Appendix 7.3

Bat Survey Report

SCOTTISHPOWER RENEWABLES

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Executive Summary

Bat survey work following the latest onshore windfarm guidance (NatureScot, formerly Scottish Natural Heritage (SNH, 2019)) was conducted at the Site of a proposed windfarm at Carrick Forest, South Ayrshire (hereafter referred to as the 'Proposed Development'). 14 static Anabat Swift bat detectors were distributed based on the Proposed Development for up to 30 days in Autumn 2019, 27 days in Spring 2020 and 30 days in Summer 2020.

Five species/genera of bats were recorded, including Soprano Pipistrelle (the most commonly recorded species), Common Pipistrelle, *Myotis* species, Brown Long-eared Bat and Leisler's Bat.

Three proposed wind turbines (wind turbine 2, wind turbine 5 and wind turbine 8) are potentially within the vicinity of bat roosts where more than 30 passes were recorded around roost emergence time, with two (wind turbine 2 and wind turbine 8) potentially being less than 200 metres (m) from roosts. Operational curtailment is planned for the Site.

1 Introduction

1. This Appendix describes the survey approach, methodology and results for bat surveys applied at the Site. This work provided an ecological baseline assessment of bat activity at the Site and has been prepared to inform the planning application of the Proposed Development.

2. Gavia Environmental Ltd. (GEL) was commissioned by Scottish Power Renewables (hereafter referred to as 'the Applicant') to undertake the bat survey for the Proposed Development.

1.1 Site Context

3. The Site is located at Grid Reference NX 237186, 598381 (site centroid), approximately five kilometres (km) northeast of Dalquhairn, Girvan. The Site habitat is coniferous plantation with some small pockets of broadleaved woodland and open areas of heath and acidic grassland.

4. The Proposed Development comprises up to 13 three-bladed horizontal axis wind turbines with a blade tip height of up to 200m, an Energy Storage[1] Facility energy (battery) containing up to 20 megawatts (MW) and associated infrastructure, further details of which are available in **Chapter 4: Development Description** of the EIAR.

2 Legislation

5. All bat species in the UK are afforded full statutory protection as European protected species listed on Schedule 2 of the Conservation (Natural Habitats, &c.) Regulations 1994 as amended in Scotland, which transpose into Scottish Law in the European Community's Habitats Directive (92/43/EEC). Under the terms of Regulation 39(1), with certain exceptions, it is an offence to deliberately or recklessly[2]:

- harass a wild bat or group of wild bats;
- to disturb a wild bat while it is occupying a structure or place which it uses for shelter; or protection;
- to disturb a wild bat while it is rearing or otherwise caring for its young;
- to obstruct access to a breeding site or resting place of a wild bat, or otherwise to deny the bat use of the breeding site or resting place;
- to disturb a wild 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;
- to disturb a wild 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; or
- to damage or destroy a breeding site or resting place of such an animal.

6. All the above protections apply regardless of the stage of the life of the animal in question.

7. 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 noctule*), Brown long-eared bat (*Plecotus auratus*), Leisler's (*N. leisleri*), Whiskered (*M. mystacinus*), and Brandt's (*M. brandtii*) bats.

3 Methodology

3.1 Desk Study

8. A desk study of bat records within 10km of the Site was carried out, results of which are presented in **Appendix 7.1 Ecology Baseline Report** of the EIAR.

9. A review of built structures in and around 200m the Site was carried out, results of which are presented in **Section 5.1**.

3.2 Bat Survey

10. Bat surveys were undertaken in accordance with the Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation (NatureScot[3], 2019), guidance drawn up to help in considering the potential effects of onshore wind energy developments on bats.

11. Survey works comprised:

- a review of potential roost structures; and
- the analysis of bat activity via the deployment of static bat detectors.

3.2.1 Roost Survey

12. A review of man-made structures present within 200m plus rotor radius of the Site Boundary was carried out.

13. Results of a survey of trees with bat roost potential is included in **Appendix 7.1 Ecology Baseline Report** of the EIAR.

14. Key features that could support maternity roosts and significant hibernation and/or swarming sites (both of which may attract bats from numerous colonies from a large catchment) were subject to further investigation.

[1] Subject to landowner agreement
[2] The summary is not comprehensive and is included here for illustrative purposes only. For a definitive list of offences, the reader is referred to the original legislative texts.

[3] Formerly Scottish Natural Heritage (SNH).

3.2.2 Static Bat Detector Survey

15. The standard guidance (NatureScot, 2019) recommends static detector locations should be focused on those parts of the Site where wind turbines are most likely to be located. The location of detectors was therefore based on an 18 wind turbine layout provided by the Applicant in Autumn 2019, prior to commencement of EIAR and design work (**Figure 7.3.1 Initial Proposed Wind Turbine Locations and Position of Bat Detectors**).

16. Based on this 18 wind turbine layout and following the standard recommendations (NatureScot, 2019) of siting one detector for the first ten potential wind turbine locations plus a third of additional potential wind turbine sites, fourteen detectors were sited (one more than required). As wind turbine locations were not fixed, detectors were sited to give a representative cover of the Site. EIA and design work commenced in early 2020 and this iterative design process over the course of 2020 resulted in the number of wind turbines within the layout reducing to 13 wind turbines. (**Figure 7.3.2 Carrick Static Bat Survey Autumn 2019 Results**).

17. Where possible, the detectors were placed with microphones on canes at approximately 2m above the ground with the detectors themselves attached to trees (**Photo 7.3.1** and **Photo 7.3.2**, **Annex A**).

3.2.2.1 Detector Settings

18. All detectors were set up with eight AA batteries and two SD cards with at least 32MB memory. Recording settings were as detailed in **Table 7.3.1**.

Time range	Autumn times: 30 minutes before sunset to 30 minutes after sunrise.
	Spring and Summer times: 2 hours before sunset to 2 hours after sunrise.
Trigger frequency range	15 kHz to 250 kHz
Minimum event	4 milliseconds
Max file length	10 seconds

Table 7.3.1 Anabat Settings.

19. The detectors were put onsite during three seasons as defined in the Bats and Onshore Wind Turbines Guidance (NatureScot, 2019):

Spring	April to May 2020
Summer	June to mid-August 2020
Autumn	Mid-August to October 2019 (data collected from 28/08/2019 to 26/09/2019)

Table 7.3.2 Bat Monitoring Seasons.

20. The guidance recommends ten consecutive nights of data collection per season. This study went beyond this requirement, with at least 27 nights of data per season. The data collection periods are listed in **Tables 7.3.3** to **7.3.5**. Bad weather days are highlighted in orange.

3.2.3 Weather station

21. In accordance with the Bat Onshore Wind Turbine Guidance (NatureScot, 2019) a weather station was deployed, located centrally in the Site (**Figure 7.3.1 Initial Proposed Wind Turbine Locations and Position of Bat Detectors**), for the time periods of data collection. In this situation a Dawes Vantage Vue Weather Station was used. During the Spring and Summer 2020 data collection periods, the weather station was either blown over or otherwise interfered with by unknown parties, resulting in loss of wind and rain data on occasion during those time periods, it was subsequently further secured to prevent data loss. Data was downloaded on each season's bat detector visit.

Number of days	Date	Number of days	Date
1	28/08/2019	16	12/09/2019
2	29/08/2019	17	13/09/2019
3	30/08/2019	18	14/09/2019
4	31/08/2019	19	15/09/2019
5	01/09/2019	20	16/09/2019
6	02/09/2019	21	17/09/2019
7	03/09/2019	22	18/09/2019
8	04/09/2019	23	19/09/2019
9	05/09/2019	24	20/09/2019
10	06/09/2019	25	21/09/2019
11	07/09/2019	26	22/09/2019
12	08/09/2019	27	23/09/2019
13	09/09/2019	28	24/09/2019
14	10/09/2019	29	25/09/2019
15	11/09/2019	30	26/09/2019

Table 7.3.3 Autumn 2019 Data Collection Dates

Number of days	Date	Number of days	Date
1	04/05/2020	15	18/05/2020
2	05/05/2020	16	19/05/2020
3	06/05/2020	17	20/05/2020
4	07/05/2020	18	21/05/2020
5	08/05/2020	19	22/05/2020
6	09/05/2020	20	23/05/2020
7	10/05/2020	21	24/05/2020
8	11/05/2020	22	25/05/2020
9	12/05/2020	23	26/05/2020
10	13/05/2020	24	27/05/2020

Number of days	Date	Number of days	Date
11	14/05/2020	25	28/05/2020
12	15/05/2020	26	29/05/2020
13	16/05/2020	27	30/05/2020
14	17/05/2020		

Table 7.3.4 Spring 2020 Data Collection Dates

Number of days	Date	Number of days	Date
1	01/06/2020	16	16/06/2020
2	02/06/2020	17	17/06/2020
3	03/06/2020	18	18/06/2020
4	04/06/2020	19	19/06/2020
5	05/06/2020	20	20/06/2020
6	06/06/2020	21	21/06/2020
7	07/06/2020	22	22/06/2020
8	08/06/2020	23	23/06/2020
9	09/06/2020	24	24/06/2020
10	10/06/2020	25	25/06/2020
11	11/06/2020	26	26/06/2020
12	12/06/2020	27	27/06/2020
13	13/06/2020	28	28/06/2020
14	14/06/2020	29	29/06/2020
15	15/06/2020	30	30/06/2020

Table 7.3.5 Summer 2020 Data Collection Dates

3.2.4 Bat Data Analysis

22. Bat data were analysed with the use of Anabat Insight by a team of ecologists trained in the use of the programme and in bat call sonogram identification (Russ, 2012; Middleton *et al.* 2014). All data were initially analysed with the Bat Classify auto-identification programme set at 70% probability level. All bat calls identified were checked by ecologists. For quality control, the following controls were carried out:

- 20% of Soprano Pipistrelle calls were checked by a second ecologist;
- a second ecologist checked 30% of Common Pipistrelle calls;
- 30% of 'noise' files were checked to ensure bat calls were not being missed; and
- an experienced licensed bat ecologist checked 100% of non-Pipistrelle calls

23. As *Myotis* genus sonograms can be difficult to identify to species level and as recommendations would be the same for all species in this genus, all *Myotis* calls were assigned only to genus level.

24. Results were entered into the Ecobat pro-forma and uploaded at http://www.mammal.org.uk/science-research/ecostat/, Ecobat uses percentiles to provide a numerical representation of activity levels by comparing with a large bat data set from various windfarm projects. Percentiles can then be assigned to activity categories (low, moderate, high) to provide a quantifiable measure of bat activity. The suggested levels of activity are:

- low activity: 0-20th percentiles;
- low to moderate activity: 21st-40th percentiles;
- moderate activity: 41st-60th percentiles;
- moderate to high activity: 61st-80th percentiles; and
- high activity: 81st-100th percentiles.

4 Results

4.1 Desk Study Results

25. The data search on bat species is included in **Appendix 7.1 Ecology Baseline Report** of the EIAR.

26. No built structures are present within the Site Boundary. The closest properties are north of the Site Boundary and include a derelict cottage at Garleffin (NX 34772 99975), c. 240m south of used farm buildings at Glenalla (NS 34687 00197). The cottage is c. 370m from the Site Boundary as shown in **Figure 7.3.1 Initial Proposed Wind Turbine Locations and Position of Bat Detectors** and approximately 900m from wind turbine 2 of the final design, as illustrated in **Figure 7.3.2 Carrick Static Bat Survey Autumn 2019 Results**.

4.2 Baseline Bat Results

4.2.1 Bat Roosts

27. No roost features were noted during the course of the study. Further details on checks of trees for Bat Roost Potential are included in **Appendix 7.1 Ecology Baseline Report** of the EIAR.

28. Access was not possible to the derelict cottage at Garleffin to the north of the Site, however, based on the final design as shown in **Figure 7.3.3 Carrick Static Bat Survey Spring 2020 Results**, the property is approximately 900m from wind turbine 2.

4.2.2 Bat Activity Results

29. Five bat species were recorded including Soprano Pipistrelle *Pipistrellus pygmaeus*, Common Pipistrelle *Pipistrellus pipistrellus*, *Myotis* species, Brown Long-eared Bat *Plecotus auritus* and Leisler's Bat *Nyctalus leisleri*. Pipistrelle social calls recorded in the absence of associated echolocation calls have been assigned to the genus *Pipistrellus*.

30. The total number of registrations for each species/genus at each detector location is illustrated in **Figures 7.3.2** to **7.3.4** in **Annex C**.

31. In addition to the summaries of Ecobat data presented in the following sections, box plots of each detector are included in **Annex E**.

4.2.2.1 Autumn 2019 Data

32. Technical data transfer problems resulted in no data collection from detectors 21, 31 and 34. Soprano Pipistrelle activity accounted for 76.3% of the calls recorded. The Soprano Pipistrelle echolocation calls were frequently recorded together with type D social calls (**Plate 7.3.4, Annex B**).

Species	Passes (No.)	Percentage of total (%)
Common pipistrelle	93	8.2
Soprano pipistrelle	864	76.3
Leisler's	2	0.2
Brown Long-eared	7	0.6
Myotis sp.	115	10.2
Total	**1,132**	**100.0**

Table 7.3.6 The total number of passes recorded for each species across all of the detectors, Autumn 2019

33. When these data are looked at in terms of activity levels, Soprano Pipistrelles also have the highest number of nights of high and moderate/high activity levels as summarised in **Table 7.3.7**.

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
Myotis	1	8	5	14	3
Nyctalus leisleri	0	0	0	0	2
Pipistrellus sp.	1	4	1	6	2
Pipistrellus pipistrellus	1	8	3	8	6
Pipistrellus pygmaeus	**21**	**15**	2	2	1
Plecotus auritus	0	0	0	0	7

Table 7.3.7 Summary Table Showing the Number of Nights in Autumn Recorded Bat Activity Fell into Each Activity Band (as defined by Ecobat) for Each Species, for all Detectors Combined

34. Overall, activity levels were highest at detector 29 for Soprano Pipistrelles, with high levels of activity being recorded on ten nights. The data were analysed in terms of likelihood of proximity to a bat roost by comparing bat pass times with standard roost emergence times (Russ, 2012) per species. These results are presented for all seasons in **Table 7.3.12**, **Annex D** and main areas of activity are summarised in **Figure 7.3.4 Carrick Static Bat Survey Summer 2020 Results**. For detector 29, 57 Soprano Pipistrelle passes were recorded before the end of the standard roost emergence time, with 24 (42.1%) of these being recorded on the 14 September 2020.

35. The other detector with moderate level of activity around the standard roost emergence time is detector 27, where 34 *Myotis* passes were recorded before the end of the standard roost emergence time, with the main evenings of passes in this range being 29 August (26.5%), 5 September (32.4%) and 6 September (23.5%), the gaps between dates of higher levels of activity suggesting the raised activity levels may be due to a factor such as a good feeding evening rather than, e.g. proximity to a maternity roost.

4.2.2.2 Spring 2020 Data

36. In Spring 2020, Soprano Pipistrelles accounted for 54.2% of passes recorded as summarised in **Table 7.3.7** below, with most activity at detectors 22, 32 and 34.

Species	Passes (No.)	Percentage of total (%)
Pipistrellus	91	13.7
Common pipistrelle	140	21.1
Soprano pipistrelle	360	54.2
Leisler's	2	0.3
Brown long-eared	1	0.2
Myotis	70	10.5
Total	**664**	**100.0**

Table 7.3.8 The Total Number of Passes Recorded for Each Species Across all of the Detectors, Spring 2020

37. When these data are looked at in terms of activity levels, Soprano Pipistrelles also have the highest number of nights of high and moderate/high activity levels as summarised in **Table 7.3.9**.

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
Myotis	0	**6**	**9**	8	25
Pipistrellus pipistrellus	1	**0**	**0**	9	15
Pipistrellus pygmaeus	**21**	**36**	**2**	8	15
Plecotus auritus	0	0	1	2	8

Table 7.3.9 Summary Table Showing the Number of Nights Recorded Bat Activity Fell into Each Activity Band (as defined by Ecobat) for Each Species, Spring 2020

38. High and moderate/high levels of activity were mainly recorded for Soprano Pipistrelle. The data were analysed in terms of likelihood of proximity to a bat roost by comparing bat pass times with standard roost emergence times (Russ, 2012) per species. These results are presented for all seasons in **Table 7.3.12**, **Annex D** and main areas of activity are summarised in **Figure 7.3.5 Carrick Detectors Potentially Close to Bat Roosts**.

39. This further analysis indicates that the level of Soprano Pipistrelle activity does not appear to be related to the presence of a nearby roost. An example of bat activity post roost activity is illustrated in **Plate 7.3.1** below for detector 34.

40. Time from 15 minutes before to 90 minutes after sunset. Species-specific emergence time ranges are shown as grey bars (Russ, 2012). Bat passes overlapping species-specific grey bars, or occurring earlier than this time range, may potentially indicate the presence of a nearby roost.

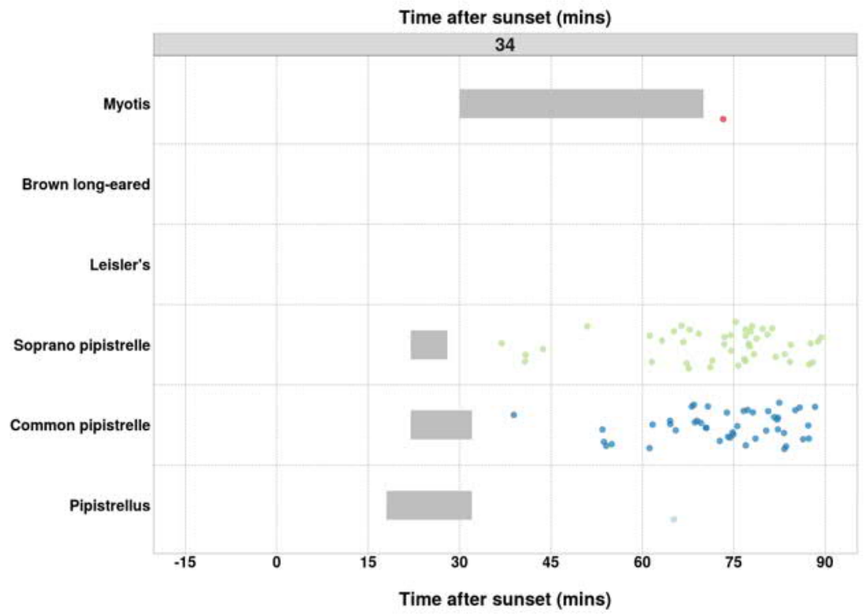


Plate 7.3.1: Bat Passes in Relation to Roost Emergence Times, Detector 34, Spring 2020.

41. For both Common and Soprano Pipistrelle, the time period of activity recorded at detector 34 (c, 160m from wind turbine 6) does not appear to indicate the presence of a nearby roost.

4.2.2.3 Summer 2020 Data

42. In Summer 2020, Soprano Pipistrelles accounted for 61% of passes recorded as summarised in **Table 7.3.10** below, with 72% of activity at detector 32.

Species	Passes (No.)	Percentage of total (%)
Pipistrellus	414	19.2
Common pipistrelle	322	14.9
Soprano pipistrelle	1,316	61.0
Leisler's	41	1.9
Brown long-eared	2	0.1
Myotis	62	2.9
Total	**2,157**	**100.0**

Table 7.3.10: The Total Number of Passes Recorded for Each Species Across all of the Detectors

43. When these data are looked at in terms of activity levels, Soprano Pipistrelles also have the highest number of nights of high and moderate/high activity levels as summarised in **Table 7.3.11**.

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
Myotis	0	0	7	0	47
Nyctalus leisleri	0	1	8	0	18
Pipistrellus sp.	13	17	29	0	24
Pipistrellus pipistrellus	4	15	45	0	85
Pipistrellus pygmaeus	**34**	**47**	**81**	0	75
Plecotus auritus	0	0	0	0	2

Table 7.3.11: Summary Table Showing the Number of Nights Recorded Bat Activity in Summer 2020 Fell into Each Activity Band (as defined by Ecobat) for Each Species

44. Overall, Soprano Pipistrelle activity levels were highest at detector 32 to the north east of the Site, accounting for 72% of passes recorded. The data were analysed in terms of likelihood of proximity to a bat roost by comparing bat pass times with standard roost emergence times (Russ, 2012) per species. These results are presented for all seasons in **Table 7.3.12, Annex D** and main areas of activity are summarised in **Figure 7.3.5 Carrick Detectors Potentially Close to Bat Roosts**. For detector 26, 39 Soprano Pipistrelle passes were recorded before the end of the standard roost emergence time, as illustrated in **Plate 7.3.2** below.

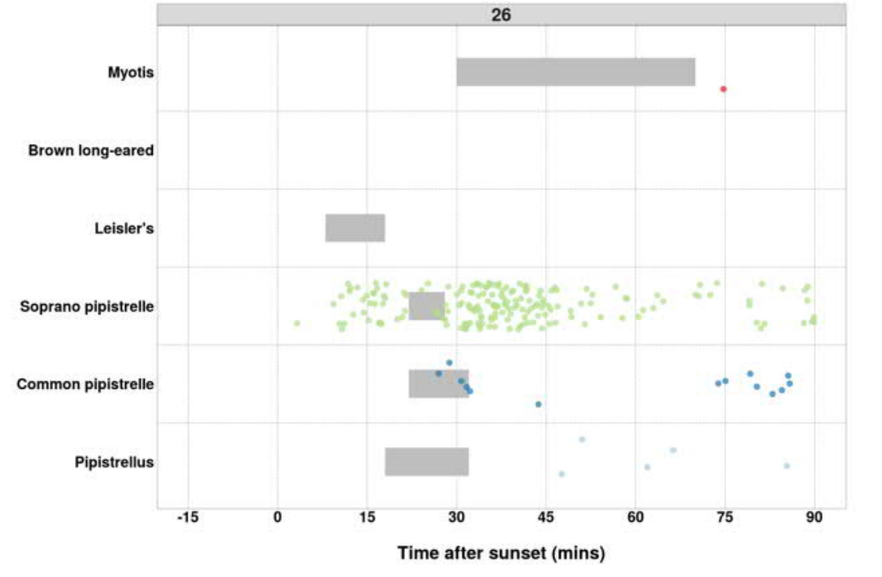


Plate 7.3.2: Bat Passes in Relation to Roost Emergence Times, Detector 26, Summer 2020

45. Time from 15 minutes before to 90 minutes after sunset. Species-specific emergence time ranges are shown as grey bars (Russ, 2012). Bat passes overlapping species-specific grey bars, or occurring earlier than this time range, may potentially indicate the presence of a nearby roost.

5 Discussion and Recommendations

46. Bat activity was recorded at varying levels at all detector locations. Of the species recorded, the pipistrelles and Leisler's fall into the High risk of wind turbine impact category (NatureScot, 2019, App. 3). There were some variations in use of the Site by species, such as Leisler's mainly being recorded to the north west of the Site at detector 25 in the summer, including three passes within the time period that could indicate the presence of a nearby roost (**Table 7.3.7**). Detector 25, however, is 1.25km from the nearest wind turbine (wind turbine 1) in the final layout, thus reducing the risk factor for this species.

47. The highest level of bat activity over all seasons was for Soprano Pipistrelle, particularly in the summer season at detector 32 to the north of the Site, which accounted for 72% of summer passes for this species. The time of these calls did not suggest the presence of a nearby roost (**Figure 7.3.5 Carrick Detectors Potentially Close to Bat Roosts**) and the fact that the nearest wind turbine location is over 1km away reduces the risk to this area of bat activity.

48. In Autumn 2019, Soprano Pipistrelle activity overlapped with standard roost emergence time at detector 29, 190m from wind turbine 2. The Soprano Pipistrelle echolocation calls were frequently recorded together with type D social calls (**Plate 7.3.4, Annex B**). These calls are representative of advertisement or agonistic calls Middleton *et al*., 2014:108). Given the time of year, it is likely that these were advertisement calls from males during the autumn mating season.

49. In summer 2020, 57 Soprano Pipistrelle passes around roost emergence time at detector 26 indicate the potential for a roost nearby. This detector is 116m from wind turbine 8 and also close to a track that would require upgrading. Any trees that need to be removed for track upgrading should be checked for bat roosts.

50. The activity (34 passes) of Myotis species at detector 27 around roost emergence time suggests the potential for a roost nearby. This detector is 700m from wind turbine 5, reducing the risk factor.

51. In addition to the above-mentioned roost possibilities, there are nine other wind turbines where smaller numbers of passes (1-10) were recorded around the roost emergence period. At least some of these may be individual bat roosts, which are often transitional in nature. The highest level of activity was recorded at detector 32 to the north east of the Site, however, this is 1973m from the nearest wind turbine (wind turbine 1).

52. In addition to the Ecobat bat data analysis presented within this section, the Applicant have conducted detailed acoustic monitoring of bats at ten operational windfarms and acoustic monitoring aligned to the SNH (2019) guidance at three development phase projects and analysed the current data within the context of this extensive data set. The results are presented in **Appendix 7.4 Bat Mitigation and Monitoring Plan** of the EIAR. Based on the calculated risk factor for Pipistrelle and *Nyctalus* bats, a programme of wind turbine curtailment for all wind turbines and post construction monitoring is proposed. Based on the monitoring results, the proposed curtailment would be revised as necessary upon consultation with NatureScot . It is considered that this curtailment programme would significantly reduce the risk to bats from the Proposed Development.

6 References

Middleton, N., Froud, A. & French, K (2014). Social Calls of the Bats of Britain and Ireland. Pelagic Publishing, Exeter.

Mitchell-Jones, T. Carlin, C (2014). Natural England Technical Information Note (TIN51) – Bats and Onshore Wind turbines Interim Guidelines (3rd edition) Natural England 2014.

Russ, J (2012). *British Bat Calls. A Guide to Species Identification*. Pelagic Publishing, Exeter.

SNH (2019) *Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation*. SNH, January 2019

Annex A: Site Photographs

Photo 7.3.1: Detector Attached to a Pine Tree Located Near Track at the Site

Photo 7.3.2: Detector Attached to Dead Tree in a Deforested Area of the Site

Annex B: Call Sonograms

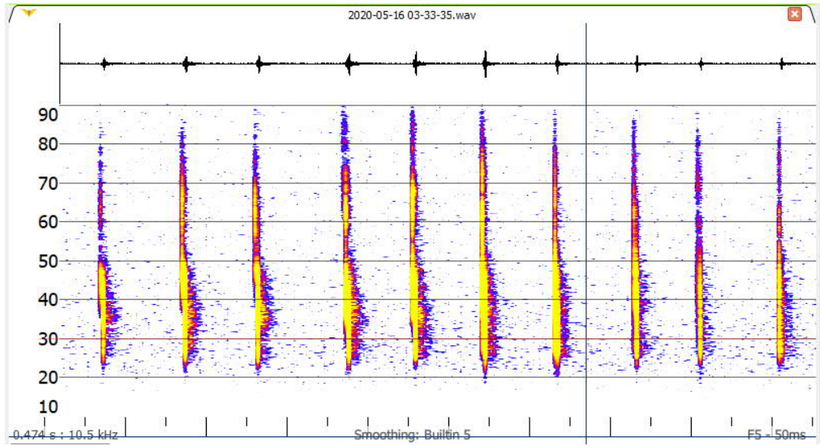


Plate 7.3.3: *Myotis* Call (considered to be Daubenton's, with Characteristic 'knee')

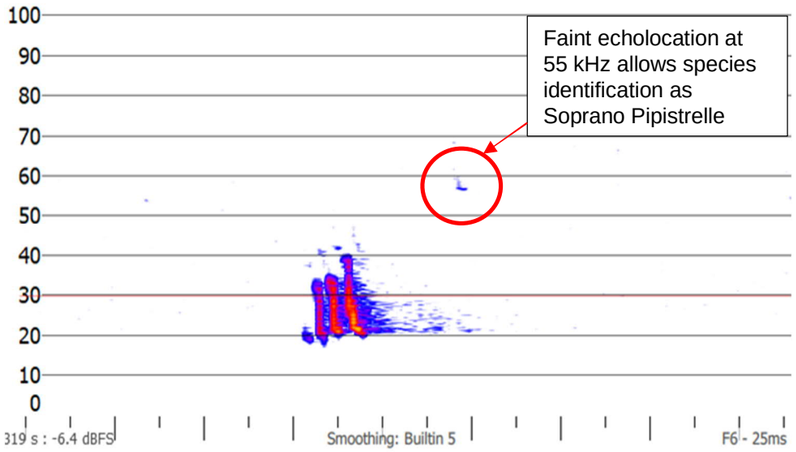


Plate 7.3.4: Three-component Version of Type D Social Call of Soprano Pipistrelle; Generally Emitted by a Male as an Advertisement Call During the Autumn Breeding Season

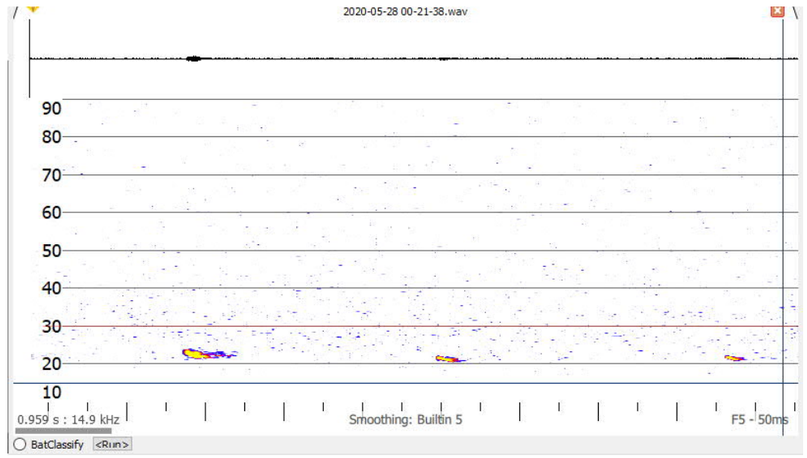


Plate 7.3.5: Leisler's Call

Annex C: Bat Distribution Figures

Annex D: Detectors Potentially Near Roosts

Detectors with more than 20 bat passes within the roost emergence period are in bold for the species concerned. Data are for the 30 day period.

*N.B. Detectors 23 and 26 changed location between Autumn 2019 and Spring and Summer 2020; this has been taken into account.

Detector number	Closest wind turbine and distance (m)	AUTUMN 2019 Species (no. of passes) which may be roosting in proximity	SPRING 2020 Species (no. of passes) which may be roosting in proximity	SUMMER 2020 Species (no. of passes) which may be roosting in proximity
22	Wind turbine 6 (330m)	*Myotis* sp. (4)		
***23 (was 26 here in Autumn)**	Wind turbine 6 (1304m)	*Myotis* sp. (1)	Soprano Pipistrelle (1)	Soprano Pipistrelle (1)
				Common Pipistrelle (1)
24	Wind turbine 3 (674m)	Soprano Pipistrelle (7)	Common Pipistrelle (4)	
		Brown Long-eared (1)		
25	Wind turbine 1 (1250m)			Leisler's (3)
***26 (was 23 here in Autumn)**	Wind turbine 8 (116m)	*Myotis* sp. (3)		**Soprano Pipistrelle (39)**
		(lots of S Pip activity later than emergence time)		Common Pipistrelle (5)
27	Wind turbine 5 (700m)	Soprano Pipistrelle (10)	*Myotis* sp. (7)	Soprano Pipistrelle (3)
		Common Pipistrelle (1)		
		***Myotis* sp. (34)**		Common Pipistrelle (2)
		Brown Long-eared (1)		Pipistrelle sp. (1)
29	Wind turbine 2 (160m)	**Soprano Pipistrelle (57)**		
		Common Pipistrelle (1)		
		Myotis sp. (2)		
30	Wind turbine 4 (331m)			Pipistrelle sp. (1)
31	Wind turbine 11 (1467m)			Soprano Pipistrelle (1)
				Common Pipistrelle (1)
32	Wind turbine 1 (1973m)			Soprano Pipistrelle (2)
				Common Pipistrelle (3)
			Myotis sp. (1)	Pipistrelle sp. (2)
33	Wind turbine 9 (205m)	*Myotis* sp. (4)		

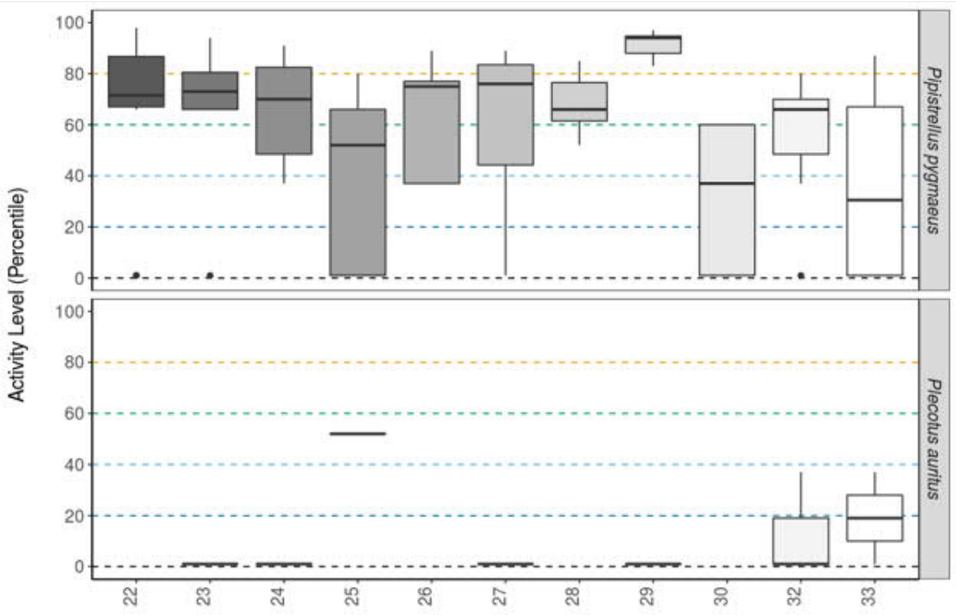
Table 7.3.12: Summary of detectors potentially close to a bat roost

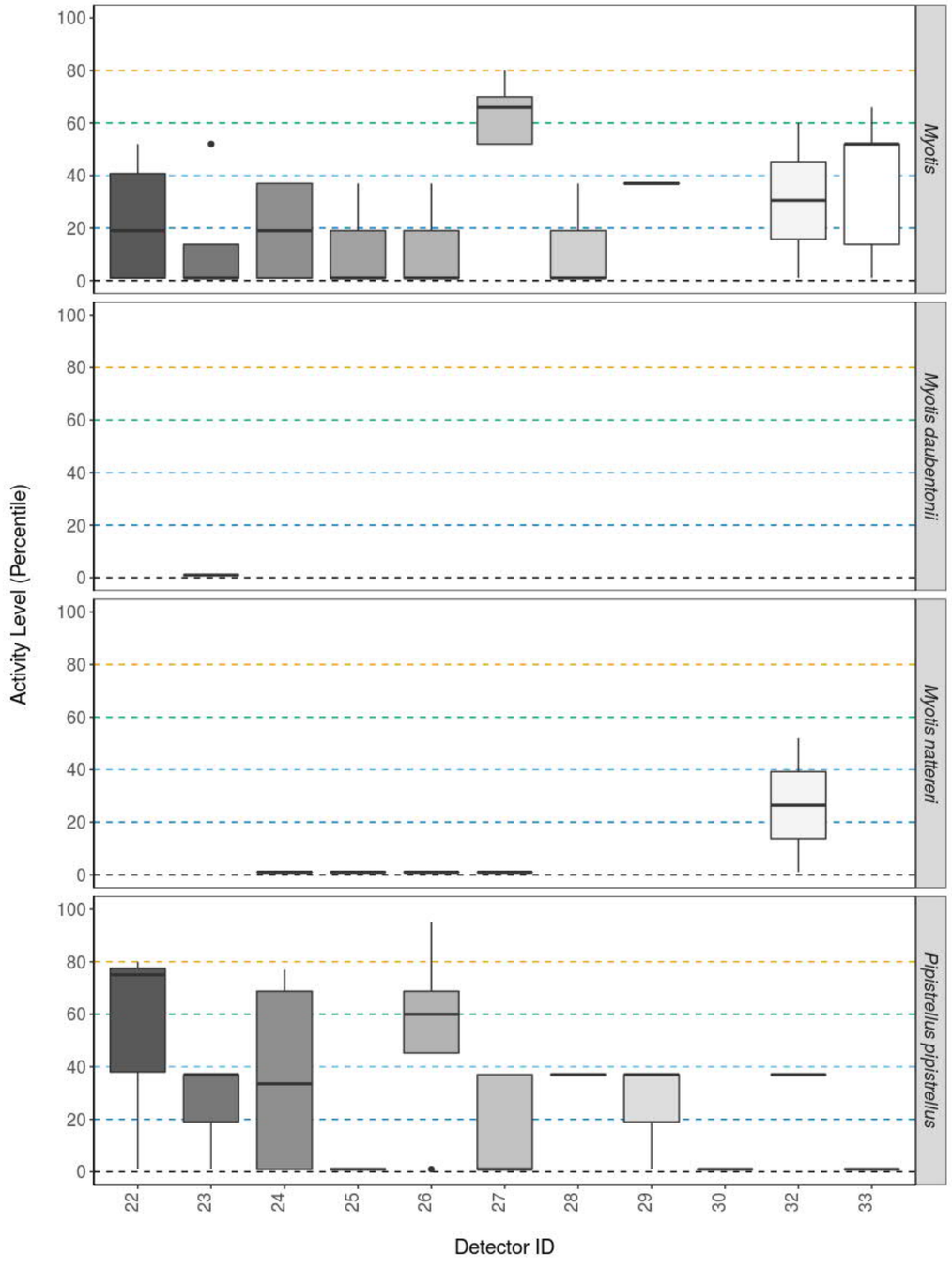
Annex E: Ecobat Activity Levels Per Detector

Autumn 2019

The recorded activity of bats during the survey. The centre line indicates the median activity level whereas the box represents the interquartile range (the spread of the middle 50% of nights of activity).

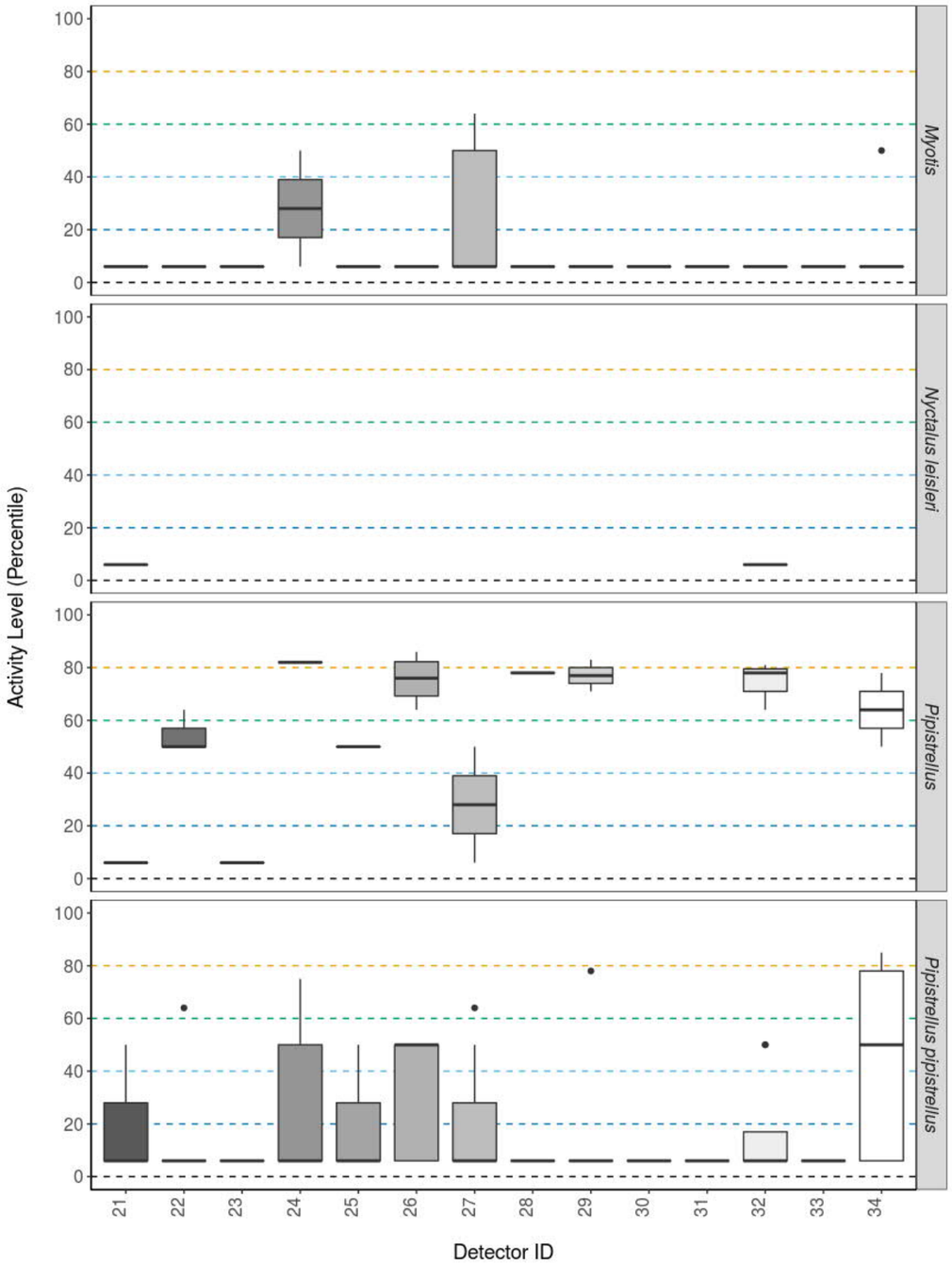
N.B. For the Autumn 2019 data, some *Myotis* calls were classified as *Myotis nattereri* and *Myotis dubenetonii*. In subsequent seasons, all *Myotis* calls were grouped together.

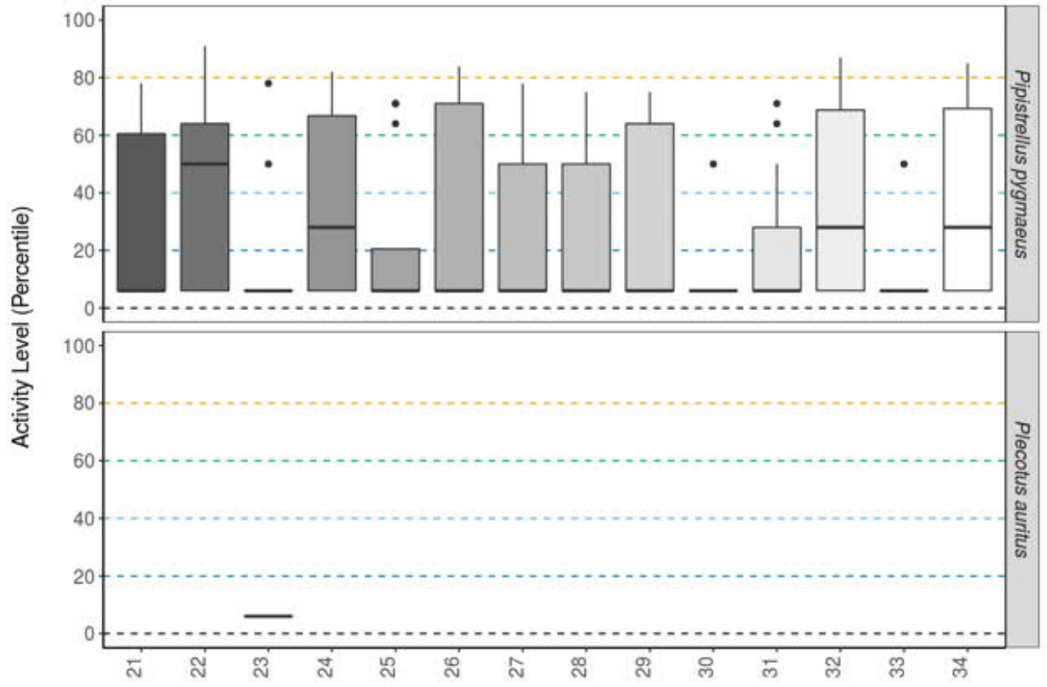




Spring 2020

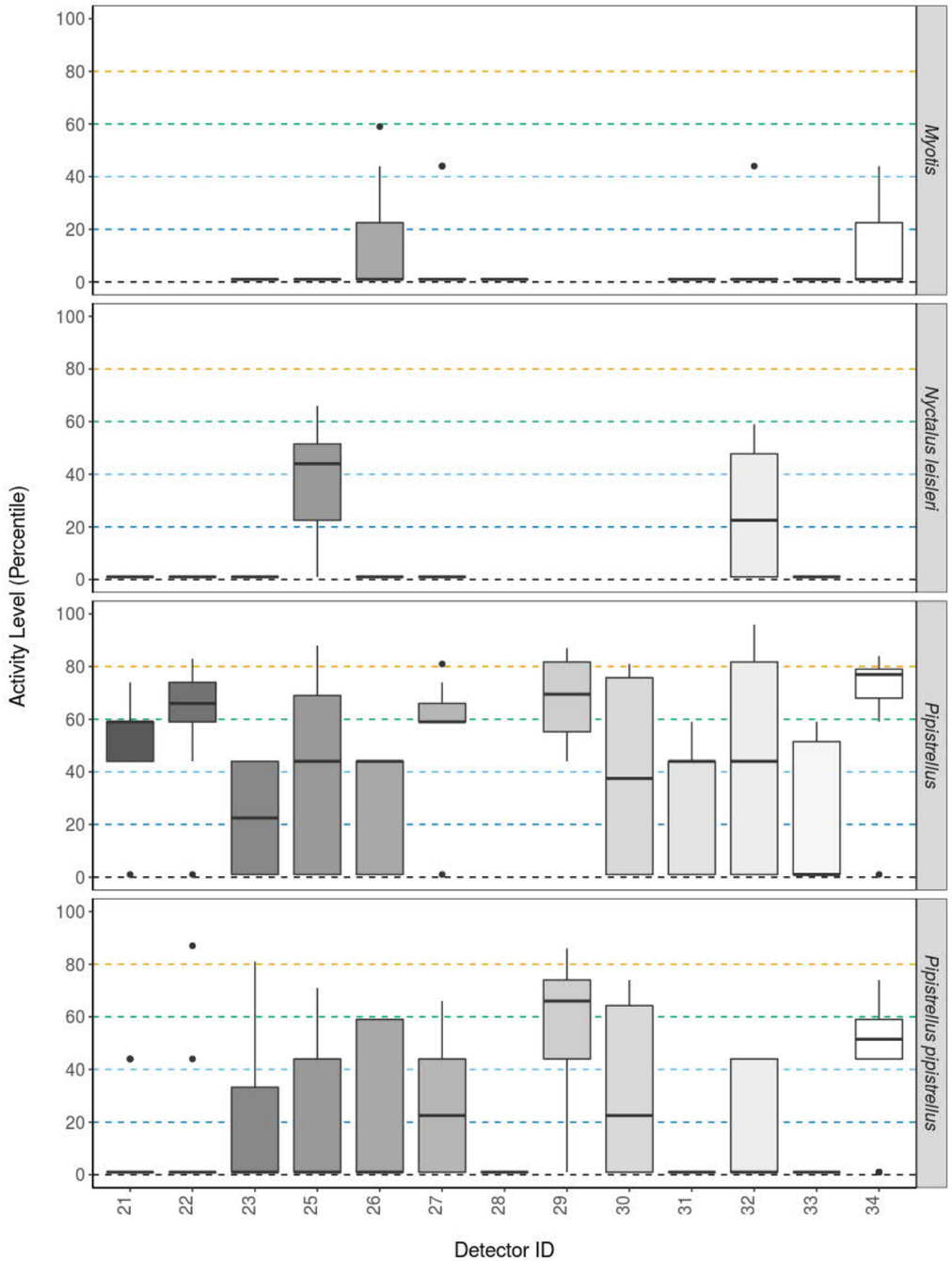
The recorded activity of bats during the survey. The centre line indicates the median activity level whereas the box represents the interquartile range (the spread of the middle 50% of nights of activity).





Summer 2020

The recorded activity of bats during the survey. The centre line indicates the median activity level whereas the box represents the interquartile range (the spread of the middle 50% of nights of activity).



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Legend

- Site Boundary
- Initial Proposed Wind Turbine Locations
- Weather Station Location
- Anabat Detector Locations

0 0.5 1 Km

Rev	Date	By	Comment
B	01/11/2021	JO	Second Issue
A	10/11/2020	BG	First Issue.

SCOTTISHPOWER RENEWABLES

Carrick Windfarm

Figure 7.3.1 Initial Proposed Wind Turbine Locations and Positions of Bat Detectors

Drg No	Carrick-WSP-I-162
Rev	B
Date	01/11/2021
Scale	1:25,000 @ A3

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Anabat 32
CP - 3
SP - 87
BLE - 2
MS - 23
PS - 6

Anabat 25
CP - 7
SP - 69
BLE - 1
NL - 1
MS - 7
PS - 1

Anabat 29
CP - 22
SP - 1607
MS - 28
PS - 3

Anabat 34
Technical error - no data

Anabat 28
CP - 3
SP - 1
MS - 12
PS - 1

Anabat 22
CP - 37
SP - 254
MS - 23
PS - 1

Anabat 30
CP - 3
SP - 28
MS - 2
PS - 3

Anabat 23
CP - 8
SP - 217
MS - 16
PS - 2

Anabat 33
CP - 5
SP - 67
BLE - 4
MS - 15
PS - 1

Anabat 27
CP - 14
SP - 540
BLE - 1
MS - 106
PS - 3

Anabat 26
CP - 116
SP - 434
BLE - 1
NL - 1
MS - 35
PS - 2

Anabat 21
Technical error - no data

Anabat 31
Technical error - no data

Anabat 24
CP - 48
SP - 524
BLE - 4
MS - 16
PS - 3

T01 T02 T03 T04 T05 T06 T07 T08 T09 T10 T11 T12 T13

BP01 BP02 BP03 BP04

Legend

- Site Boundary
- Anabat Detector Locations 2019
- Weather Station Location

Proposed Infrastructure

- Substation Compound
- Temporary Construction Compound
- Crane Pad
- Hardstanding
- Temporary SPEN Construction Compound
- Borrow Pit Search Area
- Wind Turbine
- Carrick Access Track - New Construction
- Carrick Access Track - Existing Forestry Track to be Upgraded

CP - Common Pipistrelle
SP - Soprano Pipistrelle
BLE - Brown Long-eared Bat
NL - Liesler's Bat
MS - Myotis sp.
PS - Pipistrelle sp.

0 0.5 1 Km

Rev	Date	By	Comment
C	29/10/2021	JO	Third Issue
B	19/11/2020	BG	Second Issue
A	17/11/2020	BG	First Issue.

SCOTTISHPOWER RENEWABLES

Carrick Windfarm
Figure 7.3.2 Carrick Static Bat Survey Autumn 2019 Results

Drg No	Carrick-WSP-I-163
Rev	C
Date	29/10/2021
Scale	1:25,000 @ A3

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Anabat 32
CP - 26
SP - 124
NL - 1
MS - 3
PS - 6

Anabat 25
CP - 16
SP - 38
MS - 5
PS - 1

Anabat 29
CP - 25
SP - 49
MS - 3
PS - 5

Anabat 34
CP - 101
SP - 133
MS - 23
PS - 3

Anabat 22
CP - 17
SP - 158
MS - 4
PS - 6

Anabat 28
CP - 4
SP - 29
MS - 1
PS - 1

Anabat 26
CP - 18
SP - 82
MS - 7
PS - 5

Anabat 33
CP - 6
SP - 11
MS - 1

Anabat 30
CP - 6
SP - 11
MS - 1

Anabat 27
CP - 25
SP - 52
MS - 44
PS - 2

Anabat 21
CP - 6
SP - 56
NL - 1
MS - 1
PS - 1

Anabat 23
CP - 8
SP - 25
BLE - 1
MS - 4
PS - 1

Anabat 31
CP - 4
SP - 24
MS - 3

Anabat 24
CP - 19
SP - 73
MS - 3
PS - 1

T01 T02 T03 T04 T05 T06 T07 T08 T09 T10 T11 T12 T13

BP01 BP02 BP03 BP04

B

Legend

- Site Boundary
- Anabat Detector Locations 2020
- Weather Station Location

Proposed Infrastructure

- Substation Compound
- Temporary Construction Compound
- Crane Pad
- Hardstanding
- Temporary SPEN Construction Compound
- Borrow Pit Search Area
- Wind Turbine
- Carrick Access Track - New
- Carrick Access Track - Existing Forestry Track to be Upgraded

CP - Common Pipistrelle
SP - Soprano Pipistrelle
BLE - Brown Long-eared Bat
NL - Liesler's Bat
MS - Myotis sp.
PS - Pipistrelle sp.

0 0.5 1 Km

Rev	Date	By	Comment
C	29/10/2021	JO	Third Issue
B	19/11/2020	BG	Second Issue
A	17/11/2020	BG	First Issue.

SCOTTISHPOWER RENEWABLES

Carrick Windfarm
Figure 7.3.3 Carrick Static Bat Survey Spring 2020 Results

Drg No	Carrick-WSP-I-164
Rev	C
Date	29/10/2021
Scale	1:25,000 @ A3

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Anabat 32
CP - 39
SP - 948
BLE - 1
NL - 21
MS - 7
PS - 52

Anabat 25
CP - 48
SP - 100
NL - 31
MS - 5
PS - 20

Anabat 29
CP - 153
SP - 313
PS - 11

Anabat 34
CP - 174
SP - 266
BLE - 1
MS - 7
PS - 59

Anabat 22
CP - 48
SP - 234
NL - 3
PS - 34

Anabat 28
CP - 5
SP - 63
MS - 2

Anabat 30
CP - 28
SP - 115
PS - 22

Anabat 27
CP - 39
SP - 175
NL - 4
MS - 30
PS - 36

Anabat 26
CP - 31
SP - 361
NL - 1
MS - 12
PS - 12

Anabat 33
CP - 9
SP - 21
NL - 2
MS - 1
PS - 16

Anabat 21
CP - 29
SP - 111
NL - 4
PS - 7

Anabat 23
CP - 30
SP - 127
NL - 3
MS - 4
PS - 5

Anabat 31
CP - 12
SP - 80
MS - 10
PS - 8

Anabat 24
No bat calls recorded

T01 T02 T03 T04 T05 T06 T07 T08 T09 T10 T11 T12 T13

BP01 BP02 BP03 BP04

Legend

- Site Boundary
- Anabat Detector Locations 2020
- Weather Station Location

Proposed Infrastructure

- Substation Compound
- Temporary Construction Compound
- Crane Pad
- Hardstanding
- Temporary SPEN Construction Compound
- Borrow Pit Search Area
- Wind Turbine
- Carrick Access Track - New Construction
- Carrick Access Track - Existing Forestry Track to be Upgraded

CP - Common Pipistrelle
SP - Soprano Pipistrelle
BLE - Brown Long-eared Bat
NL - Liesler's Bat
MS - Myotis sp.
PS - Pipistrelle sp.

0 0.5 1 Km

Rev	Date	By	Comment
C	29/10/2021	JO	Third Issue
B	19/11/2020	BG	Second Issue
A	17/11/2020	BG	First Issue.

SCOTTISHPOWER RENEWABLES

Carrick Windfarm
Figure 7.3.4 Carrick Static Bat Survey Summer 2020 Results

Drg No	Carrick-WSP-I-165
Rev	C
Date	29/10/2021
Scale	1:25,000 @ A3

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N

T01 T02 T03 T04 T05 T06 T07 T08 T09 T10 T11 T12 T13

BP01 BP02 BP03 BP04

SP (57; 29)

SP (39; 26)

MS (34; 27)

21 22 23 24 25 26 27 28 29 30 31 32 33 34

Knockinculloch · Back Fell · Knockskae · Knockcronal · Glengill Hill · Glenalla Fell · The Pilot · Black Hill of Garleffin · Big Benyaw · Genoch Inner Hill · Linfern Loch · Eldrick Hill · Balloch Plantation · Auchengairn · Lennie · Dunsmoddie · Craig of Dalwyne · Aldinna · Meowl of Blackrow · Bencallen

240000

Legend

- Site Boundary
- Anabat Detector
- Weather Station Location

Proposed Infrastructure

- Substation Compound
- Temporary Construction Compound
- Crane Pad
- Hardstanding
- Temporary SPEN Construction Compound
- Borrow Pit Search Area
- Wind Turbine
- Carrick Access Track - New Construction
- Carrick Access Track - Existing Forestry Track to be Upgraded

Detectors potentially close to a roost

- Autumn 2019
- Spring 2020
- Summer 2020

Bat Species (no. of passes ; detector no.)

MS - Myotis sp.
PS - Pipistrelle sp.

Only illustrated when more than 30 passes recorded

0 0.5 1 Km

Rev	Date	By	Comment
C	29/10/2021	JO	Third Issue
B	19/11/2020	BG	Second Issue
A	17/11/2020	BG	First Issue.

SCOTTISHPOWER RENEWABLES

Carrick Windfarm

Figure 7.3.5 Carrick Detectors Potentially Close to Bat Roosts

Drg No	Carrick-WSP-I-166
Rev	C
Date	29/10/2021
Scale	1:25,000 @ A3