

Environmental Impact Assessment

# Sandy Knowe Wind Farm Extension

Technical Appendix 6-4: Bat Report

ERG UK Holding Ltd.



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# 1 Introduction

## 1.1 Terms of reference

In May 2020 Atmos Consulting Ltd (Atmos) were commissioned by the Applicant to carry out bat surveys on the western extension and the northern extension was surveyed in 2021 as this area was then incorporated into the Proposed Development Footprint.

The Proposed Development is located approximately 9km west of Sanquhar and 1km southwest of Cumnock, Dumfries and Galloway (central grid reference NS 68721 11100). The Proposed Development lies adjacent to the Sandy Knowe Wind Farm which was consented in July 2020 and is currently under construction.

The Applicant commissioned the survey to establish the baseline condition as summarised in this Technical Appendix (TA).

This TA has been prepared to support Volume 1, Chapter 6: Ecology and should be read in conjunction with that chapter.

Automated static surveys were carried out over two years, in the part of the Proposed Development known as the western extension in 2020 (i.e., the area to the west of the Sandy Knowe Wind Farm comprising of turbines T25 to T28 and associated infrastructure) and in both the western and northern extensions (i.e., the area to the north of the Sandy Knowe Wind Farm comprising of turbines T29 to T30 and associated infrastructure) in 2021 (Volume 3, Figure 6-7).

## 1.2 Report Aims

This report seeks to confirm the presence or likely absence of bats within the structures of interest and document the results of the surveys with the following details:

- Legislative context;
- Field survey methodology;
- Field survey results; and
- Discussion.

## 2 Legislative Context

All bat species in Scotland are protected by the Conservation (Natural Habitats, &c.) Regulations 1994 as amended in Scotland and are commonly referred to as European Protected Species (EPS). The Regulations transpose into Scottish law the European Community's Habitats Directive (92/43/EEC).

It is an offence to deliberately or recklessly:

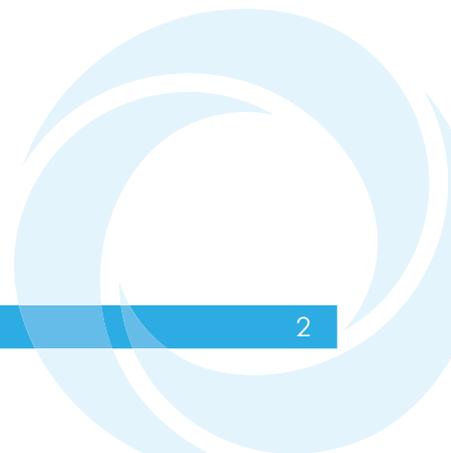
- Capture, injure or kill a bat;
- Harass an individual or group of bats;
- Disturb a bat while it is occupying a structure or place used for shelter or protection;
- Disturb a bat while it is rearing or otherwise caring for its young;
- Obstruct access to a breeding site or resting place, or otherwise deny the animal use of the breeding site or resting place;
- Disturb a bat in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs;
- Disturb a bat in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young;
- Disturb a bat while it is migrating or hibernating;

It is also an offence of strict liability to:

- Damage or destroy a breeding site or resting place of a bat even if they are not in use at the time (i.e., a summer roost during the winter period).

Of the 18 UK bat species, ten occur in Scotland: common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *P. pygmaeus*, Nathusius' pipistrelle *P. nathusii*, Natterer's *Myotis nattereri*, Daubenton's *M. daubentonii*, noctule *Nyctalus noctula*, brown long-eared bats *Plecotus auritus*, Leisler's *N. leisleri* and whiskered/Brandt's *M. mystacinus/M. brandtii* bats. However, the occurrence of these species is variable throughout Scotland.

In addition to the above a number of bat species are included within the Scottish Biodiversity List, including Brandt's, Daubenton's, whiskered, Natterer's, noctule, Nathusius', common pipistrelle, soprano pipistrelle and brown long-eared.



## 3 Methodology

### 3.1 Automatic Detector Survey

#### 3.1.1 2020

Static bat detectors were deployed at five locations over three visits in May, July and August 2020. Full spectrum bat detectors (Wildlife Acoustics Song Meter SM2+ detectors with SMx-II weatherproof acoustic microphones) were used.

The five locations corresponded to an early iteration of the wind farm design; however as the design advanced the layout changed and detector 5 was not associated with any turbine in the final design of the Proposed Development. As such, limited data from this detector is presented.

The detectors were set up to record activity from 30 minutes before sunset to 30 minutes after sunrise for a period of at least 10 nights. Table 1 shows the details of each of the three visits.

**Table 1: Bat static deployment details**

| Visit Number | Date of deployment and retrieval | Number of nights deployed | Automatic time on and off | Hours detector on per night |
|--------------|----------------------------------|---------------------------|---------------------------|-----------------------------|
| 1            | 24/05/2020 – 03/06/2020          | 10                        | 20:55 – 05:50             | 8.9                         |
| 2            | 14/07/2020 – 24/07/2020          | 10                        | 21:30 – 05:10             | 7.6                         |
| 3            | 19/08/2020 – 03/09/2020          | 15                        | 20:10 – 06:10             | 10                          |

Detectors were deployed in areas close to the proposed turbine locations as shown in Table 2.

**Table 2: Static locations for 2020**

| Static | Corresponding Turbine | Approximate Grid Reference |
|--------|-----------------------|----------------------------|
| D1     | T25                   | NS 68079 10356             |
| D2     | T26                   | NS 67997 10668             |
| D3     | T27                   | NS 68205 10922             |
| D4     | T28                   | NS 68407 11209             |
| D5     |                       | NS 68825 11769             |

#### 3.1.2 2021

Static bat detectors were deployed at six locations over two visits in May and July 2021. Full spectrum bat detectors (Wildlife Acoustics Song Meter Mini Bats) were used.

The detectors were set up to record activity from 30 minutes before sunset to 30 minutes after sunrise for a period of at least 10 nights. Table 3 shows the details of each of the three visits.

**Table 3: Bat static deployment details**

| Visit Number | Date of deployment and retrieval | Number of nights deployed | Automatic time on and off | Hours detector on per night |
|--------------|----------------------------------|---------------------------|---------------------------|-----------------------------|
| 1            | 25/05/2021 – 04/06/2021          | 10                        | 21:00 – 05:20             | 8.3                         |
| 2            | 27/07/2021 – 17/08/2021          | 21                        | 21:00 – 05:40             | 8.6                         |

**Table 4: Static locations for 2021**

| Static | Corresponding Turbine | Approximate Grid Reference |
|--------|-----------------------|----------------------------|
| D1     | T25                   | NS 68311 10314             |
| D2     | T26                   | NS 68210 10739             |
| D3     | T27                   | NS 68328 11091             |
| D4     | T28                   | NS 68428 11273             |
| D5     | T29                   | NS 70082 11318             |
| D6     | T30                   | NS 70308 11271             |

### 3.2 Sonogram Analysis

Analysis of full spectrum WAV files was undertaken using AnalookW v4.4a. All files were analysed with the assistance of bespoke species filters (using zero cross outputs).

Some species of bat are also difficult to confidently identify from sonogram analysis alone. As a result, not all calls were identified to species level with all species from the *Myotis* genera identified to genera level only.

Absolute measures of bat activity are not possible to reliably calculate for automated field studies as during recording sessions it is not possible to differentiate between one bat passing the detector ten times or ten different bats passing the detector on a single occasion. As a result, relative measures are used and must be taken into consideration when interpreting results.

The index of bat activity was taken to be a sonogram file (maximum length of 15 secs) recorded from the static detectors. Although this is to some degree an arbitrary measure, the activity levels are comparable across detectors, and it is a frequently used index. For the purpose of this report each file containing a call from a species is termed a 'pass'. Data is then converted to passes per hour adjusting for location specific night time duration (sunset to sunrise) and days of deployment (adjusted to each detectors period of functioning).

Sonogram data for each detector location during each of the survey sessions was organised and used for analysis of activity levels across static detector locations and across survey periods. In addition, the data was also organised into the required format to upload for additional analysis within the secure online tool Ecobat (<http://www.ecobat.org.uk>). This analysis tool enables comparisons to be made in a spatial context allowing a geographically relevant assessment of activity levels. It

should be noted that there is no function within Ecobat to know what volume of data is being used for geographic comparisons and as the system is in its infancy, interpreting comparative measures, especially within the remote Scottish uplands will require caution.

The Ecobat analysis approach includes a variety of outputs useful for ascertaining the importance of a site with respect to bat distribution and activity levels. In upland habitats, the issue of spatial and temporal variation is very pronounced with the potential for bat detectors to record no activity at locations generally unsuitable for bats, for example some wind farm sites. Ecobat can analyse rates of activity including or excluding 'zero activity' nights. Analysis provided by Ecobat with respect to the geographical context provides a comparative measure of high, moderate, or low activity, however, and is based on the exclusion of 'zero activity' nights and although presented here, is likely to be an over-estimation of true activity levels.

### 3.3 Limitations

#### 3.3.1 2021

During 2021 surveys a scheduling error meant that two of the recommended three months of survey data were collected. Given that surveys were carried out over two years however – on the western extension in 2020 and on the western and northern extensions in 2021 - we are confident that the baseline information is sufficient to inform the assessment. This is because the western extension has had two years of survey, as opposed to the one year required by guidance, albeit not precisely conforming to SNH 2019. The Proposed Development overall has also had two years of survey, for whilst the northern extension was not surveyed in 2020, surveys on the western extension during 2020 provide contextual information in relation to it.

## 4 Results

### Weather

Current guidance (Scottish Natural Heritage, 2019)<sup>1</sup> stipulates that surveys should capture a sufficient number of nights with appropriate weather conditions for bat activity. Lower temperature requirements are identified for Scotland with a minimum recommended temperature of 8°C at dusk.

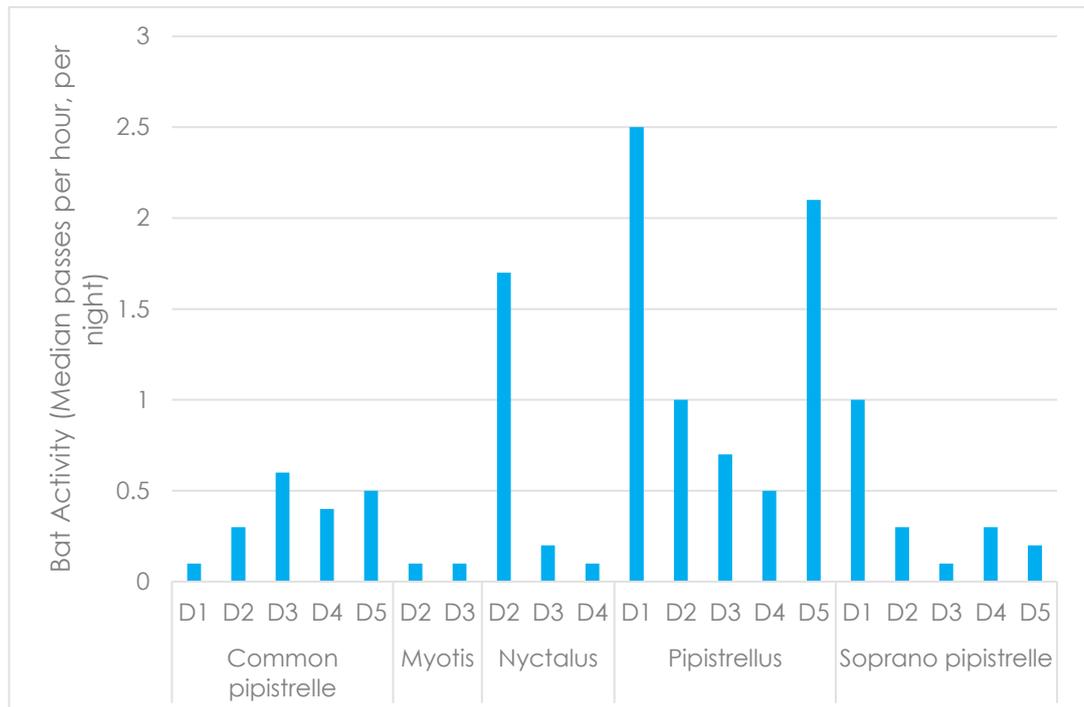
### 4.1 2020

#### 4.1.1 Overall Site Activity

The results of the static detector surveys identified the presence of at least four species: common pipistrelle, soprano pipistrelle, *Myotis* species and *Nyctalus* species. In total 1100 bat passes were recorded. Of which, 50.8% from calls identified only to Pipistrelle level only. 32.5% were identified to *Common pipistrelle* and 6.4% to *Soprano pipistrelle*. *Nyctalus* and *Myotis* comprised of 9.5% and 0.7% of all the calls respectively. The median nightly pass rate showed variation in the highest median pass rate for the different species. The highest activity for *Common pipistrelle* was at D3, *Soprano pipistrelle* at D1 and *Pipistrelle* at D1. Activity for *Nyctalus* was highest at D2, while activity was similar for *Myotis* at D2 and D3, the only two detectors that detected *Myotis* activity. See Volume 3, Figure 6-7 for static detector locations.

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<sup>1</sup> Scottish Natural Heritage. (2019) Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation.



**Figure 1. The median nightly pass rate (bat passes per hour) of each species.**

Bat pass rates are often highly variable between nights, with some nights having few or no passes and other nights having high activity. This is particularly pronounced on sites within the Scottish uplands. In these circumstances, the median is likely to be a more useful summary of the typical activity than is the mean (Lintott & Mathews, 2018).

#### 4.1.2 Spatial Variation

Table 5 presents the activity levels within the context of the geographic location and temporal coverage as computed by Ecobat. As discussed in section 3.2 this approach excludes 'zero activity' nights and as a result is likely to represent data skewed towards high activity levels. The analysis compares activity levels to centrally held data recorded within 30 days of the survey date and within 100 km<sup>2</sup> of the detector location. The results show that D3 had the highest activity levels for *Pipistrellus* species with three nights of high bat activity, along with Common pipistrelle recording one night of high bat activity at this location. *Pipistrellus*, and common pipistrelle showed several nights of high activity at D2. D5 recorded a single night of high levels of activity for *Pipistrellus* species. Four nights of *Nyctalus* activity was recorded at D2 with one of these nights in the high activity range. Low levels of *Nyctalus* activity were also recorded at D3 and D4. It should be considered that the total number of recording nights for all four turbine locations was 35, therefore suggesting an overall low use of the site by bats.

**Table 5: Summary table showing the number of nights recorded bat activity fell into each activity bands for each species. Data excludes 'zero activity' nights.**

| Detector ID | Species/Species Group | Nights of High Activity | Nights of Moderate/ High Activity | Nights of Moderate Activity | Nights of Low/Moderate Activity | Nights of Low Activity |
|-------------|-----------------------|-------------------------|-----------------------------------|-----------------------------|---------------------------------|------------------------|
| D2          | <i>Myotis spp.</i>    | 0                       | 0                                 | 0                           | 0                               | 2                      |
| D3          |                       | 0                       | 0                                 | 0                           | 1                               | 4                      |
| D2          | <i>Nyctalus spp.</i>  | 1                       | 1                                 | 1                           | 1                               | 0                      |
| D3          |                       | 0                       | 0                                 | 0                           | 2                               | 3                      |
| D4          |                       | 0                       | 0                                 | 0                           | 3                               | 5                      |
| D1          | Pipistrellus species  | 0                       | 1                                 | 0                           | 0                               | 0                      |
| D2          |                       | 2                       | 4                                 | 2                           | 3                               | 0                      |
| D3          |                       | 3                       | 1                                 | 3                           | 3                               | 1                      |
| D4          |                       | 0                       | 3                                 | 3                           | 2                               | 0                      |
| D5          |                       | 1                       | 6                                 | 1                           | 0                               | 0                      |
| D1          | Common pipistrelle    | 0                       | 1                                 | 0                           | 0                               | 4                      |
| D2          |                       | 1                       | 1                                 | 4                           | 4                               | 3                      |
| D3          |                       | 1                       | 2                                 | 4                           | 1                               | 2                      |
| D4          |                       | 0                       | 2                                 | 1                           | 3                               | 2                      |
| D5          |                       | 0                       | 5                                 | 2                           | 4                               | 2                      |
| D1          | Soprano pipistrelle   | 0                       | 1                                 | 0                           | 0                               | 0                      |
| D2          |                       | 0                       | 1                                 | 0                           | 3                               | 1                      |
| D3          |                       | 0                       | 0                                 | 0                           | 1                               | 3                      |
| D4          |                       | 0                       | 0                                 | 2                           | 3                               | 2                      |
| D5          |                       | 0                       | 0                                 | 2                           | 3                               | 5                      |

### 4.1.3 Temporal variation

Activity levels can vary significantly throughout the activity season which may indicate a number of potential features being close by, such as maternity roosts, swarming sites and hibernation roosts. Bat passes were recorded for each species in relation to their emergence time, between 15 minutes before and 90 minutes after sunset. At D2 8 calls and at D3 two calls were detected during a single night during the emergence time range but as no cluster of activity was present, it is not considered to represent a roost in the vicinity.

## 4.2 2021

### 4.2.1 Overall Site Activity

The results of the static detector surveys identified the presence of at least four species: common pipistrelle, soprano pipistrelle, *Myotis* species and *Nyctalus* species. In total 508 bat passes were recorded. Of which 50.2% were attributed to *Common pipistrelle* and 5.7% were attributed to *Soprano pipistrelle*. 28.1 % of calls were identified to *Pipistrelle* level only. *Nyctalus* comprised of 13.4% of calls and *Myotis* 2.6%.

Common pipistrelle activity was highest at D5 and D6, while Soprano pipistrelle was similar across the board across D1, D2, D3, D5 and D6. Nyctalus activity was highest at D1 and D6, while Myotis was highest at D6.

See Appendix A Figure 6-7 for static locations.

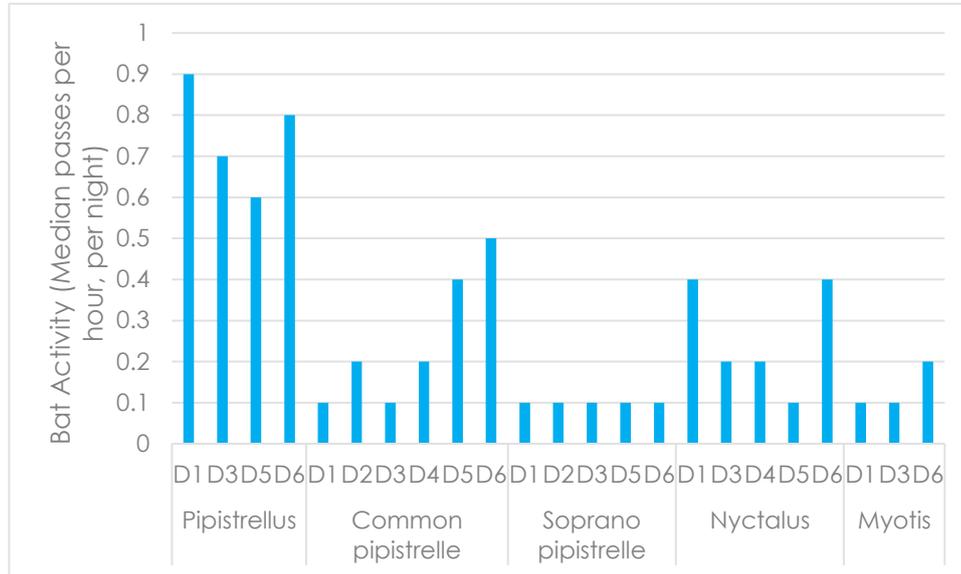


Figure 2. The median nightly pass rate (bat passes per hour) of each species.

#### 4.2.2 Spatial Variation

Table 6 presents the activity levels within the context of the geographic location and temporal coverage as computed by Ecobat. As discussed in section 3.2 this approach excludes 'zero activity' nights and as a result is likely to represent data skewed towards high activity levels. The analysis compares activity levels to centrally held data recorded within 30 days of the survey date and within 100 km<sup>2</sup> of the detector location. The results show that D6 had the highest activity levels for Pipistrellus species with two nights of high bat activity. Common pipistrelle also recorded one night of high activity at D5 and D6. It should be considered that the total number of recording nights for all six turbine locations was 31, therefore suggesting an overall low use of the site by bats.

Table 6: Summary table showing the number of nights recorded bat activity fell into each activity bands for each species. Data excludes 'zero activity' nights.

| ID | Species/Species Group | Nights of High Activity | Nights of Moderate/High Activity | Nights of Moderate Activity | Nights of Low/Moderate Activity | Nights of Low Activity |
|----|-----------------------|-------------------------|----------------------------------|-----------------------------|---------------------------------|------------------------|
| D1 | Myotis                | 0                       | 0                                | 0                           | 0                               | 2                      |
| D3 |                       | 0                       | 0                                | 0                           | 0                               | 1                      |
| D6 |                       | 0                       | 0                                | 1                           | 2                               | 2                      |
| D1 | Nyctalus              | 0                       | 1                                | 0                           | 5                               | 1                      |
| D3 |                       | 0                       | 0                                | 0                           | 4                               | 4                      |
| D4 |                       | 0                       | 0                                | 0                           | 1                               | 0                      |
| D5 |                       | 0                       | 0                                | 0                           | 0                               | 1                      |
| D6 |                       | 0                       | 0                                | 2                           | 5                               | 1                      |

| ID | Species/Species Group | Nights of High Activity | Nights of Moderate/High Activity | Nights of Moderate Activity | Nights of Low/Moderate Activity | Nights of Low Activity |
|----|-----------------------|-------------------------|----------------------------------|-----------------------------|---------------------------------|------------------------|
| D1 | Pipistrellus species  | 0                       | 1                                | 0                           | 0                               | 0                      |
| D3 |                       | 0                       | 1                                | 0                           | 0                               | 1                      |
| D5 |                       | 0                       | 0                                | 3                           | 1                               | 0                      |
| D6 |                       | 2                       | 1                                | 3                           | 2                               | 0                      |
| D1 | Common pipistrelle    | 0                       | 1                                | 2                           | 0                               | 4                      |
| D2 |                       | 0                       | 0                                | 0                           | 2                               | 2                      |
| D3 |                       | 0                       | 1                                | 0                           | 3                               | 6                      |
| D4 |                       | 0                       | 0                                | 1                           | 0                               | 2                      |
| D5 |                       | 1                       | 1                                | 2                           | 2                               | 3                      |
| D6 |                       | 1                       | 3                                | 4                           | 5                               | 3                      |
| D1 | Soprano pipistrelle   | 0                       | 0                                | 0                           | 0                               | 1                      |
| D2 |                       | 0                       | 0                                | 0                           | 0                               | 1                      |
| D3 |                       | 0                       | 0                                | 0                           | 0                               | 1                      |
| D5 |                       | 0                       | 0                                | 1                           | 0                               | 4                      |
| D6 |                       | 0                       | 0                                | 1                           | 3                               | 5                      |

### 4.2.3 Temporal variation

Activity levels can vary significantly throughout the activity season which may indicate a number of potential features being close by, such as maternity roosts, swarming sites and hibernation roosts. Bat passes were recorded for each species in relation to their emergence time, between 15 minutes before and 90 minutes after sunset. Only a single Common pipistrelle call was detected during the emergence time range and as no cluster of activity was present, it is not considered to represent a roost in the vicinity.

## 5 Summary

Bat activity surveys were undertaken across the Proposed Development site during the 2020 and 2021 seasons. Analysis of data collected by the bat detectors indicated that the site was predominantly used by common species such as common and soprano pipistrelles. Small numbers of *Nyctalus* and *Myotis* species were also recorded.

Overall, the data indicates that bat activity on site is low for of the 35 nights of activity in 2020 just one night of high activity was found for *Nyctalus* sp. at one location (D2). Numbers for *Pipistrellus* species (common and soprano) two and three nights of high activity were recorded (at D2 and D3 respectively). During the 2021 surveys, of the 31 nights of activity, there was no high activity for *Nyctalus* and just one at high/moderate level (Table 6). The remaining high activity was limited to *Pipistrellus* species for one night at location D6.

