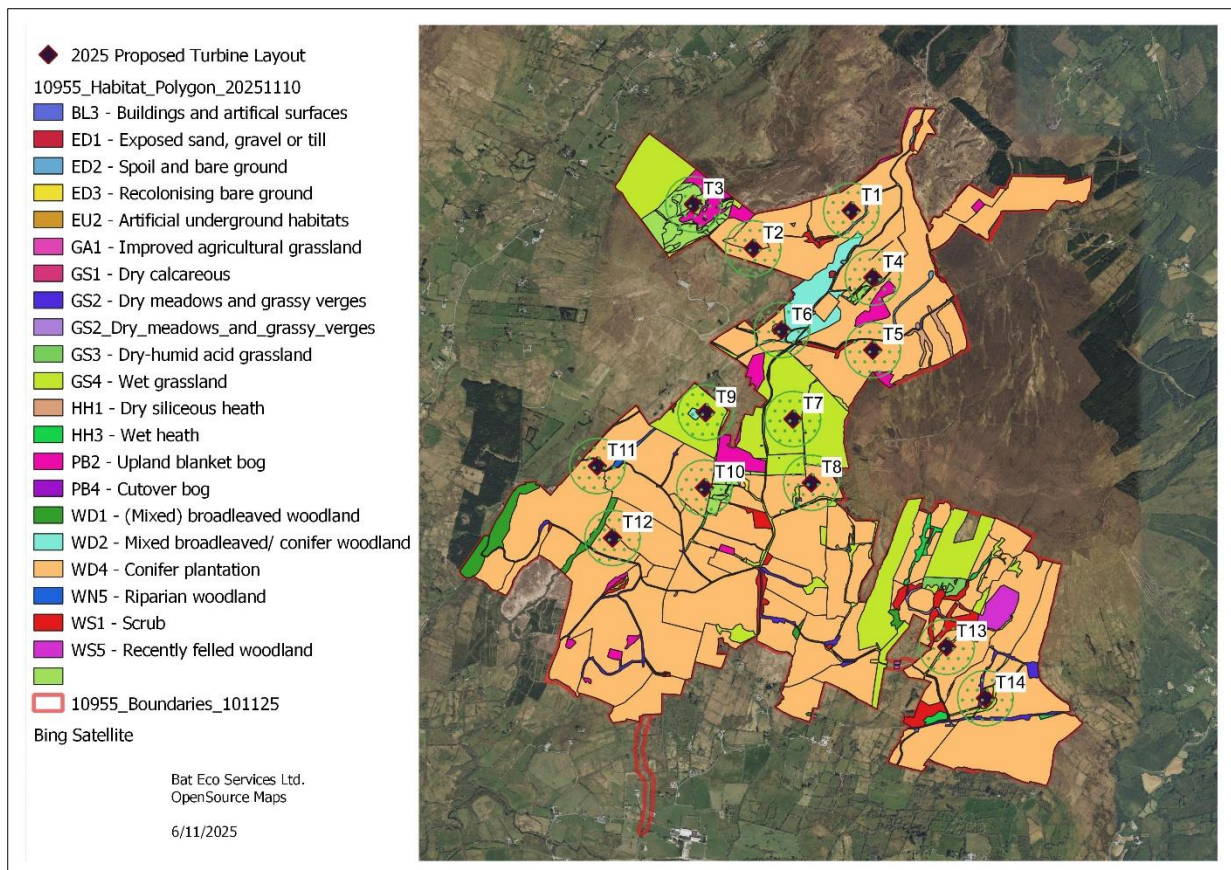


Figure 7b: QGIS analysis of habitat categories within 200m of turbine locations.

The supporting infrastructure for the proposed development travels north to the proposed development area. In vicinity of the tracks, the following bat species were recorded: common pipistrelle, soprano pipistrelle, Leisler's bats, brown long-eared bats, Natterer's bats, Daubenton's bats Nathusius' pipistrelle.

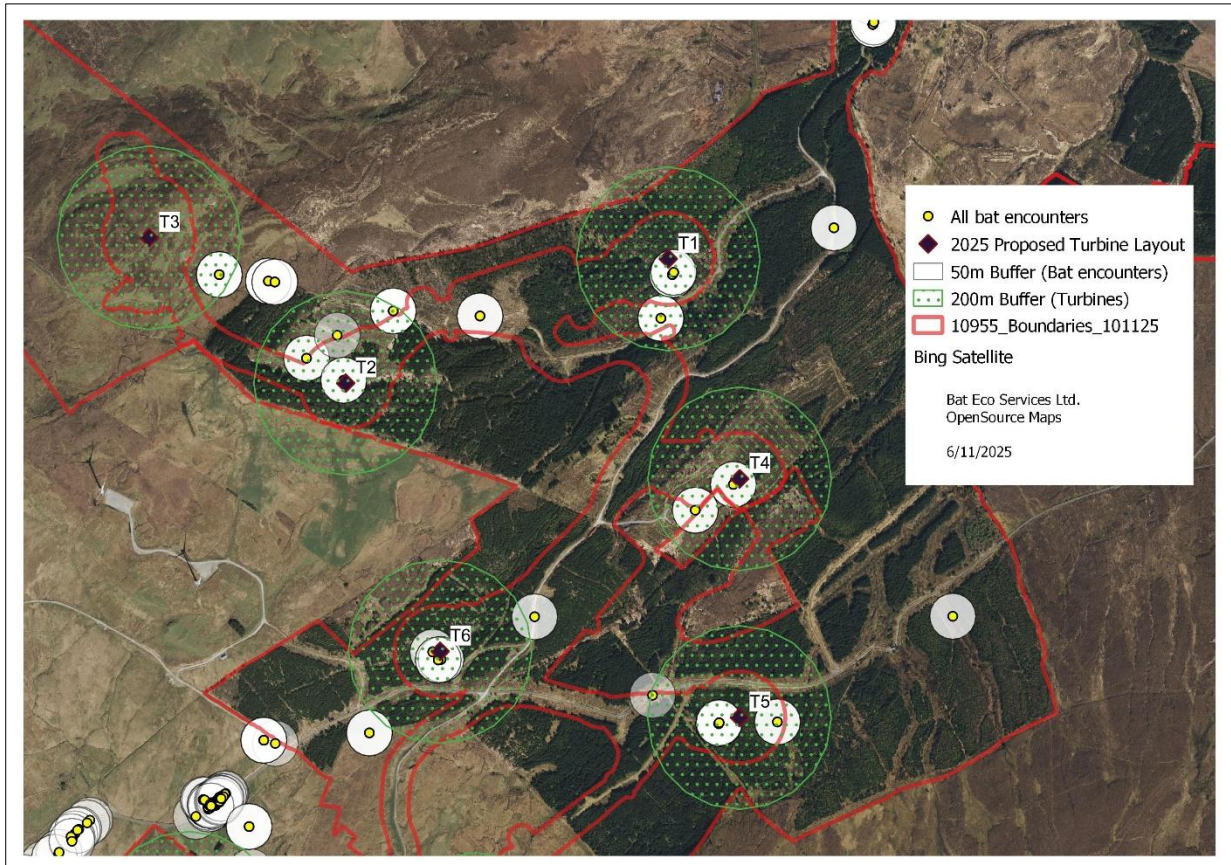


Figure 7c: QGIS analysis of bat encounters 50m buffers and proposed infrastructure (T1 to T6).

There are multiple bat encounters within the 200m buffer zone around the proposed turbine locations and along the proposed road haul routes to facilitate the required infrastructure for the proposed turbine locations.

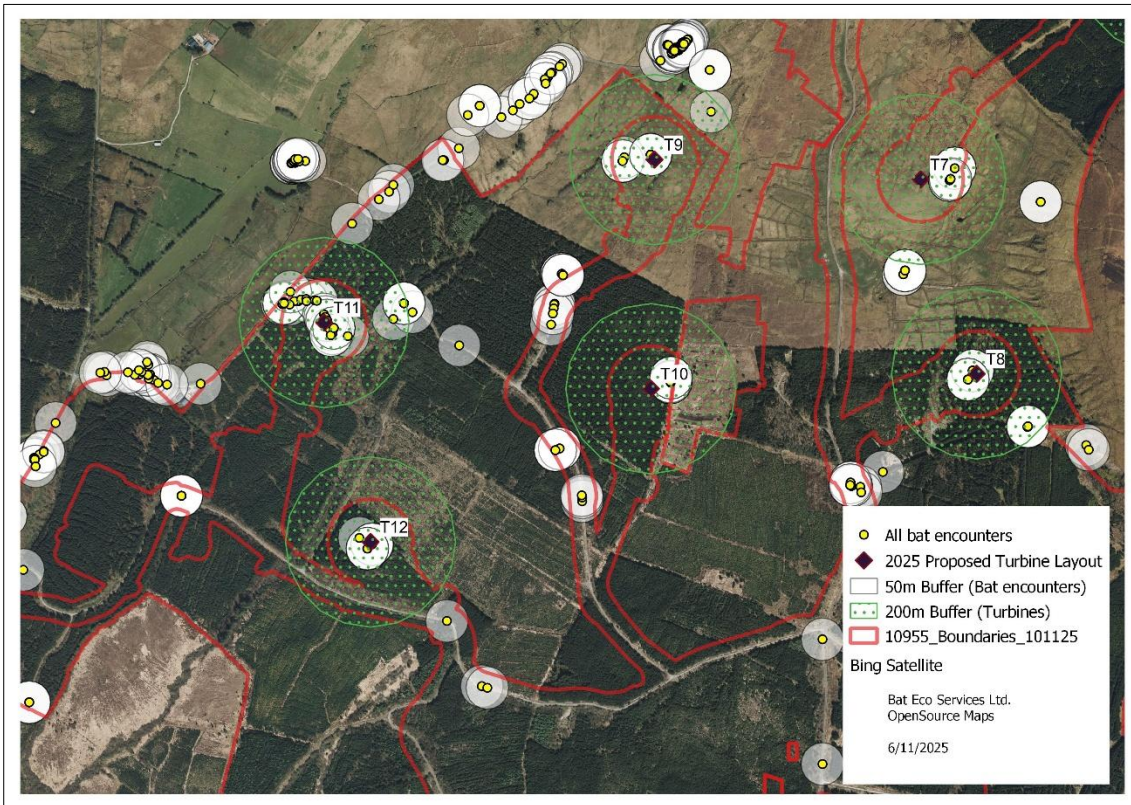


Figure 7d: QGIS analysis of bat encounters 50m buffers and proposed infrastructure (T7 to T12).

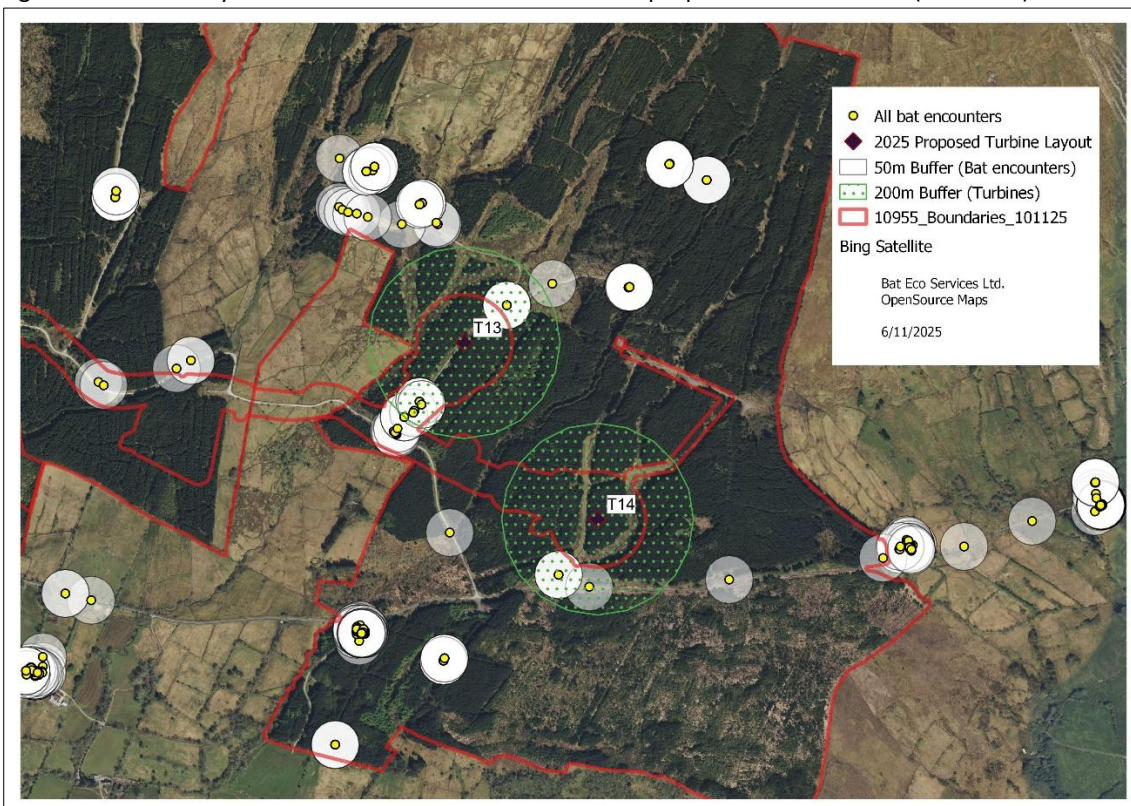


Figure 7e: QGIS analysis of bat encounters 50m buffers and proposed infrastructure (T13 to T14).

Site Risk Assessment

The Site Risk Assessment is calculated according to NaturScot, 2021 (See Appendix IV for details of how this is calculated).

The assessment value (i.e. Turbine Risk value) is compared to the ranges below:

- Low (green) 0-4
- Medium (amber) 5-12
- High (red) 15-25

While Leisler's bat can be considered as common in Ireland, its status as an "Internationally Important" population, ranks it higher than the two common *Pipistrellus* species (i.e. soprano pipistrelle and common pipistrelle). The bat activity level of all three named bat species were taken into consideration as a result of the analysis of the 2024 surveillance.

5.1.1 Stage 1 Assessment

The proposed wind farm is to be comprised of 14 turbine locations. Therefore, the Project Size is Medium.

The Habitat Risk has been calculated for each turbine site individually and this is based on the predominant habitat present within the 200m buffer of the proposed turbine location and whether bats roosts were recorded within 500m of the proposed turbine location. Overall, the habitat is considered to be Moderate value (Amber, Value = 3). However, two proposed locations are given a High (Red, Value = 4) due to the location of recorded bats roosts and/or trees identified as PBRs (i.e. Turbine 9 – Building 4 and PBRs & Turbine 14 – Building 8).

With reference to the nightly bat activity at each of the static locations, T1, T2, T3, T4, T5, T8 and T14 were deemed to have a Low level of bat activity. T9, T10 and T12 was deemed to have a Medium level of bat activity while T6, T7, T11 and T13 was deemed to have a High level of bat activity. To complete the table below, the Bat Activity Category (using similar values as per EcoBat Tool) is valued as follows:

Low = 1 point

Medium = 3 points

High = 5 points

Table 7b: Risk assessment for each proposed turbine location for local bat populations using Common pipistrelle bat activity levels.

Turbine No.	Site Risk Value	Bat Activity Category	Turbine Risk Site Risk x Bat Activity Category
1	3	1	3
2	3	1	3
3	3	1	3
4	3	1	3
5	3	1	3
6	3	5	15
7	3	5	15
8	3	1	3
9	4	3	12
10	3	3	9
11	3	5	15
12	3	3	9
13	3	5	15
14	4	1	4

In summary, for High Risk Bat Species, the proposed turbine locations have the following Risk Factor:

Low: T1, T2, T3, T4, T5, T8, T14

Medium: T9, T10, T12

High: T6, T7, T11, T13

Impact Assessment

The impact assessment takes into consideration the following:

- Seven bat species were recorded during the 2024 and 2021 bat surveys of the proposed development site.
- Four of these species are considered to be High Risk bat species in relation to wind turbines: Leisler's bat, common pipistrelle, nathusius' pipistrelle and soprano pipistrelle.
- The remaining three species are Low Risk: Natterer's bat, Daubenton's bat and brown long-eared bat.
- Analysis results highlighted turbine locations with High Risk and Medium Risk for common pipistrelle, soprano pipistrelle and Leisler's bat, as these bat species were recorded at Moderate to High levels of bat activity during static surveillance.
- Spread of bat encounter records within the proposed development site, particularly, in relation to infrastructure.
- Bat habitats present within 200m of turbine locations and along infrastructure routes.

5.1.2 Core Sustenance Areas

Six buildings were recorded as bat roosts for the following bat species: common pipistrelle, soprano pipistrelle, Natterer's bat and brown long-eared bat (Buildings 4, 6, 7, 8, 12, and 19).

The CSZ for brown long-eared bat and soprano pipistrelle is 3km, for common pipistrelle is 2km and for Natterer's bat is 4km. Therefore, the proposed development is located inside the CSZ for the known bat roosts recorded relative to the listed buildings. Two bat species recorded roosting are considered to be Low Risk bat species in relation to wind farms (i.e. brown long-eared bat and Natterer's bat) while the two remaining bat species (common pipistrelle and soprano pipistrelle) are High Risk bat species relative to wind farms. However, in relation to the latter, the roost types recorded were daytime roosts.

5.1.3 Potential Impact on Local Bat Populations

One building is located within the proposed development area and this was recorded as a bat Daytime roost for soprano pipistrelles (Building 4). This bat species is considered to be High Risk bat species in relation to wind farms. This roost is a Daytime Roost with a small number of bat roosting within the structure. Additional buildings were also recorded as bat roosts but these were located outside the proposed development area. No roosts were confirmed in trees but PBRs were identified in vicinity on Turbine 9.

The construction of the proposed development will result in the removal of habitats (Please see EAIR Chapter 5 – Biodiversity for more detailed information). In relation to “bat habitats”, the following habitat loss is reported in EIAR Chapter 5 – Biodiversity:

- Mixed broadleaved woodland: 0.56 ha
- Hedgerows: 1,107m
- Riparian woodland: 0.06 ha
- Scrub: 1.43 ha
- Treelines: 432m.

These results were taken into consideration as part of the Risk Assessment for each proposed turbine location. The following table summarises the result of the impact assessment for each of the turbine locations. If no mitigation measures are implemented, there are four High Risk turbines (T6, T7, T11 and T13) and three Medium Risk turbines (T9, T10 and T12).

Table 7c: Summary table showing the number of nights recorded bat activity fell into High activity band for common pipistrelles only.

Turbine No.	Risk Assessment: Common pipistrelle	Other bat species recorded within 200m of turbine	If no mitigation is applied, what is the potential impact level?
T1	3	SP, CP, Leis, Daub, Natt, Nath pip	Low
T2	3	SP, CP, BLE, Leis, Daub, Natt, Nath pip	Low
T3	3	SP, CP, BLE, Leis, Daub	Low
T4	3	SP, CP, BLE, Leis, Daub	Low
T5	3	SP, CP, BLE, Leis, Daub, Natt	Low
T6	15	SP, CP, Leis, Daub, Natt, Nath pip	High
T7	15	SP, CP, BLE, Leis, Daub, Natt	High
T8	3	SP, CP, BLE, Leis, Daub, Natt	Low
T9	12	SP, CP, BLE, Leis, Daub, Natt, Nath pip	Medium
T10	9	SP, CP, BLE, Leis, Daub, Natt	Medium
T11	15	SP, CP, BLE, Leis, Daub, Natt	High
T12	9	SP, CP, BLE, Leis, Daub, Natt	Medium

T13	15	SP, CP, BLE, Leis, Daub, Natt, Nath pip	High
T14	4	SP, CP, Leis, Daub	Low

5.1.4 Cumulative Impacts of Existing Forestry Operations

Forestry operations will continue within sections of the proposed development site during the construction phase and throughout the life span of the proposed development. Such operations include clear felling and new planting. The cumulative impact of these forestry operations in combination with the proposed development will not cause a significant increase to potential impacts of the proposed development identified above.

5.1.5 Cumulative Impacts of Additional Wind Farm Applications

There is one operational wind farm located west of the proposed wind farm site, namely Faughary Wind Farm, containing three (3) 119-metre high Enercon wind turbines.

Carrickeeny Wind Farm with four (4) operating turbines is located approximately 8km to the west and Tullynamoyle (9 turbines) is located approximately 10 km to the south. Other wind farms in the wider area include Garvagh Glebe (13) and Moneenatieve (5) located in south Leitrim, a distance of 18-20 km south of the site, with Tullynahaw (11) and Altagowlan (9) further south in north County Roscommon close to the border with Leitrim. Acres Wind Farm (6) is located approximately 22 km to the north in Co. Donegal.

Using the Core Sustenance Zone radius of 4km (this is the CSZ for Natterer's bat, the widest zone value for the seven bat species recorded during the surveys and for the three bat species recorded roosting in Building 2), a buffer of 4km was created from the proposed wind farm site boundary of the proposed development site. Apart from Faughary Wind Farm, all other listed wind farms are outside the 4km CSZ for Natterer's bats.

The cumulative impact of these wind farm operations in combination with the proposed development will not cause a significant increase to potential impacts of the proposed development identified above.

Mitigation Measures

To reduce the potential impact of the proposed development on local bat populations the following mitigation is recommended.

5.1.6 Construction Phase

Mitigation is best achieved through avoidance especially in relation to bat fauna. The following measures will be put in place to avoid or lessen the degree of impacts on local bat populations.

5.1.6.1 Minimum Buffer Zone

In accordance with NatureScot (2021) to minimize risk to bat populations, a minimum 50m buffer zone must be maintained between the blade tip and the nearest habitat feature such as forestry, treelines, hedgerows and woodland feature, to ensure that no part of the turbine will intrude.

Using the formula quoted below (NatureScot, 2021), the minimum distances of wind turbines for bat mitigation are calculated for the potential turbine model (information supplied by TOBIN).

*formula: Buffer distance = $\sqrt{(50 + bl)^2 - (hh - fh)^2}$
where bl = blade length, hh = hub height, fh = feature height (all in meters)*

The dimensions of the potential wind turbine models proposed to be used are: wind turbines with a blade tip height of 180-185 metres (m), a rotor diameter of 149-163 m and hub height of 101-110.5m. Feature height is 20-25m (typical conifer plantation height, the predominant habitat type present within the survey area).

Using the above formula the bat buffers, required to achieve a minimum 50m clearance between turbine blade tip and tall vegetation and taking account of a range of potential turbine dimensions permitted and vegetation heights, was calculated. For vegetation heights in the range of 20–25 m, the calculation indicates that an appropriate bat buffer would fall between 85.5m and 105.5 m. For the purposes of this assessment, a precautionary buffer of 100 m has been adopted as a reasonable approximation within this range. The final buffer will be defined at detailed design stage and will reflect the specific distances required in relation to the surrounding vegetation heights.

Accordingly, a buffer of 100 m is recommended for Medium and High Risk turbines, while the minimum buffer requirement is considered sufficient for Low Risk turbines.

Providing alternative foraging areas outside the wind farm zone has been shown to reduce the presence of bats within cleared zones around individual wind turbines (i.e. bats are attracted to the more favourable foraging habitats). Therefore, compensatory habitat is recommended and, where possible, such planting should include deciduous woodland.

5.1.6.2 Construction Phase Bat Mitigation Measures

Following the formula in the above section, ensure that the required minimum distance from tall vegetation is achieved.

Table 10: Bat Mitigation Measures recommended during the Construction Phase.

High Level Turbine Locations This applies to T6, T7, T11, T13	EcoBat Tool Medium Level Turbine Locations This applies to T9, T10, T12	EcoBat Tool Low Level Turbine Locations This applies to T1, T2, T3, T4, T5, T8, T14
Ensure that wind turbine is 100m away from plantation edge/woodland edge.		The wind turbines (Low Risk) will be located 50m (from the tip to the blade to nearest tall vegetation) from tall vegetation.
<p>A zone of 100m around the wind turbines should be cleared of tall vegetation (shrubs, trees, scrub etc.) to reduce favourability of this zone for foraging and commuting bats.</p> <p>A low level of vegetation should be maintained for the entire operational phase. This should be monitored to ensure that scrub vegetation does not develop within the zone around the turbines.</p>		<p>A minimum buffer of 50m must be maintained between the tip of blade and the nearest tall vegetation (shrubs, trees, scrub etc.) to reduce favourability of this zone for foraging and commuting bats.</p> <p>A low level of vegetation should be maintained for the entire operational phase. This should be monitored to ensure that scrub vegetation does not develop within the zone around the turbines.</p>
Complete clearance work at least 6 months prior to installation of wind turbines. Studies have shown that bats are attracted to clear felled forestry areas due to increase insect loading. This has been shown to occur for a period of 3-6 months before the insect loading reduces to pre-cleared felled levels.		
Building 4 and mature trees surrounding the building will be protected during construction of the proposed development. This area will also be protected during the operation of the proposed development. There are no destruction of bat roosts and therefore a Regulation 54 derogation licence is not required.		

It is recommended that Building 3 in vicinity of T9 is removed. Prior to this, pre-construction bat surveys are required according to Collins (2023). In relation to trees identified as PBRs, pre-construction surveys are also required according to Collins (2023). If bat roosts are recorded during preconstruction surveys of both Building 3 and Tree PBRs, then a Regulation 54 Derogation Licence is required. Bat mitigation measures will be required to provide alternative roosting and this will depend on the bat species and type of bat roost recorded. The demolition of a bat roosts (building) and the felling of tree roosts will be undertaken in a manner to ensure that no bats are harmed and will be strictly described as part of a Regulation 54 derogation application.

It is recommended that outdoor lighting required to aid construction works are turned off outside the workday. That such lighting is placed in a manner that it does not shine on linear habitats, woodland edge or waterbodies.

5.1.7 Operational Phase

5.1.7.3 Feathering of blades

The operation of the turbines should be in a manner that will restrict the rotation of turbine blades as much as possible below the manufacturer's cut-in speed (e.g. by feathering the blades during low wind levels - changes in blade feathering by altering the angle of the blade and therefore preventing the blades from rotating during low wind situations). This would prevent freewheeling or idling of the blades.

Therefore, ensure that blades of turbines are prevented from freewheeling (idling/spinning). Feathering of the blades during low wind conditions are recommended for all turbines.

5.1.7.4 Turbine Cut-in Speeds

There are few bat mitigation measures available in relation to wind farms to reduce fatalities. One successful measure applied to wind farms in Europe is to increase the cut-in speeds of the individual turbines. This is important to protect High Risk species (Leisler's bat, soprano and common pipistrelle) foraging/commuting in vicinity of turbine locations.

Increasing the cut-in speed to 5.5 m/s from 30 minutes prior to sunset and to 30 minutes after sunrise to reduce bat collisions with turbines should be employed where required (i.e. at turbine locations where surveillance recorded high bat activity levels for High Risk and Medium Risk bat species and/or bat carcasses were recorded). This recommended for year 1 of operation followed by a review of monitoring data.

The duration required depends on the level of bat mitigation required for individual turbine sites (i.e. full bat activity season or confined to spring & autumn months – this will be determined by first year surveillance). A risk assessment should be undertaken using the surveillance data and analysed using best practice e.g. assessment of static data should be completed using the online tool *EcoBat* as recommended by NaturScot, 2021 or other equivalent tool depending on most up to-date recommendations at the time of monitoring.

Where cut-in speeds are required, they should be operated according to specific weather conditions. In a previous bat survey (on different site location) undertaken by the author, static

units were erected on an anemometer at 4m and 50m level. The number of bat passes recorded on the static units was analysed according to temperature and wind speed recorded at similar height levels. During this survey, it was determined that:

1. The vast majority of bat passes were recorded at the temperatures of 8°C and greater. Therefore, when the air temperature was less than 7°C there was no bat activity recorded below this temperature during the surveys completed.
2. In general, bat activity was highest at low wind speeds (<5.5m/s). It has been shown that curtailing the operations of wind turbines at low wind speeds can reduce bat mortality dramatically, especially during the late summer and early autumn months.
3. NaturScot (2021) recommend that curtailment is implement for 10°C and above.

Reducing fatalities can be reduced by changing the speed trigger or cut-in speeds of the turbines (i.e. meaning that the turbine is not operational during low wind speeds) or by changing the turbine blades angles which will mean that higher wind speeds are needed to start the wind turbine blades moving. Modern remotely operated wind turbines allow such cut-in speeds to be controlled centrally and automatically.

Due to the high levels of bat activity, cut-in speeds will be implemented at T6, T7, T11 and T13. As a precautionary measure, cut-in speeds will be implemented at T9, T10 and T12. This is due to the research by Lintott *et al.* (2016) and Richardson *et al.* (2021) which reported that ecological impact assessments have failed to reduce the risk of wind farms on local bat populations and that the bat activity levels recorded during pre-construction bat surveys may not accurately reflect the bat activity levels during wind farm operation.

Surveillance will be undertaken at the High (T6, T7, T11 and T13) and Medium Risk turbines (T9, T10 and T12) over a period of three years (first three years of operation, but an annual review will determine if the cut-in speeds should be implemented after 1 year of operation). If the Common pipistrelle, Soprano pipistrelle and Leisler's bat activity remains moderate to high at the T9, T10 and T11 Medium Risk turbine after the first year of surveillance then the cut-in speeds (coupled with carcass search results) will continue. High and Medium Risk turbines surveillance will continue to review the situation at each individual turbine location for the remaining two years. This will allow refinement of the curtailment regime.

For all other turbines, operation without cut-in speeds will be coupled with 3 years of surveillance (according to NaturScot, 2021 guidelines) to determine if cut-in speeds are required at these turbine locations.

As recommended by SNH, 2019 if curtailment is put into operation, *“then the effectiveness of curtailment needs to be monitored in order to determine (a) whether it is working effectively (i.e. the level of bat mortality is considered to be incidental), and (b) whether the curtailment regime can be refined such that turbine down-time can be minimised whilst ensuring that it remains effective at preventing casualties”*.

“Where the need for curtailment has been identified, a curtailment regime should be developed and presented as a part of the supporting Environmental Statement for the project. The proposed operating regime should specify, and be designed around the values for the key weather parameters and other factors that are known to influence collision risk which may include any or all of the following:

- *Wind speed in m/s (measured at nacelle height)*
- *Time after sunset*
- *Month of the year*
- *Temperature (°C)*
- *Precipitation (mm/hr) “*

Post construction acoustic surveys provide additional information which, when used in conjunction with appropriate carcass search data, can support any proposed changes to pre-application predictions concerning the need for curtailment or adjustments to an agreed curtailment regime.

This surveillance and annual review should be carried out by an independent experienced bat ecologist and all reports should be issued to the Local Authority and NPWS for review.

Table 11: Bat Mitigation Measures recommended during the Operational Phase.

High Level Turbine Locations This applies to T6, T7, T11, T13	EcoBat Tool Medium Level Turbine Locations This applies to T9, T10, T12 This also applies to remaining Internal Road Network	EcoBat Tool Low Level Turbine Locations This applies to T1, T2, T3, T4, T5, T8, T14
Operate the wind turbines in a manner that reduces the movement of the blades below the cut-in speed (e.g. by feathering the blades).		
Operate the wind turbine from 30 minutes prior sunset to 30 minutes after sunrise at a cut-in speed of 5.5 m/s during specified weather conditions and during the active bat season (April to October) when air temperatures are 10°C or more at the nacelle height. Undertake monitoring the first three years of operation to determine bat activity levels post construction. Review the results of monitoring at individual High Risk turbines after Year 1. Operate wind farm with specific cut-in speeds from Day 1 of Year 1. Undertake review to determine if required from Year 2 and onwards with continued monitoring for a minimum of 3 years.		
Undertake a carcass search for 3 years post operation of the wind farm to determine whether an adjustment to the cut-in speed of the blades is required. Review after Year 1 along with bat activity monitoring.		Undertake a carcass search for 3 years post operation of the wind farm.
Annual inspection of each buffer zone around each turbine will be undertaken and any regenerating trees or tall shrubs will be cut back.		
Any lighting required at substations, etc. will be designed to meet “bat friendly” requirements to reduce impact on nocturnal wildlife. The following are the primary recommendations according to BCT (2023): Where lighting is deemed necessary, the following are required:		

- All luminaires should lack UV elements when manufactured. Metal halide, compact fluorescent sources should not be used.
- LED luminaires should be used where possible due to their sharp-cut-off, lower intensity, good colour rendition and dimming capability,
- A warm white light source (2700 Kelvin or lower) should be adopted to reduce blue light component of luminaires. A 2700 Kelvin luminaire appears as a warm yellow due to the reduction in the stark blue light associated with higher Kelvin values (e.g. 4000 Kelvins). The “warmer” the light, the less of an impact on nocturnal wildlife. The progression of LED technology means that the majority of luminaires are available at 2700 Kelvins and lower. Therefore, it is recommended that such luminaires are standard for “biodiversity areas” and as LED technology develops, 2200 Kelvins may become more commonly available in future years.
- Light sources should feature peak wavelengths higher than 550nm to avoid the component of light most disturbing to bats.
- Internal luminaires, in relation to buildings within the proposed development area, can be recessed (as opposed to using a pendant fitting) where installed in proximity to windows to reduce glare and light spill.
- Waymarking inground markers (low output with cowls or similar to minimised upward light spill) to delineate path edges, if required, for pedestrian zones within the proposed development area should be used.
- Column heights should be carefully considered to minimise light spill and glare visibility. This should be balanced with the potential for increased numbers of columns and upward light reflectance as with bollards.
- Only luminaires with a negligible or zero Upward Light Ratio, and with good optical control, should be considered.
- Luminaires should always be mounted horizontally, with no light output above 90° and/or no upward tilt.
- Where appropriate, external security light should be set on motion sensors and set to as short a possible a timer as the risk assessment will allow (e.g. 1-2 minute timer).
- Only if all other options have been explored, accessories such as baffles, hoods or louvres can be used to reduce light spill and direct it only to where it is needed.

Bat mitigation measures during the Operational Phase will be reviewed by implementing a strict surveillance programme for the first three years of operation of the wind farm in order to identify if there exists a substantial risk at a particular turbine location or during a particular time-period (3 yrs - as per recommendation of NaturScot, 2021 guidelines). This surveillance will then be repeated at Year 10 and Year 20 of the operation of the wind farm to ensure that sufficient mitigation is being implemented. This surveillance required is as follows:

a) Bat activity surveillance

The level of bat activity will be monitored for a minimum of 10 nights at each turbine location (ground level) during three of the eight-month activity period (March/April to October/November). The surveillance periods will be divided into three survey periods to represent the three main periods where bat collisions have been documented: Spring (April/May); Summer (June/July) and Autumn (August/September).

b) Carcass search

During the surveillance periods of specific wind turbines, carcass search will be required for a minimum of 1 morning per turbine (i.e. 3/4 mornings in total over the 1 year surveillance i.e. one per surveillance period). For each turbine, the search area should

be 100m radius after ideal bat foraging weather conditions (mild, calm and dry weather and greater than 10°C). A scavenger trial is required to facilitate analysis (as per NaturScot, 2021 guidelines).

- c) For exact protocols consult most up-date best practice guidelines from current research publications / guidelines (e.g. NaturScot, 2021).
- d) Assessment of static data should be completed using the online tool *EcoBat Tool* as recommended by NaturScot, 2021 or other equivalent tool depending on most up to-date recommendations at the time of monitoring.

5.1.8 Bat Surveys – Age of Data

It is recommended that if three years lapse from between pre-construction surveys and prior to the commencement of construction, it may be necessary to repeat the pre-construction surveys (Rodrigues *et al.*, 2015). Surveys completed for this report concluded in Autumn 2024. Therefore, a review should be undertaken no later than Spring 2028. Future survey work will be completed according to best practice guidelines available.

5.1.9 Residual Effects

5.1.9.5 Construction Phase

Mitigation measures will be implemented during the Construction Phase to reduce the impacts of habitat loss, disturbance and risk of mortality and these mitigation measure include removal of tall vegetation around the proposed turbine locations. In addition, the Construction Phase will result in the loss of Potential Tree Roosts in trees and it is recommended that one building is removed (as a precautionary measure) to reduce roosting directly adjacent to a proposed turbine location. There is no direct impact on recorded bat roosts recorded during the surveys however, mitigation measures have been provided to protect any roosts located in vicinity of construction works. The proposed project would still result in a medium-term likely Significant residual effect at a local level, primarily due to habitat loss.

Construction activity associated with vegetation removal could result in reduced and fragmented commuting and foraging habitat. This may permanently alter the existing landscape to deter bats from commuting and foraging in vicinity of the proposed turbine locations. The proposed project would still result in a medium-term likely Significant residual effect at a local level, primarily due to habitat loss.

Mitigation measures will be implemented to ensure that lighting during construction would not significantly affect bats. Therefore, the proposed project will not result in any likely significant effects due to lighting on any bat species.

5.1.9.6 Operational Phase

Mitigation measures in the form of controls on wind turbine operation, vegetation control, lighting design etc. will be implemented and monitored during the operational phase. These measures will ensure that there would not be a significant negative effect on the local bat populations.

Therefore, the proposed project would not result in a likely significant negative residual effect on bats, at any geographical scale.

5.1.9.7 Conclusions

The survey area is deemed to have a Low to Medium landscape favourability for Irish bat species.

During bat surveys seven species of bat were recorded within the survey area and this is a high level of bat biodiversity. The level of bat activity recorded in 2024 was, in general, Low to Moderate but some Moderate to High levels were recorded on specific static units during surveillance, particularly for common pipistrelle, soprano pipistrelle and Leisler's bat.

Fourteen turbines are proposed as part of this wind farm development. Bat activity was recorded at all or in vicinity of the proposed turbine locations. Additional bat activity was recorded along much of the walking and driven transect routes while a lower level was recorded in open areas of bog compared to forest tracks and the local road network. But this is also a reflection of restricted survey locations during the hours of darkness.

One building, located within the proposed development area, was recorded as a bat Daytime roost for soprano pipistrelles (Building 4). This bat species is deemed a High Risk bat species in relation to wind farms. However, this roost is a Daytime Roost with a small number of bat roosting within the structure. Additional buildings were also recorded as bat roost but these were located outside the proposed development area. No roosts were confirmed in trees but PBRs were identified in vicinity of Turbine 9. These results were taken into consideration as part of the Risk Assessment for each proposed turbine location.

The result of the impact assessment for each of the turbine locations indicated that there are four High Risk turbines (T6, T7, T11 and T13) and three Medium Risk turbines (T9, T10 and T12).

The location of wind turbines is important in relation to their potential impact on local bat populations. To reduce impact on High-Risk species such as common pipistrelle, soprano pipistrelles and Leisler's bats, it is important to ensure that turbines are not located adjacent to the linear habitat features and habitat considered important for foraging bats. The proposed development will impact on local bat populations, particularly common pipistrelle, soprano pipistrelle and Leisler's bat. These three bat species are considered to be High Risk species in relation to wind farms. As a consequence, bat mitigation measures are required.

The mitigation measures recommended in this report will be implemented to reduce the long-term impact of the proposed wind farm on local bat populations. The proposed wind farm is likely to have an overall Moderate impact on local bat populations. The implementation of mitigation measures will reduce this to a Low Impact on local bat populations.

Monitoring (including acoustic surveillance and carcass surveys) is essential to determine that mitigation measures recommended are reducing the potential impacts on local bat populations. The operation of the wind farm will be flexible to implement changes, if recommended, by the monitoring results.

6. References

- Abbott, I. M., Butler, F. And Harrison, S. (2012) When flyways meet highways – the relative permeability of different motorway crossing sites to functionality diverse bat species. *Landscape and Urban Planning* 106 (4): 293-302.
- Abbott, I. M., Berthinessen, A., Stone, E., Booman, M., Melber, M. and Altringham, J. (2015) Bats and Roads, Chapter 5, pp/ 290-299. In: *Handbook of Road Ecology*. Editors: R. Van der Ree., D. J. Smidt and C. Grilo. Wiley Blackwell.
- Altringham, J. D. (2013) *British Bats*. Collins New Naturalist Library, Volume 93. Haper Collins, London.
- Altringham, J. And Kerth, G. (2016) Bats and Roads, Chapter 3. In: *Bats in the Anthropocene: Conservation of Bats in a Changing World*. Editors: C. C. Voigt and T. Kingston. Springer Open.
- Arnett, E. B., M. M. Huso, M. R. Schirmacher, and J. P. Hayes. (2011) Altering turbine speed reduces bat mortality at windenergy facilities. *Frontiers in Ecology and the Environment* 9:209–214
- Arnett EB, Brown WK, Erickson WP, Fiedler JK, Hamilton BL, Henry TH, Jain A, Johnson GD, Kerns J, Koford RR, Nicholson, CP, O'Connell TJ, Piorkowski MD, Tankersley RD (2008) Patterns of bat fatalities at wind energy facilities in North America. *Journal of Wildlife Management* 72:61–78.
- Aughney, T., Stephens, R. and Roche, N. (2021) Monthly roost counts of Lesser Horseshoe Bats (*Rhinolophus hipposideros* (Bechstein)) in a purpose-renovated building in Co. Galway. *Irish Naturalists' Journal* 37 (2):137-141.
- Aughney, T., Roche, N., & Langton, S (2018) The Irish Bat Monitoring Programme 2015-2017. *Irish Wildlife Manuals*, No. 103. National Parks and Wildlife Service, Department of Cultural heritage and the Gaeltacht, Ireland.
- Aughney, T., Roche, N. and Langton, S. (2022) Irish Bat Monitoring Programme 2018-2021. *Irish Wildlife Manuals*, No. 137. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.
- Baerwald, E.F, Barclay, R.M.R (2009) Geographic variation in activity and fatality of migratory bats at wind energy facilities. *Journal of Mammalogy* 90:1341–1349.
- Baerwald, E. F., J. Edworthy, M. Holder, and R. M. Barclay. (2009). A large-scale mitigation experiment to reduce bat fatalities at wind energy facilities. *Journal of Wildlife Management* 73:1077–1081.
- Barataud, M. (2016) *Acoustic Ecology of European bats: species identification, study of their habitats and foraging behaviour*. University of Chicago Press, Chicago, Illinois, 352pp.
- Barratt, E. M., Deauville, R., Burland, T. M., Bruford, M. W., Jones, G., Racey, P. A., & Wayne, R. K. (1997). DNA answers the call of pipistrelle bat species. *Nature* 387: 138 - 139.
- Bat Conservation Ireland (2015) BATLAS 2020 Pilot Project 2015: Volunteer Survey Manual. Version 01. www.batconservationireland.org.
- Bat Conservation Trust (2018) Bats and artificial lighting in the UK: bats and the built environment series. Guidance Note 08/2019. BCT, London.
- Bharddwaj, M., Soaner, K., Straka, T., Lahoz-Monfort, J., Lumsden, L. F. and van der Ree, R. (2017) Differential use of highway underpasses by bats. *Biological Conservation* 212: 22-28.

- Billington, G. E. & Norman, G. M. (1997). A report on the survey and conservation of bat roosts in bridges in Cumbria, Kendal. English Nature.
- BTHK (2018) Bat Roosts in Trees – A Guide to Identification and Assessment for Tree-Care and Ecology Professionals. Exeter: Pelagic Publishing.
- CIEEM (2016) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal (2nd Edition). CIEEM, Winchester.
- Collins, J. (ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd Edition). The Bat Conservation Trust, London.
- Collins, J. (ed.) (2023) Bat Surveys for Professional Ecologists: Good Practice Guidelines (4th Edition). The Bat Conservation Trust, London.
- Collins, J.H., Ross, A.J., Ferguson, J.A., Williams, C.D. & Langton, S.D. (2022) The implementation and effectiveness of bat roost mitigation and compensation measures for *Pipistrellus* and *Myotis* spp. and brown long-eared bat (*Plecotus auritus*) included in building development projects completed between 2006 and 2014 in England and Wales. Conservation Evidence: 17, 19-26.
- Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) 1982.
- Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention) 1979.
- Dietz, C., Helversen, O. and Dietmar, N. (2011) Bats of Britain, Europe & Northweat Africa. A&C Black, London.
- Downs, N.C., Beaton, V., Guest, J., Polanski, J., Robinson, S.L. and Racey, P.A. (2003) The effects of illuminating the roost entrance on the emergence behaviour of *Pipistrellus pygmaeus*. Biological Conservation 111, p. 247-252.
- EC Directive on The Conservation of Natural habitats and of Wild Fauna and Flora (HabitatsDirective) 1992.
- Eisenbeis G and Hassel F. (2000). Zur Anziehung nachtaktiver Insekten durch Straßenlaternen – eine Studie kommunaler Beleuchtungseinrichtungen in der Agrarlandschaft Reinhessens Attraction of nocturnal insects to street lights – a study of municipal lighting systems in a rural area of Rheinhessen (Germany)]. *Natur und Landschaft* 75: 145–56.
- Finch, D. & McAney, K. (2020) Using Circuitscape to identify potential landscape corridors for the lesser horseshoe bat in Ireland. Unpublished report for Vincent Wildlife Trust, Ledbury, UK.
- Frank K.D. (1988). Impact of outdoor lighting on moths: an assessment. *J Lepidop Soc* 42: 63–93.
- Gunnell, K., Grant, G. and Williams, C (2012) Landscape and urban design for bats and biodiversity. The Bat Conservation Trust, London.
- Hanski, I. (1998) Metapopulation Dynamics. *Nature*, 396, 41-49.
- Holker, F., Wolter, C., Perkin, E.K. & Tockner, K. (2010). Light pollution as a biodiversity threat. *Trends Ecol. Evol.* 25, 681–682. <https://doi.org/10.1016/j.tree.2010.09.007>.
- Hulme 2014: Bridging the knowing–doing gap: know-who, know-what, know-why, know-how and know-when. *Journal of Applied Ecology*, 51, 1131-1136.
- Hundt, L. (2012) Bat Surveys: Good Practice Guidelines (2nd Edition). The Bat Conservation Trust, London.

Kelleher, C. & Marnell, F. (2006) Bat Mitigation Guidelines for Ireland. Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Kolligs D. 2000. Ökologische Auswirkungen künstlicher Lichtquellen auf nachtaktive Insekten, insbesondere Schmetterlinge (Lepidoptera) [Ecological effects of artificial light sources on nocturnally active insects, in particular on moths (Lepidoptera)]. *Faunistisch-Ökologische Mitteilungen Suppl* **28**: 1–136.

Lintott, P.R., Richardson, S.M., Hosken, D.J., Fensome, S.A. & Mathews, F. (2021) Ecological impact assessments fail to reduce risk of bat casualties at wind farms. *Curr. Biol.* **26**, R1135-1136.

Lintott P. & Mathews F. (2018) *Reviewing the evidence on mitigation strategies for bats in buildings: informing best-practice for policy makers and practitioners*. CIEEM Commissioned Report

Longcore T. and Rich C. (2004). Ecological light pollution. *Frontiers in Ecology and Environment*. **2**: 191-198.

Lundy, M.G., Montgomery, I.W., Roche, N. & Aughney, T. (2011). *Landscape Conservation for Irish Bats & Species Specific Roosting Characteristics* (Unpublished). Bat Conservation Ireland, Cavan, Ireland.

Lysaght, L. and Marnell, F. (eds) (2016) Atlas of Mammals in Ireland 2010-2015, National Biodiversity Data Centre, Waterford.

Lyons, F. (2014) GIS desktop project: Mapping a future of the Lesser horseshoe bat – a study of its population fragmentation in Limerick and north Kerry. Unpublished report for the Vincent Wildlife Trust, Ledbury, UK.

Marnell, F., Kingston, N. & Looney, D. (2009) *Ireland Red List No. 3: Terrestrial Mammals*, National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

Marnell, F., Looney, D. & Lawton, C. (2019) Ireland Red List No. 12: Terrestrial Mammals. National Parks and Wildlife Service, Department of the Culture, Heritage and the Gaeltacht, Dublin, Ireland.

Marnell, F., Kelleher, C. & Mullen, E. (2022) Bat mitigation guidelines for Ireland v2. Irish Wildlife Manuals, No. 134. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.

Martín, B.; Pérez, H.; Ferrer, M. Light-Emitting Diodes (LED): A Promising Street Light System to Reduce the Attraction to Light of Insects. *Diversity* **2021**, *13*, 89. <https://doi.org/10.3390/d13020089>.

Mathews, F., Roche, N., Aughney, T., Jones, N.M. Day, J., Baker, J. and Langton, S. (2015) Barriers and benefits: implications of artificial night-lighting for the distribution of common bats in Britain and Ireland. *Philosophical Transactions of the Royal Society of London B* **370** (1667), doi: 10.1098/rstb.2014.0124.

McAney, K. (2006) A conservation plan for Irish vesper bats, Irish Wildlife Manual No. 20 National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

McAney, K. (2014). An overview of *Rhinolophus hipposideros* in Ireland (1994-2014). *Vespertilio* **17**, 115–125.

McAney, K., O'Mahony, C., Kelleher, C., Taylor, A. & Biggane, S. (2013). *The Lesser Horseshoe Bat in Ireland: Surveys by The Vincent Wildlife Trust*. Belfast, Northern Ireland: Irish Naturalists' Journal.

Mullen, E. (2007). Brandt's Bat *Myotis brandtii* in Co. Wicklow. Irish Naturalists' Journal **28**: 343.

- Norberg U.M. and Rayner J.M.V. (1987). Ecological morphology and flight in bats (Mammalia; Chiroptera): wing adaptations, flight performance, foraging strategy and echolocation. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*. **316**: 335-427.
- NPWS & VWT (2022) Lesser Horseshoe Bat Species Action Plan 2022- 2026. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage, Ireland.
- NPWS (2018) Conservation objectives supporting document – lesser horseshoe bat (*Rhinolophus hipposideros*) Version 1. Conservation Objectives Supporting Document Series. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Dublin, Ireland
- O’Sullivan, P. (1994). *Bats in Ireland*. Special supplement to the Irish Naturalists’ Journal.
- Rich, C. & Longcore, T. (eds). 2006 Ecological consequences of artificial night lighting. Washington, DC: Island Press
- Richardson, P. (2000). *Distribution atlas of bats in Britain and Ireland 1980 - 1999*. The Bat Conservation Trust, London, UK.
- Richardson, S.M., Lintott, P.R., Hosken, D.J., Economou, T. & Mathews, F. (2021) Peaks in bat activity at turbines and the implications for mitigating the impact of wind energy developments on bats. *NaturePortfolio*, 11;3636. www.nature.com/scientific-reports.
- Roche, N., Aughney, T. & Langton, S. (2015). *Lesser Horseshoe Bat: population trends and status of its roosting resource* (No. 85). , Irish Wildlife Manuals. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.
- Roche, N., Langton, S. & Aughney, T. (2012). *Lesser Horseshoe Bat: Population, Trends and Threats 1986 to 2012* (Unpublished). Bat Conservation Ireland, Cavan, Ireland.
- Roche, N., Aughney, T., Marnell, F. & Lundy, M. (2014). *Irish Bats in the 21st Century*. Bat Conservation Ireland, Cavan, Ireland.
- Rodrigues, L., Bach, L., Duborg-Savage, M.J., Karapandza, B., Kovak, D., Kervyn, T., Dekker, J., Kepel, A., Back, P., Collins, J., Harbusch, C., Park, K., Micevski, B., Minderman, J. (2015) Guidelines for consideration of bats in wind farm projects – Revision 2014. EUROBATS Publication Series No. 6 (English Version). UNEP/EUROBATS Secretariat, Bonn, Germany, 133 pp.
- Rowse EG, Harris S, Jones G. 2018 Effects of dimming light-emitting diode street lights on light-opportunistic and light-averse bats in suburban habitats. *R.Soc. open sci.* **5**: 180205. <http://dx.doi.org/10.1098/rsos.180205>
- Russ, J. (2012) *British Bat Calls: A guide to species identification*. Pelagic Publishing, Exeter.
- Russo, D., Cistrone, L., Libralato, N., Korine, C., Jones, G. & Ancillotto, L. (2017). Adverse effects of artificial illumination on bat drinking activity. *Anim. Conserv.* **20**, 492–501. <https://doi.org/10.1111/acv.12340>.
- Rydell J. (1992). Exploitation of insects around streetlamps by bats in Sweden. *Functional Ecology* **6**: 744-750.
- Rydell J. (2006). Bats and their insect prey at streetlights. In C. Rich and T. Longcore (eds.) *Ecological Consequences of Artificial Night Lighting*. 43-60.

- Rydell J. and Racey P.A. (1995). Street lamps and the feeding ecology of insectivorous bats. In P.A. Racey and S.M. Swift (eds.) *Ecology, evolution and behaviour of bats. Symposia of the Zoological Society of London*. **67** pp 291-307. Clarendon Press, Oxford.
- Schofield, H. (2008). *The Lesser Horseshoe Bat Conservation Handbook*. Herefordshire, England: The Vincent Wildlife Trust.
- Scottish Natural Heritage et al (2021) *Bats and onshore wind turbines – survey, assessment and mitigation*. <https://www.nature.scot/bats-and-onshore-wind-turbines-survey-assessment-andmitigation>. (August 2021 - version updated)
- Scottish Natural Heritage et al (2019) *Bats and onshore wind turbines – survey, assessment and mitigation*. <https://www.nature.scot/bats-and-onshore-wind-turbines-survey-assessment-andmitigation>.
- Speakman, J.R. (1991) Why do insectivorous bats in Britain not fly in daylight more frequently? *Funct. Ecol.* **5**, 518–524.
- Stebbing, R. E. & Walsh, S. T. (1991) *Bat Boxes: A guide to the history, function, construction and use in the conservation of bats*. The Bat Conservation Trust, 1991.
- Stone, E., Jones, G. and Harris, S. (2009). Street lighting disturbs commuting bats. *Current Biology*, **19**: 1123-1127.
- Stone, E. L., Jones, G., and Harris, S. (2012). Conserving energy at a cost to biodiversity? Impacts of LED lighting on bats. *Global Change Biology* **18**, 2458–2465. doi:10.1111/j.1365-2486.2012.02705.x
- Stone EL, Harris S, Jones G. 2015 Impacts of artificial lighting on bats: a review of challenges and solutions. *Mammal. Biol.* **80**, 213–219. (doi:10.1016/j.mambio.2015.02.004)
- Svensson A.M. and Rydell J. (1998). Mercury vapour lamps interfere with bat defence of tympanate moths (*Operophtera* spp.; Geometridae). *Animal Behaviour* **55**: 223-226.
- Voigt C.C., Azam, C., Dekker, J., Feguson, J., Fritze, M., Gazaryan, S., Holker, F., Jones, G., Leader, N., Limpens, H.J.G.A., Mathews, F., Rydell, J., Schofield, H., Spoelstra, K., Zagnajster, M. (2018) Guidelines for consideration of bats in lighting projects. EUORBATS Publication Series No. 8. UNEP/EUROBATS Secretariat, Bonn.
- Wakefield, A., Broyles, M., Stone, E.L., Jones, G. & Harris, S. (2016). Experimentally comparing the attractiveness of domestic lights to insects: Do LEDs attract fewer insects than conventional light types? *Ecol. Evol.* **6**, 8028–8036. <https://doi.org/10.1002/ece3.2527>.
- Whilde, A. (1993). *Threatened mammals, birds, amphibians and fish in Ireland. Irish Red Data Book 2: Vertebrates*. Belfast: HMSO.
- Wildlife Act 1976 and Wildlife [Amendment] Act 2000. Government of Ireland.
- Wilson, R., Wakefield, A., Roberts, N. and Jones, G. (2021) Artificial light and biting flies: the parallel development of attractive light traps and unattractive domestic lights. *Parasite & Vectors*. <https://doi.org/10.1186/s13071-020-04530-3>.
- Wray, S., Wells, D., Long, E. & Mitchell-Jones, T. (2010) *Valuing Bats in Ecological Impact Assessment*. IEEM In-Practice p. 23-25.

Zeale, M.R.K., Stone, E.L., Zeale, E., Browne, W.J., Harris, S. & Jones, G. (2018). Experimentally manipulating light spectra reveals the importance of dark corridors for commuting bats. *Glob. Chang. Biol.* 24, 5909–5918. <https://doi.org/10.1111/gcb.14462>.

Appendix I: Static Surveillance Bat Survey Data

Table A: All static surveillance data collated in Spring 2024.

EcoBat Code	Static ITM Easting	Static ITM Northing	Start Date	End Date	No. of Nights
Spring 1	592580	844201	12/04/2024	25/04/2024	13
Spring 2	592259	842863	10/04/2024	22/04/2024	12
Spring 3	591618	844296	12/04/2024	21/04/2024	10
Spring 4	593155	841050	11/04/2024	21/04/2024	10
Spring 5	593786	841544	10/04/2024	20/04/2024	10
Spring 6	591945	843298	11/04/2024	23/04/2024	12
Spring 7	593477	840721	11/04/2024	21/04/2024	10
Spring 8	591591	842360	11/04/2024	23/04/2024	12
Spring 9	593089	841564	11/04/2024	23/04/2024	12
Spring 10	592655	843783	12/04/2024	27/04/2024	15
Spring 11	590799	842488	11/04/2024	27/04/2024	16
Spring 12	591808	844114	12/04/2024	27/04/2024	15
Spring 13	592484	842400	11/04/2024	27/04/2024	16
Spring 14	591478	842880	11/04/2024	27/04/2024	16
Spring 15	592834	843322	11/04/2024	27/04/2024	16
Spring 16	590859	841995	11/04/2024	27/04/2024	16

Table B: All static surveillance data collated in Summer 2024.

EcoBat Code	Static ITM Easting	Static ITM Northing	Start Date	End Date	No. of Nights
Summer 1	592605	844296	18/06/2024	30/06/2024	12
Summer 2	591889	844066	18/06/2024	30/06/2024	12
Summer 3	591725	844282	18/06/2024	29/06/2024	11
Summer 4	592738	843839	18/06/2024	29/06/2024	11
Summer 5	592706	843318	18/06/2024	30/06/2024	12
Summer 6	592101	843458	18/06/2024	30/06/2024	12
Summer 7	591618	844296	18/06/2024	01/07/2024	13
Summer 8	592301	842388	18/06/2024	01/07/2024	13
Summer 9	593237	840542	19/06/2024	01/07/2024	13
Summer 10	591590	842362	18/06/2024	01/07/2024	13
Summer 11	590783	842506	18/06/2024	28/06/2024	10
Summer 12	590889	841980	18/06/2024	30/06/2024	12
Summer 13	593076	841562	19/06/2024	01/07/2024	13
Summer 14	593709	841578	19/06/2024	29/06/2024	10
Summer 15	592247	842835	08/07/2024	22/07/2024	14
Summer 16	591541	842887	08/07/2024	22/07/2024	14

Table C: All static surveillance data collated in Autumn 2024.

EcoBat Code	Static ITM Easting	Static ITM Northing	Start Date	End Date	No. of Nights
Autumn 1	592608	844301	19/08/2024	05/09/2024	17
Autumn 2	591875	844164	19/08/2024	05/09/2024	17
Autumn 3	591618	844296	19/08/2024	05/09/2024	17
Autumn 4	592732	843841	19/08/2024	05/09/2024	17
Autumn 5	592707	843320	19/08/2024	05/09/2024	17
Autumn 6	592095	843457	19/08/2024	05/09/2024	17
Autumn 7	592249	842838	19/08/2024	05/09/2024	17
Autumn 8	592290	842367	19/08/2024	05/09/2024	17
Autumn 9	591544	842895	19/08/2024	05/09/2024	17
Autumn 10	591592	842371	19/08/2024	05/09/2024	17
Autumn 11	590792	842471	19/08/2024	27/08/2024	8
Autumn 12	590878	841970	19/08/2024	05/09/2024	17
Autumn 13	593093	841572	19/08/2024	05/09/2024	17
Autumn 14	593708	841577	19/08/2024	05/09/2024	17
Autumn 15	593191	841076	19/08/2024	05/09/2024	17
Autumn 16	593239	840547	19/08/2024	05/09/2024	17

Appendix II: Relevant Legislation

Relevant Legislations & Bat Species Status in Ireland

All Irish bat species are protected under the Irish Wildlife Act (1976) and Wildlife Amendment Acts (2000 and 2010). Also, the EC Directive on The Conservation of Natural habitats and of Wild Fauna and Flora (Habitats Directive 1992), seeks to protect rare species, including bats, and their habitats and requires that appropriate monitoring of populations be undertaken. All Irish bats are listed in Annex IV of the Habitats Directive and the lesser horseshoe bat *Rhinolophus hipposideros* is further listed under Annex II. Across Europe, they are further protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), which, in relation to bats, exists to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries. The Irish government has ratified both these conventions.

Irish Statutory Provisions

A small number of animals and plants are protected under Irish legislation (Nelson, *et al.*, 2019). The principal statutory provisions for the protection of animal and plant species are under the Wildlife Act 1976 (as amended) and the European Communities (Birds and Natural Habitats) Regulations 2011, as amended. The Flora (Protection) Order 2015 (S.I. no. 356 of 2015) lists the plant species protected by Section 21 of the Wildlife Acts. See www.npws.ie/legislation for further information.

The codes used for national legislation are as follows:

- WA = Wildlife Act, 1976, Wildlife (Amendment) Act, 2000 and other relevant amendments
- FPO = Flora (Protection) Order, 2015 (S.I. No. 356 of 2015)

EU Legislation

The Birds Directive (Directive 2009/147/EC) and Habitats Directive (Council Directive 92/43/EEC) are the legislative instruments which are transposed into Irish law, *inter alia*, by the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. No. 477 of 2011) ('the 2011' Regulations), as amended.

The codes used for the Habitats Directive (Council Directive 92/43/EEC) are:

- Annex II Animal and plant species listed in Annex II
- Annex IV Animal and plant species listed in Annex IV
- Annex V Animal and plant species listed in Annex V

The main aim of the Habitats Directive is the conservation of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species listed on the Annexes to the Directive at a favourable conservation status. These annexes list habitats (Annex I) and species (Annexes II, IV and V) which are considered threatened in the EU territory. The listed habitats and species represent a considerable proportion of biodiversity in Ireland and the Directive itself is one of the most important pieces of legislation governing the conservation of biodiversity in Europe.

Under Article 11 of the Directive, each member state is obliged to undertake surveillance of the conservation status of the natural habitats and species in the Annexes and under Article

17, to report to the European Commission every six years on their status and on the implementation of the measures taken under the Directive. In April 2019, Ireland submitted the third assessment of conservation status for 59 habitats and 60 species. There are three volumes with the third listing details of the species assessed.

Article 12 of the Habitats Directive requires Member States to take measures for the establishment of a strict protection regime for animal species listed in Annex IV(a) of the Habitats Directive within the whole territory of Member States. Article 16 provides for derogation from these provisions under defined conditions. These provisions are implemented under Regulations 51 and 54 of the 2011 Regulations.

IUCN Red Lists

The International Union for the Conservation of Nature (IUCN) coordinates the Red Listing process at the global level, defining the categories so that they are standardised across all taxa. Red Lists are also produced at regional, national and subnational levels using the same IUCN categories (IUCN 2012, 2019). Since 2009, Red Lists have been produced for the island of Ireland by the National Parks and Wildlife Service (NPWS) and the Northern Ireland Environment Agency (NIEA) using these IUCN categories. To date, 13 Red Lists have been completed. The Red Lists are an assessment of the risk of extinction of each species and not just an assessment of their rarity. Threatened species are those species categorised as Critically Endangered, Endangered or Vulnerable (IUCN, 2019) – also commonly referred to as ‘Red Listed’.

Irish Red List - Mammals

Red Lists in Ireland refer to the whole island, i.e. including Northern Ireland, and so follow the guidelines for regional assessments (IUCN, 2012, 2019). The abbreviations used are as follows:.

- RE Regionally Extinct
- CR Critically Endangered
- EN Endangered
- VU Vulnerable
- NT Near Threatened
- DD Data Deficient
- LC Least Concern
- NA Not Assessed
- NE Not Evaluated

There are 27 terrestrial mammals species in Ireland, which includes the nine resident bat species listed. The terrestrial mammal, according to Marnell *et al.*, 2019, list for Ireland consists of all terrestrial species native to Ireland or naturalised in Ireland before 1500. The IUCN Red List categories and criteria are used to assess that status of wildlife. This was recently completed for the terrestrial mammals of Ireland. Apart from the two following two mammal species (grey wolf *Canis lupus* (regionally extinct) and black rat *Rattus rattus* (Vulnerable)), the remaining 25 species were assessed as least concern in the most recent IUCN Red List publication by NPWS (Marnell *et al.*, 2019).

Irish Bat Species

All Irish bat species are protected under the Wildlife Act (1976) and Wildlife Amendment Acts (2000 and 2010). Also, the EC Directive on The Conservation of Natural habitats and of Wild Fauna and Flora (Habitats Directive 1992), seeks to protect rare species, including bats, and their habitats and requires that appropriate monitoring of populations be undertaken. All Irish bats are listed in Annex IV of the Habitats Directive and the lesser horseshoe bat *Rhinolophus hipposideros* is further listed under Annex II. Across Europe, they are further protected under the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982), which, in relation to bats, exists to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was instigated to protect migrant species across all European boundaries. The Irish government has ratified both these conventions.

Also, under existing legislation, the destruction, alteration or evacuation of a known bat roost is an offence. The most recent guidance document is “Guidance document on the strict protection of animal species of Community interest un the Habitats Directive (Brussels, 12.10.2021 C(2021) 7391 final”.

Regulation 51(2) of the 2011 Regulations provides –

“(2) Notwithstanding any consent, statutory or otherwise, given to a person by a public authority or held by a person, except in accordance with a licence granted by the Minister under Regulation 54, a person who in respect of the species referred to in Part 1 of the First Schedule—

(a) deliberately captures or kills any specimen of these species in the wild, (b) deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration,

(c) deliberately takes or destroys eggs of those species from the wild,

(d) damages or destroys a breeding site or resting place of such an animal, or

(e) keeps, transports, sells, exchanges, offers for sale or offers for exchange any specimen of these species taken in the wild, other than those taken legally as referred to in Article 12(2) of the Habitats Directive,

shall be guilty of an offence.”

The grant of planning permission does not permit the commission of any of the above acts or render the requirement for a derogation licence unnecessary in respect of any of those acts.

Any works interfering with bats and especially their roosts, may only be carried out under a derogation licence granted by National Parks and Wildlife Service (NPWS) pursuant to Regulation 54 of the European Communities (Birds and Natural Habitats) Regulations 2011 (which transposed the EU Habitats Directive into Irish law).

There are eleven recorded bat species in Ireland, nine of which are considered resident on the island. Eight resident bat species and one of the vagrant bat species are vesper bats and all vespertilionid bats have a tragus (cartilaginous structure inside the pinna of the ear). Vesper bats are distributed throughout the island. Nathusius' pipistrelle *Pipistrellus nathusii* is a recent

addition while the Brandt's bat has only been recorded once to-date (Only record confirmed by DNA testing, all other records have not been genetically confirmed). The ninth resident species is the lesser horseshoe bat *Rhinolophus hipposideros*, which belongs to the Rhinolophidea and has a complex nose leaf structure on the face, distinguishing it from the vesper bats. This species' current distribution is confined to the western seaboard counties of Mayo, Galway, Clare, Limerick, Kerry and Cork. The eleventh bat species, the greater horseshoe bat, was only recorded for the first time in February 2013 in County Wexford and is therefore considered to be a vagrant species. A total of 41 SACs have been designated for the Annex II species lesser horseshoe bat (1303), of which nine have also been selected for the Annex I habitat 'Caves not open to the public' (8310).

Irish bat species list is presented in Table A along with their current status.

Table D: Status of the Irish bat fauna (Marnell *et al.*, 2019).

Species: Common Name	Irish Status	European Status	Global Status
Resident Bat Species ^			
Daubenton's bat <i>Myotis daubentonii</i>	Least Concern	Least Concern	Least Concern
Whiskered bat <i>Myotis mystacinus</i>	Least Concern	Least Concern	Least Concern
Natterer's bat <i>Myotis nattereri</i>	Least Concern	Least Concern	Least Concern
Leisler's bat <i>Nyctalus leisleri</i>	Least Concern	Least Concern	Least Concern
Nathusius' pipistrelle <i>Pipistrellus nathusii</i>	Least Concern	Least Concern	Least Concern
Common pipistrelle <i>Pipistrellus pipistrellus</i>	Least Concern	Least Concern	Least Concern
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	Least Concern	Least Concern	Least Concern
Brown long-eared bat <i>Plecotus auritus</i>	Least Concern	Least Concern	Least Concern
Lesser horseshoe bat <i>Rhinolophus hipposideros</i>	Least Concern	Least Concern	Least Concern
Possible Vagrants ^			
Brandt's bat <i>Myotis brandtii</i>	Data deficient	Least Concern	Least Concern
Greater horseshoe bat <i>Rhinolophus ferrumequinum</i>	Data deficient	Near threatened	Near threatened

^ Roche *et al.*, 2014

6.1.1 NPWS Article 17 Reporting

NPWS (2019) provides details on the conservation status for each of Ireland's bat species along with distribution maps. The following table summarises the conclusions of Article 17 assessment of conservation status at the end of the most recent reporting period. Additional information for each of the bat species provides some clarifying notes in relation to the

Appendix III:
Bat Survey Data – Dusk Surveys, Walking
& Driving Transects

Table F: All bat data recorded during dusk and dawn surveys, walking transects and driving transects.

DATE	TIME	MANUAL ID	MODEL	Easting ITM	Northing ITM	Survey Type
16/04/2021	29:52.1	Daubenton's bat	Scout	591147	841647	Transects
16/04/2021	30:02.1	Natterer's bat	Scout	591065	841800	Transects
16/04/2021	45:13.0	Natterer's bat	Scout	591160	841643	Transects
16/04/2021	45:23.0	Myotis species	Scout	590376	842366	Transects
16/04/2021	45:33.0	Myotis species	Scout	590342	842379	Transects
16/04/2021	45:43.0	Common pipistrelle	Scout	590069	841920	Transects
16/04/2021	45:53.0	Common pipistrelle	Scout	591247	840051	Transects
16/04/2021	46:03.0	Common pipistrelle	Scout	591591	840347	Transects
16/04/2021	46:13.0	Common pipistrelle	Scout	589879	841776	Transects
16/04/2021	46:23.0	Common pipistrelle	Scout	589459	841239	Transects
16/04/2021	46:33.0	Common pipistrelle	Scout	590250	843707	Transects
16/04/2021	46:43.0	Common pipistrelle	Scout	591194	840016	Transects
16/04/2021	46:53.0	Common pipistrelle	Scout	589794	841655	Transects
16/04/2021	47:03.0	Common pipistrelle	Scout	589500	841303	Transects
16/04/2021	47:13.0	Common pipistrelle	Scout	589385	841116	Transects
16/04/2021	47:23.0	Common pipistrelle	Scout	589126	840777	Transects
16/04/2021	47:33.0	Common pipistrelle	Scout	588970	840640	Transects
16/04/2021	47:43.0	Common pipistrelle	Scout	590245	843735	Transects
16/04/2021	47:53.0	Common pipistrelle	Scout	591321	840079	Transects
16/04/2021	48:03.0	Common pipistrelle	Scout	591167	839972	Transects
16/04/2021	48:13.0	Common pipistrelle	Scout	591159	839960	Transects
16/04/2021	48:23.0	Common pipistrelle	Scout	591356	840205	Transects
16/04/2021	23:30:07	Common pipistrelle	M2	591219	840040	Transects
16/04/2021	48:33.0	Soprano pipistrelle	Scout	590245	843735	Transects
16/04/2021	48:43.0	Soprano pipistrelle	Scout	591321	840079	Transects
16/04/2021	48:53.0	Soprano pipistrelle	Scout	591167	839972	Transects
16/04/2021	49:03.0	Soprano pipistrelle	Scout	591159	839960	Transects
16/04/2021	49:13.0	Soprano pipistrelle	Scout	591356	840205	Transects
16/04/2021	49:23.0	Soprano pipistrelle	Scout	591050	839659	Transects
16/04/2021	49:33.0	Soprano pipistrelle	Scout	590246	843637	Transects
16/04/2021	49:43.0	Soprano pipistrelle	Scout	590246	843688	Transects
16/04/2021	49:53.0	Soprano pipistrelle	Scout	590253	843817	Transects
16/04/2021	50:03.0	Soprano pipistrelle	Scout	590250	843762	Transects
16/04/2021	50:13.0	Soprano pipistrelle	Scout	590249	843654	Transects
16/04/2021	50:23.0	Soprano pipistrelle	Scout	590249	843601	Transects
16/04/2021	50:33.0	Soprano pipistrelle	Scout	592007	840555	Transects
16/04/2021	50:43.0	Soprano pipistrelle	Scout	591702	840450	Transects
16/04/2021	50:53.0	Soprano pipistrelle	Scout	591653	840421	Transects
16/04/2021	51:03.0	Soprano pipistrelle	Scout	591616	840379	Transects
16/04/2021	51:13.0	Soprano pipistrelle	Scout	591579	840334	Transects
16/04/2021	51:23.0	Soprano pipistrelle	Scout	591540	840307	Transects
16/04/2021	51:33.0	Soprano pipistrelle	Scout	591431	840265	Transects
16/04/2021	51:43.0	Soprano pipistrelle	Scout	591383	840230	Transects
16/04/2021	51:53.0	Soprano pipistrelle	Scout	591350	840187	Transects
16/04/2021	52:03.0	Soprano pipistrelle	Scout	591342	840129	Transects
16/04/2021	52:13.0	Soprano pipistrelle	Scout	591204	840027	Transects
16/04/2021	52:23.0	Soprano pipistrelle	Scout	591087	839873	Transects
16/04/2021	52:33.0	Soprano pipistrelle	Scout	591076	839809	Transects
16/04/2021	52:43.0	Soprano pipistrelle	Scout	590858	839524	Transects
16/04/2021	52:53.0	Soprano pipistrelle	Scout	590907	839527	Transects
16/04/2021	53:03.0	Soprano pipistrelle	Scout	591116	839909	Transects
16/04/2021	53:13.0	Soprano pipistrelle	Scout	591408	840251	Transects
16/04/2021	53:23.0	Soprano pipistrelle	Scout	591632	840402	Transects
16/04/2021	53:33.0	Soprano pipistrelle	Scout	591686	840442	Transects
16/04/2021	53:43.0	Soprano pipistrelle	Scout	591747	840473	Transects
16/04/2021	53:53.0	Soprano pipistrelle	Scout	591807	840498	Transects

16/04/2021	54:03.0	Soprano pipistrelle	Scout	592001	840531	Transects
16/04/2021	54:13.0	Soprano pipistrelle	Scout	592005	840583	Transects
16/04/2021	54:23.0	Soprano pipistrelle	Scout	592004	840639	Transects
16/04/2021	54:33.0	Soprano pipistrelle	Scout	590486	842357	Transects
16/04/2021	54:43.0	Soprano pipistrelle	Scout	590407	842355	Transects
16/04/2021	22:01:15	Soprano pipistrelle	Walkabout	591309	843086	Transects
16/04/2021	21:01:34	Soprano pipistrelle	M2	589072	840795	Transects
16/04/2021	21:01:36	Soprano pipistrelle	M2	589081	840807	Transects
16/04/2021	23:17:18	Soprano pipistrelle	M2	593541	840696	Transects
16/04/2021	23:27:33	Soprano pipistrelle	M2	592007	840570	Transects
16/04/2021	23:27:58	Soprano pipistrelle	M2	591871	840507	Transects
16/04/2021	23:28:32	Soprano pipistrelle	M2	591646	840419	Transects
16/04/2021	23:28:40	Soprano pipistrelle	M2	591618	840385	Transects
16/04/2021	23:28:47	Soprano pipistrelle	M2	591584	840342	Transects
16/04/2021	23:30:15	Soprano pipistrelle	M2	591183	839997	Transects
16/04/2021	23:30:17	Soprano pipistrelle	M2	591176	839986	Transects
16/04/2021	23:30:40	Soprano pipistrelle	M2	591094	839878	Transects
16/04/2021	54:53.0	Brown long-eared bat	Scout	590315	842384	Transects
16/04/2021	55:03.0	Brown long-eared bat	Scout	590250	842383	Transects
09/05/2021	22:25:39	Natterer's bat	M2	590832	842469	Transects
09/05/2021	22:26:03	Natterer's bat	M2	590797	842483	Transects
09/05/2021	22:26:26	Natterer's bat	M2	590781	842511	Transects
09/05/2021	22:27:27	Natterer's bat	M2	590716	842551	Transects
09/05/2021	21:56:27	Leisler's bat	M2	590682	842549	Transects
09/05/2021	21:56:28	Leisler's bat	M2	590682	842549	Transects
09/05/2021	21:56:29	Leisler's bat	M2	590682	842549	Transects
09/05/2021	23:47:02	Leisler's bat	M2	593225	841452	Transects
09/05/2021	23:47:06	Leisler's bat	M2	593222	841455	Transects
09/05/2021	23:51:38	Leisler's bat	M2	593020	841589	Transects
09/05/2021	23:58:26	Leisler's bat	M2	593150	841452	Transects
09/05/2021	21:52:01	Common pipistrelle	M2	589849	841721	Transects
09/05/2021	21:59:49	Common pipistrelle	M2	590706	842551	Transects
09/05/2021	22:00:03	Common pipistrelle	M2	590722	842555	Transects
09/05/2021	22:00:13	Common pipistrelle	M2	590734	842556	Transects
09/05/2021	22:00:33	Common pipistrelle	M2	590759	842552	Transects
09/05/2021	22:03:20	Common pipistrelle	M2	590939	842509	Transects
09/05/2021	22:26:30	Common pipistrelle	M2	590779	842514	Transects
09/05/2021	22:27:46	Common pipistrelle	M2	590695	842543	Transects
09/05/2021	22:33:51	Common pipistrelle	M2	590939	842824	Transects
09/05/2021	23:16:53	Common pipistrelle	M2	592568	842213	Transects
09/05/2021	23:16:57	Common pipistrelle	M2	592574	842202	Transects
09/05/2021	23:28:50	Common pipistrelle	M2	592517	841123	Transects
09/05/2021	23:28:52	Common pipistrelle	M2	592528	841116	Transects
09/05/2021	23:29:24	Common pipistrelle	M2	592710	841168	Transects
09/05/2021	23:38:28	Common pipistrelle	M2	593141	841026	Transects
09/05/2021	23:56:57	Common pipistrelle	M2	593019	841488	Transects
09/05/2021	23:57:04	Common pipistrelle	M2	593026	841482	Transects
09/05/2021	23:57:11	Common pipistrelle	M2	593038	841477	Transects
09/05/2021	23:57:24	Common pipistrelle	M2	593056	841474	Transects
09/05/2021	23:57:40	Common pipistrelle	M2	593079	841467	Transects
09/05/2021	21:48:15	Soprano pipistrelle	M2	589016	840677	Transects
09/05/2021	21:48:38	Soprano pipistrelle	M2	589112	840770	Transects
09/05/2021	21:51:32	Soprano pipistrelle	M2	589746	841600	Transects
09/05/2021	22:00:33	Soprano pipistrelle	M2	590759	842552	Transects
09/05/2021	22:00:57	Soprano pipistrelle	M2	590776	842520	Transects
09/05/2021	22:01:11	Soprano pipistrelle	M2	590781	842504	Transects
09/05/2021	22:01:26	Soprano pipistrelle	M2	590789	842486	Transects
09/05/2021	22:01:36	Soprano pipistrelle	M2	590796	842475	Transects
09/05/2021	22:03:58	Soprano pipistrelle	M2	590984	842525	Transects

09/05/2021	22:05:34	Soprano pipistrelle	M2	591094	842447	Transects
09/05/2021	22:26:30	Soprano pipistrelle	M2	590779	842514	Transects
09/05/2021	23:29:18	Soprano pipistrelle	M2	592680	841151	Transects
09/05/2021	23:29:24	Soprano pipistrelle	M2	592710	841168	Transects
10/05/2021	00:29:04	Common pipistrelle	M2	593133	841020	Transects
10/05/2021	00:36:31	Common pipistrelle	M2	593139	841014	Transects
10/05/2021	00:38:28	Common pipistrelle	M2	593138	841016	Transects
10/05/2021	00:38:59	Common pipistrelle	M2	593136	841018	Transects
10/05/2021	00:46:44	Common pipistrelle	M2	593833	840711	Transects
10/05/2021	00:48:09	Common pipistrelle	M2	594323	840780	Transects
10/05/2021	00:48:35	Common pipistrelle	M2	594465	840833	Transects
10/05/2021	00:49:00	Common pipistrelle	M2	594596	840853	Transects
10/05/2021	00:50:17	Common pipistrelle	M2	594715	840864	Transects
10/05/2021	00:56:53	Common pipistrelle	M2	592502	840668	Transects
10/05/2021	00:57:04	Common pipistrelle	M2	592448	840682	Transects
10/05/2021	01:00:16	Common pipistrelle	M2	591595	840350	Transects
10/05/2021	01:01:06	Common pipistrelle	M2	591353	840195	Transects
10/05/2021	01:01:44	Common pipistrelle	M2	591248	840050	Transects
10/05/2021	00:52:04	Soprano pipistrelle	M2	594154	840756	Transects
10/05/2021	00:57:04	Soprano pipistrelle	M2	592448	840682	Transects
10/05/2021	00:57:31	Soprano pipistrelle	M2	592301	840662	Transects
10/05/2021	00:58:30	Soprano pipistrelle	M2	592055	840606	Transects
10/05/2021	00:58:36	Soprano pipistrelle	M2	592038	840624	Transects
10/05/2021	00:58:50	Soprano pipistrelle	M2	592009	840571	Transects
10/05/2021	00:59:30	Soprano pipistrelle	M2	591815	840501	Transects
10/05/2021	00:59:41	Soprano pipistrelle	M2	591750	840475	Transects
10/05/2021	01:00:02	Soprano pipistrelle	M2	591646	840414	Transects
10/05/2021	01:00:07	Soprano pipistrelle	M2	591630	840396	Transects
10/05/2021	01:00:28	Soprano pipistrelle	M2	591542	840307	Transects
10/05/2021	01:02:13	Soprano pipistrelle	M2	591140	839937	Transects
10/05/2021	01:02:17	Soprano pipistrelle	M2	591125	839920	Transects
10/05/2021	01:02:25	Soprano pipistrelle	M2	591100	839889	Transects
10/05/2021	01:02:37	Soprano pipistrelle	M2	591081	839820	Transects
17/06/2021	22:48:17	Leisler's bat	M2	588580	840160	Transects
17/06/2021	23:01:42	Leisler's bat	M2	590754	842553	Transects
17/06/2021	22:54:09	Common pipistrelle	M2	589774	841638	Transects
17/06/2021	22:56:48	Common pipistrelle	M2	590265	842377	Transects
17/06/2021	22:53:40	Common pipistrelle	M2	589664	841526	Transects
17/06/2021	22:53:48	Common pipistrelle	M2	589696	841556	Transects
17/06/2021	22:53:58	Common pipistrelle	M2	589734	841596	Transects
17/06/2021	22:54:13	Common pipistrelle	M2	589789	841656	Transects
17/06/2021	22:56:16	Common pipistrelle	M2	590145	842265	Transects
17/06/2021	22:56:59	Common pipistrelle	M2	590331	842378	Transects
17/06/2021	22:57:05	Common pipistrelle	M2	590364	842369	Transects
17/06/2021	22:57:09	Common pipistrelle	M2	590386	842359	Transects
17/06/2021	23:27:43	Common pipistrelle	M2	591383	842081	Transects
17/06/2021	23:27:49	Common pipistrelle	M2	591383	842090	Transects
17/06/2021	23:27:53	Common pipistrelle	M2	591382	842095	Transects
17/06/2021	23:34:13	Common pipistrelle	M2	591310	842496	Transects
17/06/2021	23:36:47	Common pipistrelle	M2	591318	842545	Transects
17/06/2021	23:36:49	Common pipistrelle	M2	591317	842543	Transects
17/06/2021	23:36:55	Common pipistrelle	M2	591316	842534	Transects
17/06/2021	23:37:06	Common pipistrelle	M2	591314	842522	Transects
17/06/2021	23:50:13	Common pipistrelle	M2	590735	842551	Transects
17/06/2021	23:52:28	Common pipistrelle	M2	590678	842544	Transects
17/06/2021	23:52:58	Common pipistrelle	M2	590682	842547	Transects
17/06/2021	23:53:18	Common pipistrelle	M2	590682	842547	Transects
17/06/2021	23:53:26	Common pipistrelle	M2	590682	842545	Transects
17/06/2021	23:53:28	Common pipistrelle	M2	590682	842546	Transects

17/06/2021	23:55:30	Common pipistrelle	M2	590929	842808	Transects
17/06/2021	23:55:56	Common pipistrelle	M2	591058	842882	Transects
17/06/2021	23:56:28	Common pipistrelle	M2	591220	842999	Transects
17/06/2021	22:55:34	Common pipistrelle	M2	590028	842046	Transects
17/06/2021	22:55:34	Soprano pipistrelle	M2	590028	842046	Transects
17/06/2021	22:48:39	Soprano pipistrelle	M2	588649	840277	Transects
17/06/2021	22:50:44	Soprano pipistrelle	M2	589114	840761	Transects
17/06/2021	22:56:05	Soprano pipistrelle	M2	590117	842199	Transects
17/06/2021	23:57:46	Soprano pipistrelle	M2	591627	843159	Transects
18/06/2021	00:15:15	Soprano pipistrelle	M2	593041	844889	Transects
18/06/2021	00:15:23	Soprano pipistrelle	M2	593041	844890	Transects
18/06/2021	22:50:08	Soprano pipistrelle	M2	593464	841328	Transects
19/06/2021	00:32:45	Leisler's bat	M2	588804	840474	Transects
19/06/2021	00:33:37	Leisler's bat	M2	588607	840207	Transects
19/06/2021	00:33:39	Leisler's bat	M2	588601	840198	Transects
19/06/2021	00:33:52	Leisler's bat	M2	588568	840141	Transects
19/06/2021	00:34:24	Leisler's bat	M2	588470	839974	Transects
19/06/2021	00:26:02	Common pipistrelle	M2	590260	842385	Transects
19/06/2021	00:28:40	Common pipistrelle	M2	589752	841617	Transects
19/06/2021	00:28:58	Common pipistrelle	M2	589676	841537	Transects
19/06/2021	00:29:13	Common pipistrelle	M2	589618	841475	Transects
19/06/2021	00:29:16	Common pipistrelle	M2	589609	841466	Transects
19/06/2021	00:31:19	Common pipistrelle	M2	589177	840837	Transects
19/06/2021	00:32:54	Common pipistrelle	M2	588765	840436	Transects
19/06/2021	00:33:03	Common pipistrelle	M2	588725	840395	Transects
19/06/2021	00:29:09	Soprano pipistrelle	M2	589634	841493	Transects
19/06/2021	00:32:29	Soprano pipistrelle	M2	588872	840546	Transects
19/06/2021	00:32:32	Soprano pipistrelle	M2	588858	840531	Transects
19/06/2021	00:33:32	Soprano pipistrelle	M2	588624	840235	Transects
19/06/2021	00:34:19	Soprano pipistrelle	M2	588489	840003	Transects
19/06/2021	00:35:14	Soprano pipistrelle	M2	588330	839817	Transects
19/06/2021	00:35:22	Soprano pipistrelle	M2	588329	839818	Transects
19/06/2021	00:35:25	Soprano pipistrelle	M2	588329	839817	Transects
27/06/2021	22:30:41	Leisler's bat	M2	591616	843149	Transects
27/06/2021	22:38:24	Leisler's bat	M2	591617	843155	Transects
27/06/2021	22:51:41	Leisler's bat	M2	591606	843142	Transects
27/06/2021	22:23:34	Leisler's bat	M2	591610	843140	Transects
27/06/2021	22:25:57	Leisler's bat	M2	591606	843143	Transects
27/06/2021	22:26:02	Leisler's bat	M2	591604	843142	Transects
27/06/2021	22:26:08	Leisler's bat	M2	591604	843141	Transects
27/06/2021	22:26:18	Leisler's bat	M2	591603	843142	Transects
27/06/2021	22:26:22	Leisler's bat	M2	591603	843142	Transects
27/06/2021	22:26:42	Leisler's bat	M2	591603	843141	Transects
27/06/2021	22:26:45	Leisler's bat	M2	591603	843142	Transects
27/06/2021	22:26:59	Leisler's bat	M2	591603	843142	Transects
27/06/2021	22:27:06	Leisler's bat	M2	591604	843141	Transects
27/06/2021	22:27:09	Leisler's bat	M2	591604	843141	Transects
27/06/2021	22:27:21	Leisler's bat	M2	591604	843141	Transects
27/06/2021	22:27:30	Leisler's bat	M2	591605	843142	Transects
27/06/2021	22:27:39	Leisler's bat	M2	591604	843143	Transects
27/06/2021	22:27:43	Leisler's bat	M2	591604	843143	Transects
27/06/2021	22:27:47	Leisler's bat	M2	591604	843144	Transects
27/06/2021	22:27:50	Leisler's bat	M2	591603	843145	Transects
27/06/2021	22:27:52	Leisler's bat	M2	591603	843145	Transects
27/06/2021	22:27:54	Leisler's bat	M2	591603	843145	Transects
27/06/2021	22:28:16	Leisler's bat	M2	591613	843146	Transects
27/06/2021	22:28:18	Leisler's bat	M2	591614	843147	Transects
27/06/2021	22:29:01	Leisler's bat	M2	591618	843149	Transects
27/06/2021	22:29:38	Leisler's bat	M2	591616	843150	Transects

27/06/2021	22:29:46	Leisler's bat	M2	591616	843151	Transects
27/06/2021	22:29:56	Leisler's bat	M2	591615	843150	Transects
27/06/2021	22:30:59	Leisler's bat	M2	591616	843149	Transects
27/06/2021	22:31:01	Leisler's bat	M2	591617	843148	Transects
27/06/2021	22:35:13	Leisler's bat	M2	591632	843166	Transects
27/06/2021	22:35:22	Leisler's bat	M2	591627	843162	Transects
27/06/2021	22:36:36	Leisler's bat	M2	591603	843141	Transects
27/06/2021	22:36:37	Leisler's bat	M2	591601	843140	Transects
27/06/2021	22:36:42	Leisler's bat	M2	591600	843140	Transects
27/06/2021	22:36:49	Leisler's bat	M2	591601	843139	Transects
27/06/2021	22:37:12	Leisler's bat	M2	591610	843145	Transects
27/06/2021	22:37:20	Leisler's bat	M2	591614	843148	Transects
27/06/2021	22:38:28	Leisler's bat	M2	591616	843153	Transects
27/06/2021	22:38:37	Leisler's bat	M2	591613	843149	Transects
27/06/2021	22:38:43	Leisler's bat	M2	591610	843145	Transects
27/06/2021	22:38:47	Leisler's bat	M2	591606	843143	Transects
27/06/2021	22:38:52	Leisler's bat	M2	591603	843140	Transects
27/06/2021	22:38:55	Leisler's bat	M2	591600	843138	Transects
27/06/2021	22:39:03	Leisler's bat	M2	591597	843134	Transects
27/06/2021	22:39:16	Leisler's bat	M2	591596	843135	Transects
27/06/2021	22:39:26	Leisler's bat	M2	591596	843136	Transects
27/06/2021	22:39:34	Leisler's bat	M2	591596	843135	Transects
27/06/2021	22:40:37	Leisler's bat	M2	591630	843165	Transects
27/06/2021	22:40:53	Leisler's bat	M2	591617	843152	Transects
27/06/2021	22:41:12	Leisler's bat	M2	591604	843142	Transects
27/06/2021	22:41:13	Leisler's bat	M2	591604	843142	Transects
27/06/2021	22:41:49	Leisler's bat	M2	591617	843153	Transects
27/06/2021	22:41:51	Leisler's bat	M2	591618	843154	Transects
27/06/2021	22:42:34	Leisler's bat	M2	591620	843155	Transects
27/06/2021	22:42:36	Leisler's bat	M2	591619	843155	Transects
27/06/2021	22:42:39	Leisler's bat	M2	591618	843153	Transects
27/06/2021	22:42:49	Leisler's bat	M2	591610	843149	Transects
27/06/2021	22:42:54	Leisler's bat	M2	591606	843146	Transects
27/06/2021	22:43:11	Leisler's bat	M2	591600	843138	Transects
27/06/2021	22:44:34	Leisler's bat	M2	591606	843145	Transects
27/06/2021	22:51:02	Leisler's bat	M2	591618	843158	Transects
27/06/2021	22:51:04	Leisler's bat	M2	591618	843157	Transects
27/06/2021	22:51:06	Leisler's bat	M2	591616	843154	Transects
27/06/2021	22:51:36	Leisler's bat	M2	591602	843138	Transects
27/06/2021	22:51:39	Leisler's bat	M2	591604	843140	Transects
27/06/2021	22:51:52	Leisler's bat	M2	591614	843149	Transects
27/06/2021	22:51:55	Leisler's bat	M2	591616	843150	Transects
27/06/2021	22:51:59	Leisler's bat	M2	591618	843153	Transects
27/06/2021	22:52:06	Leisler's bat	M2	591622	843160	Transects
27/06/2021	22:53:26	Leisler's bat	M2	591606	843145	Transects
27/06/2021	22:53:36	Leisler's bat	M2	591613	843151	Transects
27/06/2021	22:53:44	Leisler's bat	M2	591620	843156	Transects
27/06/2021	22:56:41	Leisler's bat	M2	591601	843138	Transects
27/06/2021	22:56:54	Leisler's bat	M2	591612	843144	Transects
27/06/2021	23:03:42	Leisler's bat	M2	591618	843149	Transects
27/06/2021	23:13:00	Common pipistrelle	M2	591598	843136	Transects
27/06/2021	23:01:06	Common pipistrelle	M2	591613	843151	Transects
27/06/2021	23:01:18	Common pipistrelle	M2	591609	843146	Transects
27/06/2021	23:01:35	Common pipistrelle	M2	591613	843148	Transects
27/06/2021	23:02:32	Common pipistrelle	M2	591615	843153	Transects
27/06/2021	23:14:12	Common pipistrelle	M2	591598	843134	Transects
27/06/2021	23:19:40	Common pipistrelle	M2	591597	843139	Transects
27/06/2021	23:19:57	Common pipistrelle	M2	591595	843133	Transects
27/06/2021	23:20:07	Common pipistrelle	M2	591594	843132	Transects

27/06/2021	23:20:45	Common pipistrelle	M2	591593	843136	Transects
27/06/2021	23:32:52	Common pipistrelle	M2	591740	843275	Transects
27/06/2021	22:30:41	Soprano pipistrelle	M2	591616	843149	Transects
27/06/2021	22:28:20	Soprano pipistrelle	M2	591614	843148	Transects
27/06/2021	22:28:22	Soprano pipistrelle	M2	591615	843149	Transects
27/06/2021	22:28:26	Soprano pipistrelle	M2	591614	843149	Transects
27/06/2021	22:28:30	Soprano pipistrelle	M2	591613	843150	Transects
27/06/2021	22:28:35	Soprano pipistrelle	M2	591613	843151	Transects
27/06/2021	22:28:40	Soprano pipistrelle	M2	591614	843150	Transects
27/06/2021	22:28:45	Soprano pipistrelle	M2	591615	843151	Transects
27/06/2021	22:28:50	Soprano pipistrelle	M2	591616	843151	Transects
27/06/2021	22:28:51	Soprano pipistrelle	M2	591617	843150	Transects
27/06/2021	22:28:58	Soprano pipistrelle	M2	591617	843149	Transects
27/06/2021	22:29:04	Soprano pipistrelle	M2	591618	843148	Transects
27/06/2021	22:29:08	Soprano pipistrelle	M2	591618	843147	Transects
27/06/2021	22:29:15	Soprano pipistrelle	M2	591618	843148	Transects
27/06/2021	22:29:20	Soprano pipistrelle	M2	591617	843149	Transects
27/06/2021	22:29:26	Soprano pipistrelle	M2	591616	843149	Transects
27/06/2021	22:29:31	Soprano pipistrelle	M2	591616	843150	Transects
27/06/2021	22:29:36	Soprano pipistrelle	M2	591616	843150	Transects
27/06/2021	22:29:49	Soprano pipistrelle	M2	591615	843150	Transects
27/06/2021	22:30:08	Soprano pipistrelle	M2	591615	843150	Transects
27/06/2021	22:30:14	Soprano pipistrelle	M2	591615	843150	Transects
27/06/2021	22:30:25	Soprano pipistrelle	M2	591616	843149	Transects
27/06/2021	22:30:34	Soprano pipistrelle	M2	591616	843149	Transects
27/06/2021	22:31:07	Soprano pipistrelle	M2	591617	843147	Transects
27/06/2021	22:31:11	Soprano pipistrelle	M2	591617	843147	Transects
27/06/2021	22:31:15	Soprano pipistrelle	M2	591617	843147	Transects
27/06/2021	22:31:17	Soprano pipistrelle	M2	591618	843147	Transects
27/06/2021	22:31:22	Soprano pipistrelle	M2	591618	843147	Transects
27/06/2021	22:31:26	Soprano pipistrelle	M2	591617	843147	Transects
27/06/2021	22:31:36	Soprano pipistrelle	M2	591616	843147	Transects
27/06/2021	22:31:42	Soprano pipistrelle	M2	591616	843147	Transects
27/06/2021	22:31:50	Soprano pipistrelle	M2	591617	843148	Transects
27/06/2021	22:31:57	Soprano pipistrelle	M2	591618	843147	Transects
27/06/2021	22:32:03	Soprano pipistrelle	M2	591617	843148	Transects
27/06/2021	22:32:12	Soprano pipistrelle	M2	591618	843149	Transects
27/06/2021	22:32:16	Soprano pipistrelle	M2	591618	843150	Transects
27/06/2021	22:32:23	Soprano pipistrelle	M2	591619	843149	Transects
27/06/2021	22:32:48	Soprano pipistrelle	M2	591619	843149	Transects
27/06/2021	22:47:42	Soprano pipistrelle	M2	591619	843156	Transects
27/06/2021	22:48:01	Soprano pipistrelle	M2	591622	843155	Transects
28/06/2021	01:05:09	Leisler's bat	M2	588500	840022	Transects
28/06/2021	00:45:09	Leisler's bat	M2	591792	841200	Transects
28/06/2021	00:53:09	Leisler's bat	M2	591567	843116	Transects
28/06/2021	01:03:47	Leisler's bat	M2	588788	840451	Transects
28/06/2021	01:04:50	Leisler's bat	M2	588559	840122	Transects
28/06/2021	01:05:02	Leisler's bat	M2	588522	840060	Transects
28/06/2021	01:06:14	Leisler's bat	M2	588310	839800	Transects
28/06/2021	00:54:07	Common pipistrelle	M2	591236	843014	Transects
28/06/2021	00:58:54	Common pipistrelle	M2	589908	841800	Transects
28/06/2021	00:27:09	Common pipistrelle	M2	592090	842150	Transects
28/06/2021	00:27:21	Common pipistrelle	M2	592037	842115	Transects
28/06/2021	00:27:24	Common pipistrelle	M2	592039	842102	Transects
28/06/2021	00:39:41	Common pipistrelle	M2	593250	840809	Transects
28/06/2021	00:54:15	Common pipistrelle	M2	591193	842983	Transects
28/06/2021	00:54:31	Common pipistrelle	M2	591093	842910	Transects
28/06/2021	00:54:37	Common pipistrelle	M2	591055	842882	Transects
28/06/2021	00:59:53	Common pipistrelle	M2	589641	841489	Transects

28/06/2021	01:00:00	Common pipistrelle	M2	589612	841459	Transects
28/06/2021	01:04:29	Common pipistrelle	M2	588620	840226	Transects
28/06/2021	01:04:40	Common pipistrelle	M2	588590	840172	Transects
28/06/2021	00:29:03	Soprano pipistrelle	M2	591948	841464	Transects
28/06/2021	00:46:46	Soprano pipistrelle	M2	591948	841757	Transects
28/06/2021	01:02:22	Soprano pipistrelle	M2	589146	840795	Transects
28/06/2021	01:04:19	Soprano pipistrelle	M2	588660	840287	Transects
28/06/2021	01:05:33	Soprano pipistrelle	M2	588384	839882	Transects
09/08/2021	22:12:36	Natterer's bat	M2	594209	840785	Transects
09/08/2021	16:06.1	Natterer's bat	Scout	594611	840867	Transects
09/08/2021	21:56.1	Natterer's bat	Scout	594607	840867	Transects
09/08/2021	21:34:38	Common pipistrelle	M2	594209	840787	Transects
09/08/2021	22:12:01	Common pipistrelle	M2	594207	840782	Transects
09/08/2021	22:16:58	Common pipistrelle	M2	594216	840783	Transects
09/08/2021	22:27:58	Common pipistrelle	M2	594210	840778	Transects
09/08/2021	22:29:27	Common pipistrelle	M2	594210	840777	Transects
09/08/2021	22:29:37	Common pipistrelle	M2	594209	840778	Transects
09/08/2021	21:38:05	Common pipistrelle	M2	594203	840794	Transects
09/08/2021	21:41:59	Common pipistrelle	M2	594211	840781	Transects
09/08/2021	21:42:06	Common pipistrelle	M2	594212	840782	Transects
09/08/2021	21:45:22	Common pipistrelle	M2	594210	840777	Transects
09/08/2021	21:46:09	Common pipistrelle	M2	594209	840777	Transects
09/08/2021	21:47:25	Common pipistrelle	M2	594204	840790	Transects
09/08/2021	21:50:38	Common pipistrelle	M2	594188	840774	Transects
09/08/2021	21:50:40	Common pipistrelle	M2	594188	840774	Transects
09/08/2021	21:50:48	Common pipistrelle	M2	594188	840775	Transects
09/08/2021	21:50:55	Common pipistrelle	M2	594188	840775	Transects
09/08/2021	21:51:03	Common pipistrelle	M2	594188	840774	Transects
09/08/2021	21:51:20	Common pipistrelle	M2	594189	840774	Transects
09/08/2021	21:54:03	Common pipistrelle	M2	594209	840776	Transects
09/08/2021	21:58:31	Common pipistrelle	M2	594210	840779	Transects
09/08/2021	21:58:39	Common pipistrelle	M2	594209	840779	Transects
09/08/2021	22:02:56	Common pipistrelle	M2	594211	840781	Transects
09/08/2021	22:03:01	Common pipistrelle	M2	594210	840781	Transects
09/08/2021	22:03:54	Common pipistrelle	M2	594211	840781	Transects
09/08/2021	22:06:12	Common pipistrelle	M2	594212	840782	Transects
09/08/2021	22:06:29	Common pipistrelle	M2	594210	840781	Transects
09/08/2021	22:09:08	Common pipistrelle	M2	594209	840780	Transects
09/08/2021	22:11:22	Common pipistrelle	M2	594207	840779	Transects
09/08/2021	22:11:54	Common pipistrelle	M2	594208	840781	Transects
09/08/2021	22:12:24	Common pipistrelle	M2	594208	840785	Transects
09/08/2021	22:14:09	Common pipistrelle	M2	594210	840783	Transects
09/08/2021	22:14:14	Common pipistrelle	M2	594210	840782	Transects
09/08/2021	22:15:44	Common pipistrelle	M2	594210	840782	Transects
09/08/2021	22:19:16	Common pipistrelle	M2	594210	840783	Transects
09/08/2021	22:19:36	Common pipistrelle	M2	594209	840783	Transects
09/08/2021	22:21:55	Common pipistrelle	M2	594207	840792	Transects
09/08/2021	22:25:52	Common pipistrelle	M2	594211	840774	Transects
09/08/2021	22:27:26	Common pipistrelle	M2	594209	840779	Transects
09/08/2021	22:29:48	Common pipistrelle	M2	594209	840778	Transects
09/08/2021	22:37:52	Common pipistrelle	M2	594213	840771	Transects
09/08/2021	35:49.1	Common pipistrelle	Scout	594597	840914	Transects
09/08/2021	36:49.1	Common pipistrelle	Scout	594597	840914	Transects
09/08/2021	55:49.1	Common pipistrelle	Scout	594597	840913	Transects
09/08/2021	09:16.1	Common pipistrelle	Scout	594609	840869	Transects
09/08/2021	09:56.1	Common pipistrelle	Scout	594610	840865	Transects
09/08/2021	11:16.1	Common pipistrelle	Scout	594609	840867	Transects
09/08/2021	11:36.1	Common pipistrelle	Scout	594609	840867	Transects
09/08/2021	13:56.1	Common pipistrelle	Scout	594610	840866	Transects

10/08/2021	22:06:06	Natterer's bat	M2	590567	844693	Transects
10/08/2021	22:15:32	Natterer's bat	M2	590555	844711	Transects
10/08/2021	09:21.8	Natterer's bat	Scout	593067	840599	Transects
10/08/2021	15:51.8	Natterer's bat	Scout	593065	840599	Transects
10/08/2021	16:21.8	Natterer's bat	Scout	593065	840599	Transects
10/08/2021	24:31.8	Natterer's bat	Scout	593065	840601	Transects
10/08/2021	54:41.8	Myotis species	Scout	593068	840602	Transects
10/08/2021	22:51.8	Myotis species	Scout	593068	840599	Transects
10/08/2021	37:21.8	Leisler's bat	Scout	593070	840599	Transects
10/08/2021	35:51.8	Leisler's bat	Scout	593068	840601	Transects
10/08/2021	21:29:02	Common pipistrelle	M2	590566	844733	Transects
10/08/2021	21:33:35	Common pipistrelle	M2	590546	844725	Transects
10/08/2021	21:46:45	Common pipistrelle	M2	590542	844729	Transects
10/08/2021	21:50:23	Common pipistrelle	M2	590566	844731	Transects
10/08/2021	21:51:32	Common pipistrelle	M2	590569	844733	Transects
10/08/2021	37:21.8	Common pipistrelle	Scout	593070	840599	Transects
10/08/2021	49:21.8	Common pipistrelle	Scout	593073	840604	Transects
10/08/2021	51:31.8	Common pipistrelle	Scout	593065	840601	Transects
10/08/2021	54:21.8	Common pipistrelle	Scout	593068	840602	Transects
10/08/2021	15:31.8	Common pipistrelle	Scout	593065	840599	Transects
10/08/2021	26:27.0	Common pipistrelle	Scout	593073	840598	Transects
10/08/2021	27:40.0	Common pipistrelle	Scout	593070	840603	Transects
10/08/2021	30:51.8	Common pipistrelle	Scout	593067	840600	Transects
10/08/2021	36:31.8	Common pipistrelle	Scout	593069	840601	Transects
10/08/2021	37:31.8	Common pipistrelle	Scout	593071	840598	Transects
10/08/2021	37:41.8	Common pipistrelle	Scout	593070	840600	Transects
10/08/2021	38:01.8	Common pipistrelle	Scout	593070	840600	Transects
10/08/2021	41:21.8	Common pipistrelle	Scout	593070	840600	Transects
10/08/2021	41:31.8	Common pipistrelle	Scout	593070	840600	Transects
10/08/2021	50:21.8	Common pipistrelle	Scout	593065	840602	Transects
10/08/2021	50:31.8	Common pipistrelle	Scout	593065	840602	Transects
10/08/2021	50:41.8	Common pipistrelle	Scout	593065	840601	Transects
10/08/2021	50:51.8	Common pipistrelle	Scout	593065	840601	Transects
10/08/2021	51:41.8	Common pipistrelle	Scout	593067	840602	Transects
10/08/2021	51:51.8	Common pipistrelle	Scout	593068	840602	Transects
10/08/2021	52:01.8	Common pipistrelle	Scout	593068	840603	Transects
10/08/2021	52:11.8	Common pipistrelle	Scout	593068	840603	Transects
10/08/2021	52:41.8	Common pipistrelle	Scout	593068	840602	Transects
10/08/2021	52:51.8	Common pipistrelle	Scout	593068	840602	Transects
10/08/2021	53:01.8	Common pipistrelle	Scout	593068	840602	Transects
10/08/2021	53:11.8	Common pipistrelle	Scout	593068	840602	Transects
10/08/2021	53:21.8	Common pipistrelle	Scout	593068	840602	Transects
10/08/2021	54:11.8	Common pipistrelle	Scout	593068	840602	Transects
10/08/2021	05:01.8	Common pipistrelle	Scout	593064	840598	Transects
10/08/2021	05:11.8	Common pipistrelle	Scout	593064	840598	Transects
10/08/2021	05:21.8	Common pipistrelle	Scout	593064	840598	Transects
10/08/2021	10:11.8	Common pipistrelle	Scout	593066	840599	Transects
10/08/2021	10:31.8	Common pipistrelle	Scout	593066	840599	Transects
10/08/2021	19:51.8	Common pipistrelle	Scout	593069	840601	Transects
10/08/2021	21:41.8	Common pipistrelle	Scout	593068	840600	Transects
10/08/2021	22:11.8	Common pipistrelle	Scout	593068	840600	Transects
10/08/2021	23:01.8	Common pipistrelle	Scout	593067	840598	Transects
10/08/2021	23:11.8	Common pipistrelle	Scout	593067	840598	Transects
10/08/2021	28:17.0	Common pipistrelle	Scout	593066	840599	Transects
10/08/2021	34:39.9	Common pipistrelle	Scout	593066	840599	Transects
10/08/2021	21:29:02	Soprano pipistrelle	M2	590566	844733	Transects
10/08/2021	21:29:10	Soprano pipistrelle	M2	590567	844733	Transects
10/08/2021	21:57:51	Soprano pipistrelle	M2	590564	844734	Transects
10/08/2021	22:09:09	Soprano pipistrelle	M2	590576	844725	Transects

10/08/2021	22:29:46	Soprano pipistrelle	M2	590553	844722	Transects
10/08/2021	22:31:36	Soprano pipistrelle	M2	590552	844726	Transects
10/08/2021	22:31:47	Soprano pipistrelle	M2	590553	844723	Transects
10/08/2021	22:31:52	Soprano pipistrelle	M2	590553	844723	Transects
10/08/2021	22:32:08	Soprano pipistrelle	M2	590551	844722	Transects
10/08/2021	22:35:13	Soprano pipistrelle	M2	590552	844722	Transects
10/08/2021	22:35:33	Soprano pipistrelle	M2	590551	844725	Transects
10/08/2021	22:35:50	Soprano pipistrelle	M2	590550	844725	Transects
10/08/2021	22:36:07	Soprano pipistrelle	M2	590550	844725	Transects
10/08/2021	22:36:17	Soprano pipistrelle	M2	590550	844725	Transects
10/08/2021	22:37:22	Soprano pipistrelle	M2	590549	844729	Transects
10/08/2021	22:37:35	Soprano pipistrelle	M2	590550	844729	Transects
10/08/2021	22:37:41	Soprano pipistrelle	M2	590550	844729	Transects
10/08/2021	22:37:58	Soprano pipistrelle	M2	590550	844728	Transects
10/08/2021	22:38:28	Soprano pipistrelle	M2	590552	844726	Transects
10/08/2021	22:39:07	Soprano pipistrelle	M2	590552	844721	Transects
10/08/2021	22:41:12	Soprano pipistrelle	M2	590553	844722	Transects
10/08/2021	22:41:30	Soprano pipistrelle	M2	590553	844722	Transects
10/08/2021	22:41:39	Soprano pipistrelle	M2	590553	844722	Transects
10/08/2021	21:23:07	Soprano pipistrelle	M2	590536	844738	Transects
10/08/2021	21:25:08	Soprano pipistrelle	M2	590538	844735	Transects
10/08/2021	21:25:12	Soprano pipistrelle	M2	590560	844732	Transects
10/08/2021	21:25:27	Soprano pipistrelle	M2	590553	844724	Transects
10/08/2021	21:25:30	Soprano pipistrelle	M2	590537	844739	Transects
10/08/2021	21:26:34	Soprano pipistrelle	M2	590575	844731	Transects
10/08/2021	21:27:15	Soprano pipistrelle	M2	590537	844737	Transects
10/08/2021	21:27:33	Soprano pipistrelle	M2	590563	844733	Transects
10/08/2021	21:27:39	Soprano pipistrelle	M2	590565	844733	Transects
10/08/2021	21:27:46	Soprano pipistrelle	M2	590567	844732	Transects
10/08/2021	21:27:55	Soprano pipistrelle	M2	590568	844732	Transects
10/08/2021	21:28:14	Soprano pipistrelle	M2	590567	844733	Transects
10/08/2021	21:28:24	Soprano pipistrelle	M2	590567	844732	Transects
10/08/2021	21:28:40	Soprano pipistrelle	M2	590568	844733	Transects
10/08/2021	21:28:44	Soprano pipistrelle	M2	590568	844733	Transects
10/08/2021	21:28:52	Soprano pipistrelle	M2	590568	844733	Transects
10/08/2021	21:28:55	Soprano pipistrelle	M2	590567	844733	Transects
10/08/2021	21:29:15	Soprano pipistrelle	M2	590567	844733	Transects
10/08/2021	21:29:17	Soprano pipistrelle	M2	590567	844733	Transects
10/08/2021	21:29:30	Soprano pipistrelle	M2	590568	844733	Transects
10/08/2021	21:29:42	Soprano pipistrelle	M2	590567	844734	Transects
10/08/2021	21:29:49	Soprano pipistrelle	M2	590567	844734	Transects
10/08/2021	21:30:28	Soprano pipistrelle	M2	590568	844742	Transects
10/08/2021	21:30:36	Soprano pipistrelle	M2	590567	844742	Transects
10/08/2021	21:30:42	Soprano pipistrelle	M2	590567	844742	Transects
10/08/2021	21:31:01	Soprano pipistrelle	M2	590565	844742	Transects
10/08/2021	21:32:05	Soprano pipistrelle	M2	590569	844743	Transects
10/08/2021	21:35:10	Soprano pipistrelle	M2	590535	844735	Transects
10/08/2021	21:41:40	Soprano pipistrelle	M2	590575	844731	Transects
10/08/2021	21:41:43	Soprano pipistrelle	M2	590575	844731	Transects
10/08/2021	21:41:54	Soprano pipistrelle	M2	590576	844731	Transects
10/08/2021	21:42:31	Soprano pipistrelle	M2	590575	844729	Transects
10/08/2021	21:42:38	Soprano pipistrelle	M2	590574	844729	Transects
10/08/2021	21:58:47	Soprano pipistrelle	M2	590568	844737	Transects
10/08/2021	22:01:44	Soprano pipistrelle	M2	590545	844720	Transects
10/08/2021	22:06:48	Soprano pipistrelle	M2	590579	844683	Transects
10/08/2021	22:09:32	Soprano pipistrelle	M2	590577	844726	Transects
10/08/2021	22:11:40	Soprano pipistrelle	M2	590567	844738	Transects
10/08/2021	22:11:55	Soprano pipistrelle	M2	590566	844740	Transects
10/08/2021	22:12:04	Soprano pipistrelle	M2	590566	844741	Transects

10/08/2021	22:12:19	Soprano pipistrelle	M2	590567	844743	Transects
10/08/2021	22:12:30	Soprano pipistrelle	M2	590567	844741	Transects
10/08/2021	22:18:52	Soprano pipistrelle	M2	590553	844719	Transects
10/08/2021	22:26:39	Soprano pipistrelle	M2	590553	844721	Transects
10/08/2021	22:28:55	Soprano pipistrelle	M2	590553	844720	Transects
10/08/2021	22:29:47	Soprano pipistrelle	M2	590553	844722	Transects
10/08/2021	22:30:40	Soprano pipistrelle	M2	590554	844722	Transects
10/08/2021	22:31:31	Soprano pipistrelle	M2	590551	844726	Transects
10/08/2021	22:32:15	Soprano pipistrelle	M2	590551	844722	Transects
10/08/2021	22:32:59	Soprano pipistrelle	M2	590554	844721	Transects
10/08/2021	22:33:38	Soprano pipistrelle	M2	590555	844721	Transects
10/08/2021	22:36:33	Soprano pipistrelle	M2	590550	844725	Transects
10/08/2021	22:37:14	Soprano pipistrelle	M2	590550	844727	Transects
10/08/2021	22:38:52	Soprano pipistrelle	M2	590553	844722	Transects
10/08/2021	22:39:10	Soprano pipistrelle	M2	590552	844721	Transects
10/08/2021	22:39:16	Soprano pipistrelle	M2	590552	844721	Transects
10/08/2021	22:31.8	Soprano pipistrelle	Scout	593068	840600	Transects
10/08/2021	23:51.8	Soprano pipistrelle	Scout	593066	840598	Transects
10/08/2021	24:50.0	Soprano pipistrelle	Scout	593070	840608	Transects
10/08/2021	30:31.8	Soprano pipistrelle	Scout	593066	840600	Transects
10/08/2021	30:41.8	Soprano pipistrelle	Scout	593066	840600	Transects
10/08/2021	31:31.8	Soprano pipistrelle	Scout	593067	840599	Transects
10/08/2021	31:41.8	Soprano pipistrelle	Scout	593068	840601	Transects
10/08/2021	31:51.8	Soprano pipistrelle	Scout	593068	840601	Transects
10/08/2021	32:01.8	Soprano pipistrelle	Scout	593068	840600	Transects
10/08/2021	38:21.8	Soprano pipistrelle	Scout	593070	840600	Transects
10/08/2021	38:31.8	Soprano pipistrelle	Scout	593070	840600	Transects
10/08/2021	38:41.8	Soprano pipistrelle	Scout	593070	840600	Transects
10/08/2021	38:51.8	Soprano pipistrelle	Scout	593070	840599	Transects
10/08/2021	59:01.8	Soprano pipistrelle	Scout	593066	840600	Transects
10/08/2021	15:01.8	Soprano pipistrelle	Scout	593066	840599	Transects
10/08/2021	15:41.8	Soprano pipistrelle	Scout	593065	840599	Transects
10/08/2021	19:41.8	Soprano pipistrelle	Scout	593069	840601	Transects
10/08/2021	24:21.8	Soprano pipistrelle	Scout	593065	840599	Transects
10/08/2021	31:07.0	Soprano pipistrelle	Scout	593066	840599	Transects
10/08/2021	31:17.0	Soprano pipistrelle	Scout	593066	840599	Transects
10/08/2021	21:52:54	Brown long-eared bat	M2	590570	844734	Transects
11/08/2021	05:00.9	Natterer's bat	Scout	592144	840570	Transects
11/08/2021	05:07.1	Natterer's bat	Scout	592144	840570	Transects
11/08/2021	12:39.6	Natterer's bat	Scout	592144	840569	Transects
11/08/2021	12:49.9	Natterer's bat	Scout	592144	840569	Transects
11/08/2021	13:02.2	Natterer's bat	Scout	592144	840569	Transects
11/08/2021	14:07.7	Natterer's bat	Scout	592143	840569	Transects
11/08/2021	14:39.8	Natterer's bat	Scout	592143	840569	Transects
11/08/2021	16:08.3	Natterer's bat	Scout	592143	840570	Transects
11/08/2021	17:05.6	Natterer's bat	Scout	592142	840570	Transects
11/08/2021	17:09.6	Natterer's bat	Scout	592142	840570	Transects
11/08/2021	17:19.7	Natterer's bat	Scout	592142	840570	Transects
11/08/2021	21:49:40	Natterer's bat	Walkabout	592388	840520	Transects
11/08/2021	21:54:00	Natterer's bat	Walkabout	592384	840519	Transects
11/08/2021	21:54:12	Natterer's bat	Walkabout	592382	840518	Transects
11/08/2021	21:54:56	Natterer's bat	Walkabout	592382	840519	Transects
11/08/2021	21:55:02	Natterer's bat	Walkabout	592382	840518	Transects
11/08/2021	21:55:05	Natterer's bat	Walkabout	592382	840518	Transects
11/08/2021	21:55:18	Natterer's bat	Walkabout	592383	840518	Transects
11/08/2021	21:56:07	Natterer's bat	Walkabout	592381	840520	Transects
11/08/2021	21:56:51	Natterer's bat	Walkabout	592377	840524	Transects
11/08/2021	21:56:55	Natterer's bat	Walkabout	592377	840527	Transects
11/08/2021	21:57:39	Natterer's bat	Walkabout	592377	840527	Transects

11/08/2021	21:57:47	Natterer's bat	Walkabout	592377	840528	Transects
11/08/2021	21:57:51	Natterer's bat	Walkabout	592378	840523	Transects
11/08/2021	21:57:58	Natterer's bat	Walkabout	592377	840527	Transects
11/08/2021	21:58:06	Natterer's bat	Walkabout	592377	840528	Transects
11/08/2021	21:58:25	Natterer's bat	Walkabout	592377	840528	Transects
11/08/2021	21:58:41	Natterer's bat	Walkabout	592378	840527	Transects
11/08/2021	21:58:53	Natterer's bat	Walkabout	592378	840524	Transects
11/08/2021	21:59:08	Natterer's bat	Walkabout	592378	840527	Transects
11/08/2021	21:59:32	Natterer's bat	Walkabout	592379	840522	Transects
11/08/2021	21:59:44	Natterer's bat	Walkabout	592378	840527	Transects
11/08/2021	21:59:53	Natterer's bat	Walkabout	592382	840522	Transects
11/08/2021	22:00:32	Natterer's bat	Walkabout	592387	840518	Transects
11/08/2021	22:00:41	Natterer's bat	Walkabout	592388	840517	Transects
11/08/2021	22:00:46	Natterer's bat	Walkabout	592387	840518	Transects
11/08/2021	22:01:14	Natterer's bat	Walkabout	592388	840518	Transects
11/08/2021	22:01:52	Natterer's bat	Walkabout	592389	840519	Transects
11/08/2021	22:02:00	Natterer's bat	Walkabout	592389	840520	Transects
11/08/2021	22:02:06	Natterer's bat	Walkabout	592389	840519	Transects
11/08/2021	22:02:19	Natterer's bat	Walkabout	592389	840519	Transects
11/08/2021	22:02:23	Natterer's bat	Walkabout	592389	840519	Transects
11/08/2021	22:03:11	Natterer's bat	Walkabout	592388	840518	Transects
11/08/2021	22:04:02	Natterer's bat	Walkabout	592389	840517	Transects
11/08/2021	22:04:17	Natterer's bat	Walkabout	592390	840518	Transects
11/08/2021	22:04:21	Natterer's bat	Walkabout	592390	840517	Transects
11/08/2021	22:04:33	Natterer's bat	Walkabout	592390	840517	Transects
11/08/2021	22:04:46	Natterer's bat	Walkabout	592390	840518	Transects
11/08/2021	22:04:53	Natterer's bat	Walkabout	592390	840519	Transects
11/08/2021	22:06:11	Natterer's bat	Walkabout	592390	840519	Transects
11/08/2021	22:06:41	Natterer's bat	Walkabout	592393	840516	Transects
11/08/2021	22:06:54	Natterer's bat	Walkabout	592392	840515	Transects
11/08/2021	22:09:37	Natterer's bat	Walkabout	592373	840526	Transects
11/08/2021	22:10:19	Natterer's bat	Walkabout	592376	840527	Transects
11/08/2021	22:10:59	Natterer's bat	Walkabout	592376	840528	Transects
11/08/2021	22:11:30	Natterer's bat	Walkabout	592376	840528	Transects
11/08/2021	22:11:43	Natterer's bat	Walkabout	592376	840528	Transects
11/08/2021	22:12:43	Natterer's bat	Walkabout	592376	840527	Transects
11/08/2021	22:14:04	Natterer's bat	Walkabout	592376	840528	Transects
11/08/2021	22:14:43	Natterer's bat	Walkabout	592376	840528	Transects
11/08/2021	22:15:39	Natterer's bat	Walkabout	592376	840527	Transects
11/08/2021	22:16:52	Natterer's bat	Walkabout	592387	840514	Transects
11/08/2021	22:17:00	Natterer's bat	Walkabout	592388	840514	Transects
11/08/2021	22:17:08	Natterer's bat	Walkabout	592387	840514	Transects
11/08/2021	22:17:12	Natterer's bat	Walkabout	592388	840514	Transects
11/08/2021	22:17:19	Natterer's bat	Walkabout	592387	840515	Transects
11/08/2021	22:17:29	Natterer's bat	Walkabout	592387	840515	Transects
11/08/2021	22:17:43	Natterer's bat	Walkabout	592386	840514	Transects
11/08/2021	22:17:56	Natterer's bat	Walkabout	592385	840514	Transects
11/08/2021	22:18:05	Natterer's bat	Walkabout	592385	840513	Transects
11/08/2021	22:18:24	Natterer's bat	Walkabout	592385	840513	Transects
11/08/2021	22:18:50	Natterer's bat	Walkabout	592385	840513	Transects
11/08/2021	22:19:04	Natterer's bat	Walkabout	592386	840514	Transects
11/08/2021	22:19:10	Natterer's bat	Walkabout	592386	840514	Transects
11/08/2021	22:23:37	Natterer's bat	Walkabout	592401	840530	Transects
11/08/2021	22:23:48	Natterer's bat	Walkabout	592399	840520	Transects
11/08/2021	22:24:13	Natterer's bat	Walkabout	592392	840512	Transects
11/08/2021	22:24:24	Natterer's bat	Walkabout	592387	840513	Transects
11/08/2021	22:26:16	Natterer's bat	Walkabout	592388	840517	Transects
11/08/2021	22:26:29	Natterer's bat	Walkabout	592389	840517	Transects
11/08/2021	22:27:27	Natterer's bat	Walkabout	592388	840519	Transects

11/08/2021	22:27:44	Natterer's bat	Walkabout	592386	840519	Transects
11/08/2021	22:28:05	Natterer's bat	Walkabout	592387	840519	Transects
11/08/2021	22:28:14	Natterer's bat	Walkabout	592384	840519	Transects
11/08/2021	22:28:23	Natterer's bat	Walkabout	592382	840519	Transects
11/08/2021	22:28:37	Natterer's bat	Walkabout	592382	840518	Transects
11/08/2021	22:28:45	Natterer's bat	Walkabout	592382	840518	Transects
11/08/2021	22:28:58	Natterer's bat	Walkabout	592382	840518	Transects
11/08/2021	22:29:04	Natterer's bat	Walkabout	592382	840519	Transects
11/08/2021	22:29:55	Natterer's bat	Walkabout	592387	840514	Transects
11/08/2021	22:30:51	Natterer's bat	Walkabout	592388	840515	Transects
11/08/2021	22:31:05	Natterer's bat	Walkabout	592385	840512	Transects
11/08/2021	22:31:13	Natterer's bat	Walkabout	592385	840512	Transects
11/08/2021	22:31:31	Natterer's bat	Walkabout	592386	840512	Transects
11/08/2021	22:31:36	Natterer's bat	Walkabout	592386	840512	Transects
11/08/2021	21:59:28	Natterer's bat	Walkabout	592378	840523	Transects
11/08/2021	21:59:56	Natterer's bat	Walkabout	592387	840518	Transects
11/08/2021	22:00:21	Natterer's bat	Walkabout	592384	840520	Transects
11/08/2021	22:00:58	Natterer's bat	Walkabout	592389	840518	Transects
11/08/2021	22:02:37	Natterer's bat	Walkabout	592388	840519	Transects
11/08/2021	22:27:35	Natterer's bat	Walkabout	592388	840519	Transects
11/08/2021	22:27:53	Natterer's bat	Walkabout	592385	840519	Transects
11/08/2021	22:30:17	Natterer's bat	Walkabout	592386	840512	Transects
11/08/2021	22:31:08	Natterer's bat	Walkabout	592385	840512	Transects
11/08/2021	21:53:13	Myotis species	Walkabout	592385	840520	Transects
11/08/2021	21:58:29	Myotis species	Walkabout	592377	840527	Transects
11/08/2021	22:01:45	Myotis species	Walkabout	592389	840519	Transects
11/08/2021	01:06.4	Leisler's bat	Scout	592177	840592	Transects
11/08/2021	16:45.0	Leisler's bat	Scout	592178	840592	Transects
11/08/2021	27:07.7	Leisler's bat	Scout	592562	843380	Transects
11/08/2021	22:18:57	Leisler's bat	Walkabout	592386	840514	Transects
11/08/2021	34:28.2	Common pipistrelle	Scout	592319	840536	Transects
11/08/2021	01:37.0	Common pipistrelle	Scout	592145	840571	Transects
11/08/2021	11:39.6	Common pipistrelle	Scout	595734	842867	Transects
11/08/2021	12:46.0	Common pipistrelle	Scout	595577	843091	Transects
11/08/2021	13:17.7	Common pipistrelle	Scout	595542	843218	Transects
11/08/2021	18:49.9	Common pipistrelle	Scout	594445	844169	Transects
11/08/2021	32:20.4	Common pipistrelle	Scout	591268	843035	Transects
11/08/2021	33:29.5	Common pipistrelle	Scout	590905	842790	Transects
11/08/2021	33:44.6	Common pipistrelle	Scout	590842	842733	Transects
11/08/2021	39:10.4	Common pipistrelle	Scout	589678	841521	Transects
11/08/2021	39:32.9	Common pipistrelle	Scout	589573	841408	Transects
11/08/2021	39:44.0	Common pipistrelle	Scout	589553	841375	Transects
11/08/2021	22:19:37	Common pipistrelle	Walkabout	592401	840550	Transects
11/08/2021	22:25:51	Common pipistrelle	Walkabout	592388	840516	Transects
11/08/2021	22:34:35	Common pipistrelle	Walkabout	592367	840513	Transects
11/08/2021	22:34:40	Common pipistrelle	Walkabout	592367	840520	Transects
11/08/2021	22:41:28	Common pipistrelle	Walkabout	592394	840515	Transects
11/08/2021	30:53.1	Soprano pipistrelle	Scout	592150	840571	Transects
11/08/2021	31:03.8	Soprano pipistrelle	Scout	592151	840574	Transects
11/08/2021	39:33.6	Soprano pipistrelle	Scout	592144	840570	Transects
11/08/2021	40:24.8	Soprano pipistrelle	Scout	592144	840571	Transects
11/08/2021	42:25.2	Soprano pipistrelle	Scout	592144	840571	Transects
11/08/2021	43:29.5	Soprano pipistrelle	Scout	592144	840571	Transects
11/08/2021	54:37.3	Soprano pipistrelle	Scout	592145	840571	Transects
11/08/2021	58:59.9	Soprano pipistrelle	Scout	592145	840571	Transects
11/08/2021	13:45.0	Soprano pipistrelle	Scout	592144	840569	Transects
11/08/2021	14:43.8	Soprano pipistrelle	Scout	592143	840569	Transects
11/08/2021	15:35.3	Soprano pipistrelle	Scout	592143	840569	Transects
11/08/2021	19:20.5	Soprano pipistrelle	Scout	594299	844187	Transects

11/08/2021	32:07.2	Soprano pipistrelle	Scout	591297	843062	Transects
11/08/2021	34:21.7	Soprano pipistrelle	Scout	590697	842573	Transects
11/08/2021	36:57.9	Soprano pipistrelle	Scout	590117	842197	Transects
11/08/2021	37:10.9	Soprano pipistrelle	Scout	590098	842163	Transects
11/08/2021	37:52.4	Soprano pipistrelle	Scout	589999	841958	Transects
11/08/2021	40:53.7	Soprano pipistrelle	Scout	589305	841013	Transects
11/08/2021	41:42.3	Soprano pipistrelle	Scout	589129	840778	Transects
11/08/2021	21:50:01	Soprano pipistrelle	Walkabout	592385	840520	Transects
11/08/2021	21:50:19	Soprano pipistrelle	Walkabout	592382	840518	Transects
11/08/2021	21:55:24	Soprano pipistrelle	Walkabout	592383	840519	Transects
11/08/2021	21:55:34	Soprano pipistrelle	Walkabout	592383	840519	Transects
11/08/2021	21:55:46	Soprano pipistrelle	Walkabout	592383	840518	Transects
11/08/2021	21:55:57	Soprano pipistrelle	Walkabout	592382	840519	Transects
11/08/2021	21:57:12	Soprano pipistrelle	Walkabout	592378	840522	Transects
11/08/2021	22:04:29	Soprano pipistrelle	Walkabout	592390	840517	Transects
11/08/2021	22:37:08	Soprano pipistrelle	Walkabout	592366	840521	Transects
11/08/2021	22:37:45	Soprano pipistrelle	Walkabout	592366	840521	Transects
11/08/2021	22:37:54	Soprano pipistrelle	Walkabout	592367	840513	Transects
11/08/2021	22:38:10	Soprano pipistrelle	Walkabout	592366	840521	Transects
11/08/2021	22:38:26	Soprano pipistrelle	Walkabout	592366	840521	Transects
11/08/2021	05:51.6	Brown long-eared bat	Scout	592144	840570	Transects
12/08/2021	30:01.9	Leister's bat	Scout	591596	843140	Transects
12/08/2021	26:57.1	Common pipistrelle	Scout	591596	843142	Transects
12/08/2021	27:13.1	Common pipistrelle	Scout	591595	843141	Transects
12/08/2021	27:31.2	Common pipistrelle	Scout	591595	843142	Transects
12/08/2021	28:31.9	Common pipistrelle	Scout	591594	843142	Transects
12/08/2021	30:44.6	Common pipistrelle	Scout	591597	843140	Transects
12/08/2021	31:00.7	Common pipistrelle	Scout	591597	843140	Transects
12/08/2021	31:46.1	Common pipistrelle	Scout	591597	843140	Transects
12/08/2021	33:00.4	Common pipistrelle	Scout	591597	843142	Transects
12/08/2021	35:16.0	Common pipistrelle	Scout	591601	843146	Transects
12/08/2021	35:22.8	Common pipistrelle	Scout	591600	843146	Transects
12/08/2021	04:35:20	Common pipistrelle	Walkabout	591336	843108	Transects
12/08/2021	04:35:27	Common pipistrelle	Walkabout	591330	843102	Transects
12/08/2021	04:37:42	Common pipistrelle	Walkabout	591296	843068	Transects
12/08/2021	04:49:06	Common pipistrelle	Walkabout	590732	842880	Transects
12/08/2021	05:17:13	Common pipistrelle	Walkabout	590717	842879	Transects
12/08/2021	04:35:42	Common pipistrelle	Walkabout	591312	843088	Transects
12/08/2021	04:35:57	Common pipistrelle	Walkabout	591303	843078	Transects
12/08/2021	04:35:59	Common pipistrelle	Walkabout	591303	843078	Transects
12/08/2021	04:36:14	Common pipistrelle	Walkabout	591298	843070	Transects
12/08/2021	04:36:23	Common pipistrelle	Walkabout	591298	843070	Transects
12/08/2021	04:36:38	Common pipistrelle	Walkabout	591297	843071	Transects
12/08/2021	04:36:53	Common pipistrelle	Walkabout	591297	843072	Transects
12/08/2021	04:37:00	Common pipistrelle	Walkabout	591297	843072	Transects
12/08/2021	04:37:04	Common pipistrelle	Walkabout	591297	843071	Transects
12/08/2021	04:37:21	Common pipistrelle	Walkabout	591296	843072	Transects
12/08/2021	04:37:27	Common pipistrelle	Walkabout	591295	843072	Transects
12/08/2021	04:38:30	Common pipistrelle	Walkabout	591269	843038	Transects
12/08/2021	04:38:45	Common pipistrelle	Walkabout	591259	843027	Transects
12/08/2021	04:38:46	Common pipistrelle	Walkabout	591259	843027	Transects
12/08/2021	04:54:27	Common pipistrelle	Walkabout	590709	842885	Transects
12/08/2021	04:59:49	Common pipistrelle	Walkabout	590715	842884	Transects
12/08/2021	23:35.2	Soprano pipistrelle	Scout	591600	843139	Transects
12/08/2021	04:53:09	Soprano pipistrelle	Walkabout	590708	842883	Transects
12/08/2021	04:53:17	Soprano pipistrelle	Walkabout	590708	842884	Transects
12/08/2021	05:00:45	Soprano pipistrelle	Walkabout	590715	842885	Transects
17/06/2024	23:47:05	Natterer's bat	Scout	592083	843475	B1 & B19
17/06/2024	23:45:43	Common pipistrelle	Scout	592083	843474	B1 & B19

17/06/2024	22:41:12	Daubenton's bat	M2	590714	842881	B2
17/06/2024	22:57:00	Soprano pipistrelle	M2	591482	842889	B2
17/06/2024	23:05:21	Common pipistrelle	Scout 1	591619	843154	B4
17/06/2024	23:12:48	Common pipistrelle	Scout 1	591618	843154	B4
17/06/2024	23:05:29	Common pipistrelle	Scout 2	591686	842996	B4
17/06/2024	22:28:27	Soprano pipistrelle	Scout 1	591620	843150	B4
17/06/2024	22:28:38	Soprano pipistrelle	Scout 1	591622	843152	B4
17/06/2024	22:28:49	Soprano pipistrelle	Scout 1	591622	843153	B4
17/06/2024	22:30:16	Soprano pipistrelle	Scout 1	591622	843153	B4
17/06/2024	22:30:22	Soprano pipistrelle	Scout 1	591622	843153	B4
17/06/2024	22:30:37	Soprano pipistrelle	Scout 1	591622	843153	B4
17/06/2024	22:34:32	Soprano pipistrelle	Scout 1	591622	843153	B4
18/06/2024	04:32:46	Soprano pipistrelle	Scout	590107	842191	B1 & B19
18/06/2024	03:55:28	Soprano pipistrelle	Scout	590363	842402	B1 & B19
18/06/2024	03:55:38	Soprano pipistrelle	Scout	590360	842408	B1 & B19
18/06/2024	03:55:48	Soprano pipistrelle	Scout	590367	842379	B1 & B19
18/06/2024	03:55:59	Soprano pipistrelle	Scout	590363	842377	B1 & B19
18/06/2024	03:56:10	Soprano pipistrelle	Scout	590362	842378	B1 & B19
18/06/2024	03:57:22	Soprano pipistrelle	Scout	590347	842385	B1 & B19
18/06/2024	03:57:32	Soprano pipistrelle	Scout	590341	842389	B1 & B19
18/06/2024	04:13:01	Soprano pipistrelle	Scout	590096	842182	B1 & B19
18/06/2024	04:15:57	Soprano pipistrelle	Scout	590096	842179	B1 & B19
18/06/2024	04:16:34	Soprano pipistrelle	Scout	590096	842179	B1 & B19
18/06/2024	04:17:24	Soprano pipistrelle	Scout	590096	842179	B1 & B19
18/06/2024	04:18:32	Soprano pipistrelle	Scout	590096	842179	B1 & B19
18/06/2024	04:22:07	Soprano pipistrelle	Scout	590095	842179	B1 & B19
18/06/2024	04:23:24	Soprano pipistrelle	Scout	590094	842182	B1 & B19
18/06/2024	04:23:43	Soprano pipistrelle	Scout	590094	842183	B1 & B19
18/06/2024	04:23:58	Soprano pipistrelle	Scout	590094	842182	B1 & B19
18/06/2024	04:24:28	Soprano pipistrelle	Scout	590095	842179	B1 & B19
18/06/2024	04:24:38	Soprano pipistrelle	Scout	590095	842179	B1 & B19
18/06/2024	04:24:56	Soprano pipistrelle	Scout	590094	842179	B1 & B19
18/06/2024	04:25:23	Soprano pipistrelle	Scout	590095	842179	B1 & B19
18/06/2024	04:26:37	Soprano pipistrelle	Scout	590095	842179	B1 & B19
18/06/2024	04:27:04	Soprano pipistrelle	Scout	590096	842179	B1 & B19
18/06/2024	04:06:38	Common pipistrelle	M2	590699	842875	B3
18/06/2024	04:06:42	Common pipistrelle	M2	590699	842875	B3
18/06/2024	04:13:03	Common pipistrelle	M2	590708	842876	B3
18/06/2024	04:09:59	Common pipistrelle	M2	590708	842876	B3
18/06/2024	04:06:48	Common pipistrelle	M2	590700	842876	B3
18/06/2024	04:13:10	Common pipistrelle	M2	590708	842876	B3
18/06/2024	04:12:58	Common pipistrelle	M2	590708	842876	B3
18/06/2024	04:10:47	Common pipistrelle	M2	590708	842878	B3
18/06/2024	04:11:35	Common pipistrelle	M2	590709	842878	B3
18/06/2024	04:13:36	Common pipistrelle	M2	590710	842878	B3
18/06/2024	04:13:59	Common pipistrelle	M2	590709	842878	B3
18/06/2024	04:12:05	Common pipistrelle	M2	590709	842879	B3
18/06/2024	04:06:13	Common pipistrelle	M2	590704	842879	B3
18/06/2024	04:05:25	Common pipistrelle	M2	590714	842879	B3
18/06/2024	04:07:52	Common pipistrelle	M2	590707	842879	B3
18/06/2024	04:12:11	Common pipistrelle	M2	590710	842879	B3
18/06/2024	04:05:38	Common pipistrelle	M2	590716	842880	B3
18/06/2024	04:07:28	Common pipistrelle	M2	590705	842880	B3
18/06/2024	04:04:40	Common pipistrelle	M2	590714	842880	B3
18/06/2024	04:03:09	Common pipistrelle	M2	590714	842881	B3
18/06/2024	04:00:09	Soprano pipistrelle	Scout 2	591583	843152	B4
18/06/2024	03:52:48	Soprano pipistrelle	Scout 2	591583	843153	B4
18/06/2024	03:59:39	Soprano pipistrelle	Scout 2	591586	843152	B4
18/06/2024	03:58:21	Soprano pipistrelle	Scout 2	591602	843142	B4

18/06/2024	03:57:01	Soprano pipistrelle	Scout 2	591601	843143	B4
18/06/2024	03:52:31	Soprano pipistrelle	Scout 2	591600	843144	B4
18/06/2024	03:59:26	Soprano pipistrelle	Scout 2	591602	843143	B4
18/06/2024	03:59:56	Soprano pipistrelle	Scout 2	591599	843141	B4
18/06/2024	03:58:09	Soprano pipistrelle	Scout 2	591598	843142	B4
18/06/2024	04:00:03	Soprano pipistrelle	Scout 2	591598	843142	B4
18/06/2024	23:10:14	Natterer's bat	M2	592146	840567	B6
18/06/2024	22:39:55	Nathusius' pipistrelle	M2	592147	840568	B6
18/06/2024	22:40:03	Nathusius' pipistrelle	M2	592145	840571	B6
18/06/2024	22:51:10	Common pipistrelle	M2	592145	840567	B6
18/06/2024	22:33:30	Soprano pipistrelle	M2	592149	840588	B6
18/06/2024	22:33:45	Soprano pipistrelle	M2	592142	840575	B6
18/06/2024	22:34:04	Soprano pipistrelle	M2	592147	840567	B6
18/06/2024	22:34:20	Soprano pipistrelle	M2	592152	840563	B6
18/06/2024	22:34:34	Soprano pipistrelle	M2	592154	840562	B6
18/06/2024	22:34:59	Soprano pipistrelle	M2	592150	840566	B6
18/06/2024	22:35:23	Soprano pipistrelle	M2	592150	840565	B6
18/06/2024	22:35:44	Soprano pipistrelle	M2	592151	840565	B6
18/06/2024	22:35:47	Soprano pipistrelle	M2	592151	840564	B6
18/06/2024	22:36:15	Soprano pipistrelle	M2	592150	840567	B6
18/06/2024	22:36:28	Soprano pipistrelle	M2	592147	840569	B6
18/06/2024	22:36:35	Soprano pipistrelle	M2	592147	840570	B6
18/06/2024	22:36:43	Soprano pipistrelle	M2	592146	840571	B6
18/06/2024	22:36:50	Soprano pipistrelle	M2	592145	840571	B6
18/06/2024	22:37:01	Soprano pipistrelle	M2	592143	840572	B6
18/06/2024	22:37:08	Soprano pipistrelle	M2	592144	840571	B6
18/06/2024	22:37:20	Soprano pipistrelle	M2	592145	840570	B6
18/06/2024	22:37:28	Soprano pipistrelle	M2	592146	840570	B6
18/06/2024	22:37:44	Soprano pipistrelle	M2	592149	840568	B6
18/06/2024	22:37:53	Soprano pipistrelle	M2	592150	840567	B6
18/06/2024	22:38:03	Soprano pipistrelle	M2	592150	840568	B6
18/06/2024	22:38:17	Soprano pipistrelle	M2	592150	840567	B6
18/06/2024	22:38:26	Soprano pipistrelle	M2	592152	840565	B6
18/06/2024	22:38:28	Soprano pipistrelle	M2	592152	840564	B6
18/06/2024	22:38:31	Soprano pipistrelle	M2	592152	840564	B6
18/06/2024	22:38:35	Soprano pipistrelle	M2	592153	840563	B6
18/06/2024	22:38:52	Soprano pipistrelle	M2	592152	840564	B6
18/06/2024	22:38:57	Soprano pipistrelle	M2	592151	840566	B6
18/06/2024	22:45:23	Soprano pipistrelle	M2	592147	840571	B6
18/06/2024	22:47:00	Soprano pipistrelle	M2	592146	840570	B6
18/06/2024	22:49:31	Soprano pipistrelle	M2	592145	840570	B6
18/06/2024	22:49:44	Soprano pipistrelle	M2	592145	840569	B6
18/06/2024	22:49:47	Soprano pipistrelle	M2	592144	840569	B6
18/06/2024	22:49:59	Soprano pipistrelle	M2	592144	840569	B6
18/06/2024	22:53:25	Soprano pipistrelle	M2	592148	840570	B6
18/06/2024	22:53:31	Soprano pipistrelle	M2	592147	840570	B6
18/06/2024	23:06:00	Soprano pipistrelle	M2	592145	840569	B6
18/06/2024	23:16:53	Soprano pipistrelle	M2	592193	840587	B6
18/06/2024	22:36:34	Natterer's bat	Scout 1	592385	840511	B7
18/06/2024	22:44:59	Natterer's bat	Scout 1	592385	840510	B7
18/06/2024	22:48:58	Natterer's bat	Scout 1	592385	840510	B7
18/06/2024	22:50:02	Natterer's bat	Scout 1	592381	840514	B7
18/06/2024	22:51:51	Natterer's bat	Scout 1	592381	840514	B7
18/06/2024	22:52:04	Natterer's bat	Scout 1	592381	840514	B7
18/06/2024	22:55:55	Natterer's bat	Scout 1	592381	840515	B7
18/06/2024	23:01:50	Natterer's bat	Scout 1	592385	840512	B7
18/06/2024	23:07:08	Natterer's bat	Scout 1	592385	840513	B7
18/06/2024	23:12:50	Natterer's bat	Scout 1	592384	840514	B7
18/06/2024	22:20:25	Leisler's bat	Scout 1	592385	840510	B7

18/06/2024	22:30:35	Leister's bat	Scout 1	592385	840511	B7
18/06/2024	22:51:42	Leister's bat	Scout 1	592381	840514	B7
18/06/2024	22:53:18	Leister's bat	Scout 1	592381	840515	B7
18/06/2024	22:34:55	Nathusius' pipistrelle	Scout 1	592385	840511	B7
18/06/2024	22:14:20	Common pipistrelle	Scout 1	592388	840514	B7
18/06/2024	22:31:19	Common pipistrelle	Scout 1	592385	840511	B7
18/06/2024	23:02:48	Common pipistrelle	Scout 1	592385	840512	B7
18/06/2024	22:38:00	Common pipistrelle	Scout 1	592385	840512	B7
18/06/2024	22:54:35	Common pipistrelle	Scout 1	592381	840515	B7
18/06/2024	22:55:46	Common pipistrelle	Scout 1	592381	840515	B7
18/06/2024	22:57:46	Common pipistrelle	Scout 1	592382	840514	B7
18/06/2024	22:59:04	Common pipistrelle	Scout 1	592382	840515	B7
18/06/2024	23:00:21	Common pipistrelle	Scout 1	592385	840512	B7
18/06/2024	23:06:47	Common pipistrelle	Scout 1	592385	840513	B7
18/06/2024	23:11:50	Common pipistrelle	Scout 1	592384	840514	B7
18/06/2024	23:14:20	Common pipistrelle	Scout 1	592384	840514	B7
18/06/2024	23:21:25	Common pipistrelle	Scout 1	592400	840517	B7
18/06/2024	22:47:03	Soprano pipistrelle	Scout 1	592385	840510	B7
18/06/2024	22:56:39	Soprano pipistrelle	Scout 1	592382	840514	B7
18/06/2024	23:02:14	Soprano pipistrelle	Scout 1	592385	840512	B7
18/06/2024	23:03:53	Soprano pipistrelle	Scout 1	592385	840512	B7
18/06/2024	23:05:44	Soprano pipistrelle	Scout 1	592385	840512	B7
18/06/2024	22:32:18	Common pipistrelle	Scout	593057	840613	B8
18/06/2024	22:38:24	Common pipistrelle	Scout	593063	840616	B8
18/06/2024	22:43:51	Common pipistrelle	Scout	593060	840603	B8
18/06/2024	22:45:07	Common pipistrelle	Scout	593058	840603	B8
18/06/2024	22:45:42	Common pipistrelle	Scout	593060	840605	B8
18/06/2024	22:46:30	Common pipistrelle	Scout	593060	840607	B8
18/06/2024	22:46:39	Common pipistrelle	Scout	593060	840607	B8
18/06/2024	22:46:46	Common pipistrelle	Scout	593060	840609	B8
18/06/2024	22:47:11	Common pipistrelle	Scout	593060	840607	B8
18/06/2024	22:52:27	Common pipistrelle	Scout	593056	840612	B8
18/06/2024	22:54:10	Common pipistrelle	Scout	593058	840609	B8
18/06/2024	22:54:40	Common pipistrelle	Scout	593060	840603	B8
18/06/2024	22:55:19	Common pipistrelle	Scout	593069	840608	B8
18/06/2024	22:55:53	Common pipistrelle	Scout	593063	840601	B8
18/06/2024	22:56:00	Common pipistrelle	Scout	593058	840598	B8
18/06/2024	22:56:10	Common pipistrelle	Scout	593058	840597	B8
18/06/2024	23:01:36	Common pipistrelle	Scout	593061	840583	B8
18/06/2024	23:12:21	Common pipistrelle	Scout	593056	840605	B8
18/06/2024	23:12:49	Common pipistrelle	Scout	593064	840602	B8
18/06/2024	23:19:30	Common pipistrelle	Scout	593060	840607	B8
18/06/2024	23:29:17	Common pipistrelle	Scout	593062	840605	B8
18/06/2024	23:29:25	Common pipistrelle	Scout	593063	840606	B8
18/06/2024	22:46:26	Common pipistrelle	Scout	593060	840607	B8
18/06/2024	22:46:42	Common pipistrelle	Scout	593060	840608	B8
18/06/2024	22:46:56	Common pipistrelle	Scout	593060	840608	B8
18/06/2024	22:54:50	Common pipistrelle	Scout	593060	840602	B8
18/06/2024	22:56:34	Common pipistrelle	Scout	593056	840597	B8
18/06/2024	22:59:56	Common pipistrelle	Scout	593055	840603	B8
18/06/2024	23:20:52	Common pipistrelle	Scout	593056	840604	B8
18/06/2024	22:50:51	Soprano pipistrelle	Scout	593056	840608	B8
01/07/2024	23:18:37	Daubenton's bat	M2	590991	839543	Bridge 1
01/07/2024	23:31:35	Daubenton's bat	M2	590992	839543	Bridge 1
01/07/2024	23:31:46	Daubenton's bat	M2	590991	839543	Bridge 1
01/07/2024	23:32:53	Daubenton's bat	M2	590991	839543	Bridge 1
01/07/2024	23:32:31	Daubenton's bat	M2	590991	839543	Bridge 1
01/07/2024	23:16:04	Daubenton's bat	M2	590992	839544	Bridge 1
01/07/2024	22:46:55	Common pipistrelle	M2	590992	839542	Bridge 1

01/07/2024	22:46:25	Common pipistrelle	M2	590991	839542	Bridge 1
01/07/2024	22:46:59	Common pipistrelle	M2	590992	839542	Bridge 1
01/07/2024	22:50:47	Common pipistrelle	M2	590992	839543	Bridge 1
01/07/2024	22:52:57	Common pipistrelle	M2	590991	839543	Bridge 1
01/07/2024	22:51:25	Common pipistrelle	M2	590991	839544	Bridge 1
01/07/2024	22:48:44	Common pipistrelle	M2	590992	839547	Bridge 1
01/07/2024	23:14:10	Common pipistrelle	M2	590992	839545	Bridge 1
01/07/2024	23:07:53	Soprano pipistrelle	M2	590992	839541	Bridge 1
01/07/2024	23:08:18	Soprano pipistrelle	M2	590993	839542	Bridge 1
01/07/2024	22:36:15	Soprano pipistrelle	M2	590991	839543	Bridge 1
01/07/2024	23:00:43	Soprano pipistrelle	M2	590993	839545	Bridge 1
01/07/2024	22:46:55	Soprano pipistrelle	M2	590992	839542	Bridge 1
01/07/2024	22:46:25	Soprano pipistrelle	M2	590991	839542	Bridge 1
01/07/2024	22:46:59	Soprano pipistrelle	M2	590992	839542	Bridge 1
01/07/2024	22:50:47	Soprano pipistrelle	M2	590992	839543	Bridge 1
01/07/2024	22:52:57	Soprano pipistrelle	M2	590991	839543	Bridge 1
01/07/2024	22:51:25	Soprano pipistrelle	M2	590991	839544	Bridge 1
01/07/2024	22:48:44	Soprano pipistrelle	M2	590992	839547	Bridge 1
20/08/2024	23:52:24	Soprano pipistrelle	Static 36	593678	840116	B15

Appendix IV: Additional Information

Tables from Collins (2016) and Marnell *et al.* (2022)Table G: Building Bat Roost Classification System & Survey Effort (Adapted from Collins, 2016 and Marnell *et al.*, 2022).

Suitability Category	Description (examples of criteria)	Survey Effort (Timings)
Negligible	Building have no potential as a roost site Urban setting, heavily disturbed, building material unsuitable, building in poor condition etc.	No surveys required.
Low	Building has a low potential as a roost site. No evidence of bat usage (e.g. droppings)	One dusk or dawn survey.
Medium	Building with some suitable voids / crevices for roosting bats. Some evidence of bat usage Suitable foraging and commuting habitat present.	At least one survey in May to August, minimum of two surveys (one dusk and one dawn).
High	Building with many features deemed suitable for roosting bats. Evidence of bat usage. Largely undisturbed setting, rural, suitable foraging and commuting habitat, suitable roof void and building material.	At least two surveys in May to August, with a minimum of three surveys (at least one dusk survey and one dawn survey).

Table H: Tree Bat Roost Category Classification System (adapted from Collins, 2016).

Tree Category	Description
1 High	Trees with multiple, highly suitable features (Potential Roosting Features = PRFs) capable of supporting larger roosts
2 Moderate	Trees with definite bat potential but supporting features (PRFs) suitable for use by individual bats;
3 Low	Trees have no obvious potential although the tree is of a size and age that elevated surveys may result in cracks or crevices being found or the tree supports some features (PRFs) which may have limited potential to support bats;
4 Negligible	Trees have no potential.

Site Risk Assessment & Impact Assessment (NaturScot, 2021)

According to NaturScot, 2021 wind farms can affect bats in the following ways:

- Collision mortality, barotrauma and other injuries (although it is important to consider these in the context of other forms of anthropogenic mortality)
- Loss or damage to commuting and foraging habitat, (wind farms may form barriers to commuting or seasonal movements, and can result in severance of foraging habitat);
- Loss of, or damage to, roosts;
- Displacement of individuals or populations (due to wind farm construction or because bats avoid the wind farm area).

According to the NaturScot, 2021 to ensure that bats are protected by minimising the risk of collision, an assessment of impact at a site requires an appraisal of:

- The level of activity of all bat species recorded at the site assessed both spatially and temporally.
- The risk of turbine-related mortality for all bat species recorded at the site during bat activity surveys.
- The effect on the species' population status if predicted impacts are not mitigated.

In addition, it is recommended to consider the relevant factors in the assessment process:

- Is the bat species at the edge of its range
- Cumulative effects
- Presence of protected sites
- Proximity of maternity roosts
- Key foraging areas
- Key flight lines
- Possible migration routes.

Using Table 3 (See Appendices for details) in the SNH (2021) guidelines the following risk assessment for the individual turbines in relation to each bat species recorded was completed using the following values:

- Project Size = Medium (14 turbines);
- Habitat Risk = Low;
- Proposed tall wind turbines.

Therefore a value of 3 (or 4 for T9 and T14) is applied to this proposed development site (Stage 1 Site Risk Assessment) and this is multiplied by the EcoBat value for the three most common bat species recorded which are also High Risk species (i.e. Leisler's bat, common pipistrelle and soprano pipistrelle) for two separate value categories.

The overall value of the site is based on a summary of assessment in relation to bat activity (in the absence of EcoBat).

Overall assessment value (i.e. Turbine Risk value) is then compared to the ranges below:

- Low (green) 0-4
- Medium (amber) 5-12
- High (red) 15-25

Bat Population Trends & Species Profile

6.1.2 Irish Bat Monitoring Programme – Population Trends

The Irish Bat Monitoring Programme provides information on monitoring schemes managed by Bat Conservation Ireland:

- Car-Based Bat Monitoring (All Ireland) – monitors common pipistrelle, soprano pipistrelle, Leisler's bats with limited information for Nathusius' pipistrelle and *Myotis* species.
- All Ireland Daubenton's Bat Waterway Monitoring
- Brown Long-eared Bat Roost Monitoring
- Lesser Horseshoe Bat Monitoring

This provides population trend data for seven bat species: common pipistrelle, soprano pipistrelle, Leisler's bat, Nathusius' pipistrelle, Daubenton's bat, brown long-eared bat and lesser horseshoe bat (some limited data for *Myotis* species). Pilot monitoring surveys for Natterer's bat and whiskered bat are currently in progress.

Annual reporting is undertaken and Aughney *et al.* (2023) is referenced for this report. In summary, the population trends for each bat species are as follows:

- Trends of the three common bat species (common pipistrelle, soprano pipistrelle and Leisler's bat) continued to increase in 2022, although the yearly estimates of common pipistrelle levelled out a little. Confidence intervals of these three bat species were all above their baseline indices indicating they each show a significantly increasing trend.
- Nathusius' pipistrelle trends are still unclear due to low encounter rates but decreased a little in 2022 compared to previous years.
- The yearly estimate for the *Myotis* spp. group steadied out a little but overall the smoothed trend for this group is still well below the baseline.
- Daubenton's bat numbers trend line appears to be fairly steady from year to year with error bars consistently encompassing the baseline.
- Brown long-eared bat shows a fluctuating trend around the baseline and is considered to be currently stable.
- Lesser horseshoe bat continues to increase in 2022 for the summer counts while low winter counts caused a slight downward trend in 2022. But overall, this species has increased over the last 20 years of monitoring.

Leisler's bat

Ireland's population is deemed of international importance and the paucity of knowledge of roosting sites, makes this species vulnerable. However, it is considered to be widespread across the island. The modelled Core Area for Leisler's bats is a relatively large area that covers much of the island of Ireland (52,820km²). The Bat Conservation Ireland Irish Landscape Model indicated that the Leisler's bat habitat preference has been difficult to define in Ireland. Habitat modelling for Ireland shows an association with riparian habitats and woodlands (Roche *et al.*, 2014). The landscape model emphasised that this is a species that cannot be defined by habitats preference at a local scale compared to other Irish bat species but that it is a landscape species and has a habitat preference at a scale of 20.5km. In addition, of all Irish bat species, Leisler's bats have the most specific roosting requirements. It tends to select roosting habitat with areas of woodland and freshwater.

Irish Status	Near Threatened
European Status	Least Concern
Global Status	Least Concern
Irish Population Trend	2003-2013 ↑
Estimated Irish Population Size	73,000 to 130,000 (2007-2013) Ireland is considered the world stronghold for this species
Estimate Core Area (Lundy <i>et al.</i> 2011)	52,820 km ²

Taken from Roche *et al.*, 2014, Lysaght & Marnell, 2016 & Marnell *et al.*, 2019

The principal concerns for Leisler's bats are poorly known in Ireland but those that are relevant for this survey area are as follows:

- Selection of maternity sites is limited to specific habitats;
- Relative to the population estimates, the number of roost sites is poorly recorded;
- Tree felling, especially during autumn and winter months; and
- Increasing urbanisation.

Common pipistrelle

This species is generally considered to be the most common bat species in Ireland. The species is widespread and is found in all provinces. The modelled Core Area for common pipistrelles is a large area that covers much of the island of Ireland (56,485km²) which covers primarily the east and south east of the area (Roche *et al.*, 2014). The Bat Conservation Ireland Irish Landscape Model indicated that the Common pipistrelle selects areas with broadleaf woodland, riparian habitats and low density urbanization (<30%) (Roche *et al.*, 2014).

Irish Status	Least Concern
European Status	Least Concern
Global Status	Least Concern
Irish Population Trend	2003-2013 ↑
Estimated Irish Population Size	1.2 to 2.8 million (2007-2012)
Estimate Core Area (km ²) (Lundy <i>et al.</i> 2011)	56,485

Taken from Roche *et al.*, 2014, Lysaght & Marnell, 2016 & Marnell *et al.*, 2019

Principal concerns for Common pipistrelles in Ireland that are relevant for this survey area are as follows:

- Lack of knowledge of roosting requirements
- This species has complex habitat requirements in the immediate vicinity of roosts. Therefore, careful site specific planning for this species is required in order to ensure all elements are maintained.
- Renovation or demolition of derelict buildings.
- Tree felling
- Increasing urbanisation (e.g. increase in lighting)

Soprano pipistrelle

This species is generally considered to be the second most common bat species in Ireland. The species is widespread and is found in all provinces, with particular concentration along the western seaboard. The modelled Core Area for soprano pipistrelle is a large area that covers much of the island of Ireland (62,020km²). The Bat Conservation Ireland Irish Landscape Model indicated that

the soprano pipistrelle selects areas with broadleaf woodland, riparian habitats and low density urbanisation (Roche *et al.*, 2014).

Irish Status	Least Concern
European Status	Least Concern
Global Status	Least Concern
Irish Population Trend	2003-2013 ↑
Estimated Irish Population Size	0.54 to 1.2 million (2007-2012)
Estimate Core Area (km ²) (Lundy <i>et al.</i> 2011)	62,020

Taken from Roche *et al.*, 2014, Lysaght & Marnell, 2016 & Marnell *et al.*, 2019

Principal concerns for Soprano pipistrelles in Ireland that are relevant for this survey area are as follows:

- Lack of knowledge of roosts;
- Renovation or demolition of structures;
- Tree felling; and
- Increasing urbanisation (e.g. increase in lighting).

Brown long-eared Bat

This species is generally considered to be widespread across the island. The modelled Core Area for Brown long-eared bats is a relatively large area that covers much of the island of Ireland (52,820km²) with preference suitable areas in the southern half of the island. The Bat Conservation Ireland Irish Landscape Model indicated that the Brown long-eared bat habitat preference is for areas with broadleaf woodland and riparian habitats on a small scale of 0.5km emphasising the importance of local landscape features for this species (Roche *et al.*, 2014).

Irish Status	Least Concern
European Status	Least Concern
Global Status	Least Concern
Irish Population Trend	2008-2013 Stable
Biographical Range	km ²
Estimate Core Area (Lundy <i>et al.</i> 2011)	49,929 km ²

Taken from Roche *et al.*, 2014, Lysaght & Marnell, 2016 & Marnell *et al.*, 2019

Principal concerns for brown long-eared bats are poorly known in Ireland, but those that are relevant for this survey area are as follows:

- Selection of maternity sites is limited to specific habitats;
- Lack of knowledge of winter roosts;
- Loss of woodland, scrub and hedgerows;
- Tree surgery and felling;
- Increasing urbanisation; and
- Light pollution.

Natterer's bat

There are three species included in the *Myotis* species family and their echolocation calls are very similar across these three species. The modelled Core Area for Natterer's bats is a relatively large area that covers much of the island of Ireland (52,864km²). The Bat Conservation Ireland Irish Landscape Model indicated that the Natterer's bat selects areas with broadleaf woodland, riparian

habitats and areas with larger scale provision of mixed forest (Roche *et al.*, 2014). Therefore, it is likely that this species is more widespread within the survey area.

Irish Status	Least Concern
European Status	Least Concern
Global Status	Least Concern
Irish Population Trend	Unknown
Estimated Irish Population Size	Unknown
Estimate Core Area (Lundy <i>et al.</i> 2011)	52,864

Taken from Roche *et al.*, 2014, Lysaght & Marnell, 2016 & Marnell *et al.*, 2019

Principal concerns for Natterer's bats in Ireland that are relevant for this survey area are as follows:

- Lack of knowledge of roosting requirements;
- This species has complex habitat requirements in the immediate vicinity of roosts. Therefore careful site specific planning for this species is required in order to ensure all elements are maintained;
- Tree felling; and
- Increasing urbanisation (e.g. increase in lighting).

Daubenton's bat

The modelled Core Area for Daubenton's bats is a relatively large area that covers much of the island of Ireland (41,285km²) reflecting the distribution of sizeable river catchments. The Irish Landscape Model indicated that the Daubenton's bat habitat preference is for areas with broadleaf woodland, riparian habitats and low density urbanisation (Roche *et al.*, 2014).

Irish Status	Least Concern
European Status	Least Concern
Global Status	Least Concern
Irish Population Trend	2008-2013 Stable
Estimated Irish Population Size	81,000 to 103,000 (2007-2012)
Estimate Core Area (km ²) (Lundy <i>et al.</i> 2011)	41,285

Taken from Roche *et al.*, 2014, Lysaght & Marnell, 2016 & Marnell *et al.*, 2019

Principal concerns for Daubenton's bats are poorly known in Ireland but those that are relevant for this survey area are as follows:

- Potential roost loss due to bridge maintenance;
- Loss of woodland and forest clearance;
- Loss of woodland, scrub and hedgerows;
- Tree surgery and felling;
- Increasing urbanisation; and
- Light pollution.

Nathusius' pipistrelle

The modelled Core Area for Nathusius' pipistrelle is a relatively restricted area (13,543km²) and these areas are primarily associated with large water bodies such as Lough Neagh and the Lough Erne complex. The Bat Conservation Ireland Irish Landscape Model indicated that the Nathusius' pipistrelle habitat preference is large waterbodies (Roche *et al.*, 2014). But due to the paucity of

information on this species, the knowledge of this species preference in Ireland is limited, any records recorded for this species is important.

Irish Status	Least Concern
European Status	Least Concern
Global Status	Least Concern
Irish Population Trend	2003-2013 (limited data, probably stable)
Estimated Irish Population Size	10,000 to 18,000 (2007-2013)
Estimate Core Area (km²) (Lundy <i>et al.</i> 2011)	13,543

Taken from Roche *et al.*, 2014, Lysaght & Marnell, 2016 & Marnell *et al.*, 2019

The principal concerns for Nathusius' pipistrelle is the fact that roosting sites are poorly known in the Republic of Ireland:

- Lack of knowledge of winter sites and whether migration occurs;
- Renovation or demolition of derelict buildings and structures may cause undocumented roost losses; and
- Water pollution may be a threat to this species because it is particularly associated with lakes.

6.1.3 Core Sustenance Zones

Please note that there is a greater number of bat species resident in the UK compared to Ireland and therefore some of the species listed below are not resident in Ireland.

Table 1. Core Sustenance Zone sizes calculated for UK bat species

Species	CSZ radius (km)
Greater horseshoe bat <i>Rhinolophus ferrumequinum</i>	3
Lesser horseshoe bat <i>Rhinolophus hipposideros</i>	2
Barbastelle <i>Barbastella barbastellus</i>	6
Brown long-eared bat <i>Plecotus auritus</i>	3
Grey long-eared bat <i>Plecotus austriacus</i>	3
Daubenton's bat <i>Myotis daubentonii</i>	2
Natterer's bat <i>Myotis nattereri</i>	4
Whiskered/Brandt's/Alcathoe bat <i>Myotis mystacinus/brandtii/alcathoe</i>	1
Bechstein's bat <i>Myotis bechsteinii</i>	3**
Common pipistrelle <i>Pipistrellus pipistrellus</i>	2
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	3
Nathusius pipistrelle <i>Pipistrellus nathusii</i>	3
Noctule <i>Nyctalus noctula</i>	4
Leisler's bat <i>Nyctalus leisleri</i>	3
Serotine <i>Eptesicus serotinus</i>	4

** Note: There may be justification with Annex II and other rare species to increase the CSZ to reflect use of the landscape by all bats in a population. We suggest increasing the CSZ of Bechstein's bat to at least 3km, reflecting its very specific habitat requirements.

Extracted from [Bat-Species-Core-Sustenance-Zones-and-Habitats-for-Biodiversity-Net-Gain.pdf \(bats.org.uk\)](#)