Hill of Fare Wind Farm

Technical Appendix 8.1

Bat Survey Report

Author	James Bunyan
Date	5 September 2023
Ref	

TRACKS ECOLOGY
ECO - GIS - UAV

22/013/ITP/R01
V2.0
5 SEPTEMBER 2023

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ill of Fare Wind Farm, Aberdeenshire

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Bat Survey

TRACKS ECOLOGY LTD.
Director: James Bunyan, BSc.(Hons), MSc., MCIEEM
Registered in Scotland: Company Registration Number: SC690225
Ardvreck, Rosehaugh High Drive, Avoch, IV9 8RF
www.tracksecology.com - info@tracksecology.com

CLIENT

ITPEnergised
4th Floor Centrum House
108-114 Dundas Street
Edinburgh
EH3 5DQ

DOCUMENT DETAILS

Site:	ill of Fare Wind Farm, Aberdeenshire
Survey:	Bat Survey
Report Ref:	22/013/ITP/R01
Site Grid Ref:	NJ686027
Lead Surveyor(s):	James Bunyan
Author(s):	James Bunyan
Survey Date(s):	May to September 2022
Client:	ITPEnergised
Agent:	N/A

DOCUMENT HISTORY

Version	Date	Issue Notes
V2.0	5 September 2023	Minor amendments
V1.1	10 May 2023	Draft for Client review

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The evidence presented and interpretation provided is true and has been prepared and provided in accordance with the guidance of The Chartered Institute of Ecology and Environmental Management's Code of Professional Conduct.

07528 865557 | info@tracksecology.com | www.tracksecology.com | /in/jamesbunyan | @TracksEcology

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EXECUTIVE SUMMARY

- Tracks Ecology Ltd. was commissioned by ITPEnergised to undertake a series of bat surveys in relation to the proposed Hill of Fare Wind Farm Site, located 6km north of Banchory, Aberdeenshire during 2022.
- The survey was identified as necessary to support an application for the development of a wind energy scheme including a maximum of 17 turbines with a maximum tip height of 250m. The Survey Area included the site boundary with an emphasis on an area of 250m from the proposed turbines.
- Habitat assessments were undertaken, and 13 full spectrum bat detectors were deployed during three survey periods in 2022 over 84 nights.
- No confirmed roosts were identified within the Survey Area although a number of structures are present including a ruined shooting lodge which was identified as supporting high suitability for roosting bats. No impacts to these structures are anticipated and therefore, no further activity surveys were undertaken.
- Areas of woodland and scattered trees are present and offered some suitability, but due to the exposed nature of the trees and the fact they were generally coniferous, the overall suitability for roosting bats, especially a significant roost, is considered low.
- Habitat assessments identified the Survey Area to generally offer low suitability for bats with broadly open upland habitats dominating.
- The results of the static detector surveys identified the presence of at least four species; common pipistrelle, soprano pipistrelle, brown long-eared bat and *Myotis* sp. In total, 1,851 passes were identified across the 13 detectors over three survey periods. Common pipistrelle formed 49% of these calls and soprano pipistrelle a further 49% with brown long-eared bats and *Myotis* bats forming 1% each.
- Detectors located at Turbines 7 and 16 supported the most activity with median values of 1.09 and 0.82 respectively for all bat species. The majority of the other detector locations supported low activity rates.
- Although not analysed through the comparative analysis software of Ecobat, overall, it is assessed that the Survey Area supports Low to Moderate activity for the region, with the majority of detector locations supporting Low activity. Taking into account the Site Risk level being identified as 'Low' and the worst case scenario of overall bat activity across the Survey Area being identified as 'Low-Moderate', the overall risk assessment for the Survey Area is calculated as 4, assessed as Low within current guidance.
- No significant impact on bats is anticipated as a result of the proposed development, although any design alterations should follow the mitigation recommendations to ensure appropriate stand off distances from turbine blades and suitable habitat features is maintained. Consideration of bats within any future habitat management proposals should also be considered.

1 INTRODUCTION

1.1 TERMS OF REFERENCE

Tracks Ecology Ltd. was commissioned by ITPEnergised to undertake a series of bat surveys in relation to the proposed Hill of Fare Wind Farm Site, located 6km north of Banchory, Aberdeenshire during 2022.

These surveys were requested to identify the level of activity from bats across the Site, to assess the potential impacts of the proposed development on local bat populations and support the Ecological Impact Assessment. For the purpose of this report the 'Survey Area' location is detailed on Figure 1 and included all areas within 250m of the proposed wind turbine locations with a centre of NJ686027 (Figure 1).

1.2 OBJECTIVES OF STUDY

This ecological survey and report seeks to establish the baseline ecological conditions of the Survey Area with a focus on bats.

The primary aim of the surveys is to obtain detailed information to assess:

- The level of activity of all bat species recorded across the Survey Area;
- Impact of any anticipated habitat alterations on use of the Survey Area by bats;
- The risk of turbine-related mortality for all bat species recorded; and
- The likely significant environmental effect on the relevant species' population status if predicted impacts are not mitigated.

1.3 SURVEY AREA DESCRIPTION

The Survey Area is located approximately 6km north of Banchory and is centered on the Hill of Fare, which rises to a low peak of 471m above sea level. The Survey Area is dominated by open moorland supporting a mix of peat and heathland habitats with the southern and northeastern edges of the Survey Area supporting remnant Scots pine woodland and areas of plantation woodland.

No significant watercourses are present although a small number of burns drain the upland habitats, but where these are within the Survey Area, significant riparian woodland is largely absent. At the time of writing, the proposed access route has not been confirmed but is assumed to enter the Survey Area to the west.

1.4 PROPOSED DEVELOPMENT

Currently the proposed development includes a layout of 17 turbines with a 162m rotor diameter and maximum tip height of 250m. The turbine layout is constrained due to various factors including deep peat, telecoms links, underground cables and forestry activities (Figure 2). No details on the proposed access track or ancillary infrastructure is known.

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.

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.

Bats are also detailed within the UK BAP and highlighted within the Highland BAP.

Bat casualties at wind farms are likely to be considered an example of incidental killing as described in guidance to the Habitats Directive and may not constitute an offence. However, where incidental killing occurs at a certain level, it may cease to be incidental. As a result, an assessment of risk is required, and mitigation strategies developed to minimise the impacts on bats and reduce the risk of breach of legislation.

3 METHODOLOGY

3.1 DESKTOP STUDY

To provide additional contextual information a data collection exercise with respect to bats was undertaken extended to include a 5km buffer to the Proposed Development. A review of bat survey data from proposed large scale wind energy projects within 10km of the Development was also undertaken.

Several other information sources were used to obtain ecological background information for the Survey Area. Information on statutory sites was obtained from the website of the statutory agency Scottish Natural Heritage (SNH) via the "Site Link Portal" (http://www.snh.org.uk/snhi/).

A review of information held on the National Biodiversity Network (NBN) Atlas website (www.nbnatlas.org) was also undertaken to provide contextual background information for the location.

Aerial photography, both publicly available (e.g. www.bingmaps.co.uk) and through Emapsite (www.emapsite.com) of the Survey Area was also used to guide field surveys.

3.2 SURVEY DESIGN

All methodology follows the current guidance in relation to bats and onshore wind turbines (Collins, 2016; Hundt, 2012; Scottish Natural Heritage, 2019) unless otherwise specified. All surveys were undertaken by James Bunyan (NatureScot Bat License 114861) of Tracks Ecology Ltd.

Preliminary assessments of the Survey Area identified that the area was dominated by open upland environments with limited woodland habitats within the proposed turbine envelope and very few structures capable of supporting roosting bats. Overall, in line with current best practice guidance, the Proposed Development was assessed to be of low risk to bat populations (NatureScot, 2021).

3.3 RISK ASSESSMENT

Wind farms can affect bats in many ways (NatureScot, 2021):

- 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; and
- Displacement of individuals or populations (due to wind farm construction or because bats avoid the wind farm area.

In line with current guidance in relation to wind farms, initial assessments of the Survey Area indicate that very few locations suitable to support roost features are present and in general commuting and foraging habitats are likely to support very few bats. As a result, the Survey Area was identified as being of 'Low' habitat suitability. At the time of survey commencement, the development was to include 17 'large' turbines and is located within a landscape that already supports a number of other turbines. As a result, the project is assessed to be of Medium size. This results in an overall assessed risk of the Survey Area as being '2', a 'Low' risk (Table 1).

Table 1: Initial site risk assessment - Green (1-2) - low/lowest site risk; Amber (3) - medium site risk; Red (4-5) - high/highest site risk (taken from (NatureScot 2021)).

		Project Size		
		Small	Medium	Large
Habitat Risk	Low	1	2	3
	Moderate	2	3	4
	High	3	4	5

Current guidance recommends that data analysis is undertaken in conjunction with Ecobat, an online tool developed by the Mammals Society designed to assist decision-making in relation to the potential impacts of developments on bats. The tool provides a measure of relative bat activity by comparing data entered by the user with bat survey information collected from similar areas at the same time of year and in comparable weather conditions. The comparator database includes surveys from the National Bats and Wind Turbine Project and other research studies, as well as data submitted by users. Ecobat generates a percentile rank for each night of activity and provides a numerical way of interpreting the levels of bat activity recorded at a site across regions in Britain.

However, at the time of writing the Ecobat tool has been unavailable for use and is not expected to become available again in the short term. As a result, no comparative analysis

has been undertaken as part of this assessment and all analysis has been undertaken outwith the Ecobat analysis tool, but using recognised statistical analysis.

3.4 HABITAT ASSESSMENT

A walkover assessment of the Survey Area, guided by a review of aerial imagery and existing habitat survey data, was undertaken on 23rd May, 24th May and 9th August 2022 by James Bunyan. The aim of this survey was to identify any potential or confirmed roost sites, to assess the location and suitability of habitats for foraging and commuting and to identify if further surveys, such as emergence/re-entry or detailed roost inspection surveys were required. All areas of the Survey Area were assessed with an emphasis on features located within 250m of proposed turbine locations at the time of the survey. Broad habitat types were mapped to understand spatial variation in bat activity but the survey did not form a full habitat survey.

3.5 BAT ACTIVITY SURVEY

In line with recent guidance in relation to onshore wind energy projects (NatureScot, 2021), activity surveys were limited to the deployment of automated static detectors.

Thirteen Titley full spectrum bat detectors were deployed, 6 Anabat Swifts and 7 Anabat Chorus. Personal communications with Titleys UK representative confirmed that use of Swift and Chorus detectors within a single study site does not represent a limitation as detectors function on very similar software and hardware with analogous settings possible. Detectors were placed at or close to the proposed turbine locations. As the Survey Area did not support extensive highly suitable habitat features combined with the spread of turbine locations across all Survey Area habitat types, additional detectors located specifically at habitat features were not required.

Survey deployment period aimed for a minimum of ten days of suitable weather conditions which include temperatures at dusk in excess of 8°C, maximum ground level wind speed of 5m/s or 18km/h and no, or only very light, rainfall. Due to the location, the survey period was therefore extended to maximise the chances of securing ten suitable days of weather.

The full details of the locations and deployment details is presented in Table 2. All detectors were set to commence recording 30mins before sunset and continue until 30mins after sunrise. Detectors were deployed with the microphones connected directly to the units and secured on posts at approximately 0.5m above ground level. Use of cables and higher positioning of the units was avoided due to the previous experience of the surveyor. Regular interference by red deer has occurred when detectors are placed on higher posts or plastic shielded cables used.

To place the bat activity levels into context, site specific weather monitoring was undertaken through the deployment of a weather station. Within the centre of the Survey Area (NJ 68959 03054), a Davis Vantage Vue Weather Station combined with a WeatherLink - Windows USB data logger was deployed for the duration of each of the survey periods. The weather station was mounted on a pole at approximately 2.5m in height in open ground.

3.6 SONOGRAM ANALYSIS

Analysis of full spectrum WAV files was undertaken using Anabat Insight v2.0.6.3-g73846db. All files were analysed with the assistance of bespoke species filters to identify and separate common and soprano pipistrelle. This automated analysis was then subject to manual checks of approximately 20% of all calls. Where concerns over the accuracy were present, further manual species identification was undertaken. All sonogram files excluded by the pipistrelle

filters were then subject to manual checking of WAV sonograms and where bat calls were present, manual identification was undertaken. Species identification broadly followed that presented in Russ (2012a) taking into account the geographical location of the Survey Area, habitats present and ecologists own expertise and site knowledge.

Some species of bat are 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 session 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 15secs) recorded from the static detectors. Although this is to some degree an arbitrary measure, the activity levels are comparable across detectors and is a frequently used index. For this report, each file containing a call from a species is termed a 'pass'. For some portions of the analysis, 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. As discussed, the use of the comparative analysis feature of Ecobat was unavailable at the time of the analysis. As a result all data was analysed within Microsoft Excel.

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. Analysis included calculation of bat pass frequency across locations, species, survey periods with mean and medians calculated. Further analysis of timings of recorded passes across locations was undertaken to provide information on risk of nearby roosts being present.

In northern Scotland, 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. Within this document figures presented are those calculated excluding all 'zero activity' nights unless otherwise stated. In comparison to including 'zero activity' nights, this will result in higher activity rates being presented, but taking into account the location of the Survey Area, this is assessed as being the approach which will produce the most accurate assessment of risk. Assessments of the relative activity levels between detector locations and also of the Survey Area in its entirety are also made based on the surveyors knowledge of bat ecology and wind farm projects. In the absence of the Ecobat tool, quantitative relative assessments cannot be undertaken.

As night length varies throughout the survey period, rates of activity were calculated on a per night basis and corrected for variable night length with total number of passes during a survey night divided by the number of hours between sunset and sunrise.

3.7 LIMITATIONS

A number of minor limitations were experienced during the bat surveys:

- It is difficult to ensure that acceptable weather conditions are experienced during bat survey work in northern Scotland. However, to compensate for this risk detector deployment sessions were extended beyond that recommended. Although some

periods of sub-optimal weather were encountered the extended periods of monitoring resulted in non-significant impact on results.

- Use of the Ecobat tool is recommended to enable a comparison of activity across the wider area and relies on data provision from multiple third parties. This tool was unavailable at the time of writing and no comparative analysis could be undertaken. This represents and significant limitation to some areas of the analysis, but based on surveyor experience robust assessments of activity in the context of the Site can be undertaken.
- During the survey periods a small number of units failed to record due to hardware issues. As a result the overall activity levels at these locations will be reduced, however, rates of activity takes into account the number of active nights and will remain unaffected for the periods when detectors functioned correctly.
- It is anticipated that the proposed turbine locations detailed within this report will change as the site design evolves. Although detector locations may no longer be located at or near turbines the spread of the 13 detectors will provide a comprehensive understanding of bat activity across the turbine envelope.
- No details on the proposed access track or ancillary infrastructure are known and no assessment of any proposed access routes, compounds, borrow pits etc. is included within this assessment.

Although a number of limitations exist, the data obtained provides a clear picture of bat activity across the Survey Area and wider environs and as a result it is not anticipated that the limitations affect the robustness of the results to a significant degree.

Table 2 Summary of automated static detector deployment

Static Detector Location	Grid Reference	Survey 1					Survey 2					Survey 3				
		Deploy Date	Collect Date	Failure Date	Min. Active Nights	Total night time hours	Deploy Date	Collect Date	Failure Date	Min. Active Nights	Total night time hours	Deploy Date	Collect Date	Failure Date	Min. Active Nights	Total night time hours
T01	368770 , 804295	23/05/22	25/06/22	N/A	33	209.67	08/08/22	06/09/22	N/A	29	270.77	22/09/22	14/10/22	N/A	22	277.88
T02	368406 , 803850	23/05/22	25/06/22	N/A	33	209.67	08/08/22	06/09/22	N/A	29	270.77	22/09/22	14/10/22	N/A	22	277.88
T03	367857 , 803653	23/05/22	25/06/22	N/A	33	209.67	08/08/22	06/09/22	N/A	29	270.77	22/09/22	14/10/22	N/A	22	277.88
T05	366921 , 802967	Unit failure		-	0	0	08/08/22	23/08/22	N/A	15	131.92	22/09/22	14/10/22	N/A	22	277.88
T07	367128 , 801843	23/05/22	25/06/22	N/A	33	209.67	08/08/22	06/09/22	N/A	29	270.77	22/09/22	14/10/22	N/A	22	277.88
T08	367509 , 802491	23/05/22	25/06/22	N/A	33	209.67	08/08/22	06/09/22	N/A	29	270.77	22/09/22	14/10/22	N/A	22	277.88
T10	368006 , 801748	Unit failure		-	0	0	08/08/22	06/09/22	N/A	29	270.77	22/09/22	14/10/22	N/A	22	277.88
T11	368592 , 801895	23/05/22	25/06/22	N/A	33	209.67	08/08/22	06/09/22	N/A	29	270.77	22/09/22	14/10/22	N/A	22	277.88
T13	368419 , 802824	23/05/22	25/06/22	N/A	33	209.67	SD card failure		-	0	0	22/09/22	14/10/22	N/A	22	277.88
T14	368790 , 803271	23/05/22	25/06/22	N/A	33	209.67	08/08/22	06/09/22	N/A	29	270.77	22/09/22	14/10/22	N/A	22	277.88
T15	369336 , 803069	23/05/22	25/06/22	N/A	33	209.67	08/08/22	06/09/22	N/A	29	270.77	22/09/22	14/10/22	N/A	22	277.88
T16	369853 , 803323	23/05/22	25/06/22	N/A	33	209.67	08/08/22	06/09/22	N/A	29	270.77	22/09/22	14/10/22	N/A	22	277.88
T17	370428 , 803293	23/05/22	25/06/22	N/A	33	209.67	08/08/22	06/09/22	N/A	29	270.77	22/09/22	14/10/22	N/A	22	277.88

* Failure was due to technical issue with detector which has subsequently been identified as a known issue by the manufacturer requiring hardware repair.

4 RESULTS

4.1 DESK STUDY

The Survey Area does not include any conservation designations with the closest, the River Dee Site of Special Scientific Interest (SSSI) is located 2.5km south west at its nearest location. No other designated sites are present within 5km of the Site. The qualifying features of the River Dee SAC include Atlantic salmon *Salmo salar*, freshwater pearl mussel *Margaritifera margaritifera and o*tter *Lutra lutra*. No designated sites are present within 5km of the Survey Area which are designated for bats, although the SAC is likely to offer suitable habitat for bats in the form of riverine habitats.

No large-scale wind farm applications are within 10km of the Survey Area (Aberdeenshire Council, 2022). Several smaller wind energy developments either involving single large turbines or small numbers of small turbines (<30 tip height) were present. The details of all these applications were assessed through the Aberdeenshire Planning Portal. Although ecological information was present on some projects, no bat activity surveys were undertaken as part of the ecological impact assessment process.

4.2 HABITAT ASSESSMENT

The Survey Area is dominated by dry heath habitats with scattered areas of bog and wet heath, with the peripheries of the Survey Area supporting a mix of semi-natural woodland, plantation woodland and scattered coniferous trees. Smaller areas supporting flushed grassland, heath/grassland mosaics and bracken are also present (Figure 2). Within the areas that support peaty soils a small number of pools are present, although these are exposed and isolated, they may provide some foraging opportunities for bats. The wider blanket bog areas are also likely to offer foraging resources during calm conditions. The watercourses present are generally small and may provide some foraging as well as offering suitable commuting routes from the woodland habitats and wider lowland habitats surrounding the Survey Area to the more exposed upland sections within the Survey Area.

Roosting opportunities are assessed as being very limited. Locations include a few structures, primarily a ruined shooting lodge (TN14), a more modern corrugated tin bothy (TN5) and a ruined bothy structure in the east of the Survey Area (TN20). The ruined shooting lodge was assessed as being of high suitability for supporting roosting bats, whereas the other two structures were assessed as being low to moderate at best. None of these are within 200m of the proposed turbine locations and all will remain unaffected by the proposed development and so no further activity surveys have been undertaken.

Within the edges of the Survey Area commercial plantation woodland and areas of more scattered semi-natural coniferous woodland are present. The majority of these areas are sparsely populated, and trees, where present, are generally small, offering no significant suitability to support roosting bats. Denser areas of woodland with more mature trees are present, however, the vast majority of these areas are located in the east or southern edge of the Survey Area in excess of 500m from proposed turbine locations. Two turbines are located within or close to areas of sparse woodland, T1 and T17. The scattered trees surrounding the location of T1 are generally small and sparse, but immediately adjacent. These trees offer very limited potential for supporting roosting bats, although small cracks and crevices are present within the older specimens. The position of T17 is approximately 35m from a small number of semi-mature Scot's pine which are exposed and relatively isolated with no obvious potential roost features. Further denser Scot's pine woodland is present further south, approximately 90m from the proposed turbine location. These trees include a number of gnarled mature individuals which may offer some moderate potential

for use by bats as small summer roosts. Impacts could occur if the blade radius is within 50m, therefore micro-siting should ensure at least 50m, plus blade radius and avoid mature native trees.

Connectivity over much of the Survey Area is poor with only small burns and ditches offering suitable commuting routes across an otherwise very open landscape.

A brief description of all features of interest within the Survey Area is detailed in Table 4 and presented on Figure 2.

Table 4: Suitability of Features of Interest.

TN	Description	Suitability	X	Y
1	Bog pools may offer some limited foraging resource during calm weather.	Foraging - Moderate	367138	802581
2	Bog pools may offer some limited foraging resource during calm weather.	Foraging - Moderate	367248	802832
3	Scattered isolated trees along the southern boundary. Trees are generally small, exposed and generally unsuitable for use by bats for roosting.	Roosting - Low	367253	801518
4	Bog pools may offer some limited foraging resource during calm weather.	Foraging - Moderate	367271	802021
5	Bothy, low potential beneath corrugated metal roof and walls. No definitive signs and very exposed.	Roosting - Low/Moderate	367775	801819
6	The large central section of modified bog may offer some suitability for foraging during calm conditions. Small watercourses will also serve as foraging and commuting links.	Foraging - Moderate	367794	803192
7	Narrow section of rush dominated flush, likely to offer foraging and potentially commuting link to areas of bog.	Foraging - Moderate	367931	802253
8	Small number of isolated trees unsuitable for use by bats	Roosting - Low	368005	801824
9	Wide area of rush dominated flushed habitat which is likely to offer suitable foraging resources during calm weather.	Foraging - Moderate	368731	803973
10	Encroachment of self-set coniferous trees from adjacent plantation along with occasional remnant Scot's pine. Very limited roosting potential, but over time will increase suitability for sheltered foraging.	Roosting - Low	368776	804343
11	Small areas of sparse woodland extending on to Survey Area. Trees were generally unsuitable to support roosting bats but may offer some limited resources for foraging.	Roosting - Low	368803	801312
12	Small areas of sparse woodland with trees generally of low suitable to support roosting bats but may offer some limited resources for foraging.	Roosting - Low	368803	802567
13	Two small copses of trees and scrub. Area is isolated and exposed and offers limited suitability for roosting bats.	Roosting - Low	368978	801944

14	Highly suitable ruined structure. Inaccessible for internal assessment but appears to offer numerous potential roost features within stone walls and damaged roof. No definitive signs identified on external assessment.	Roosting - High	369113	801910
15	Mixed woodland areas with larger mature trees potentially supporting roost features. Woodland also supports watercourse and is likely to offer a foraging resource for local bat populations.	Roosting - Moderate	369117	803944
16	Larger areas of sparse woodland with areas of wind throw. In general, the trees were suboptimal but may support bat roosting opportunities. Area is not near the turbines, but if clearance required further surveys would be necessary.	Roosting - Moderate	369420	801425
17	Encroachment of self-set coniferous trees from adjacent plantation. No roosting suitability but will over time increase suitability for sheltered foraging.	Roosting - Low	369803	803426
18	Sparsely distributed trees which are generally of low suitability.	Roosting - Low	369812	801649
19	Larger areas of sparse woodland with areas of wind throw. In general, the trees were suboptimal but may support bat roosting opportunities. Area is not near the turbines, but if clearance required further surveys would be necessary.	Roosting - Moderate	369828	801067
20	Small, ruined structure with only stone walls remaining. Offers moderate potential to support roosting bats within cracks and crevices of stone walls but unlikely to support significant number of roosting bats. No definitive evidence of use identified during the survey.	Roosting - Moderate	369889	802789
21	Larger areas of sparse woodland with areas of wind throw. In general, the trees were suboptimal but may support bat roosting opportunities. Area is not near the turbines, but if clearance required further surveys would be necessary.	Roosting - Moderate	370316	801415
22	Larger areas of sparse woodland with areas of wind throw. In general, the trees were suboptimal but may support bat roosting opportunities. Area is not near the turbines, but if clearance required further surveys would be necessary.	Roosting - Moderate	370422	801879
23	Scattered mature and semi-mature trees including a number offering some limited potential to support bats. No highly suitable features identified but furrowed bark and damaged sections may support small opportunities.	Roosting - Moderate	370474	803169
24	Scrub and woodland. Low suitability for roosting bats but likely to provide some foraging resources during calm conditions.	Roosting - Low	371035	803750

25	Small areas of sparse woodland extending on to Survey Area. Trees were generally unsuitable to support roosting bats but may offer some limited resources for foraging.	Roosting - Low	371889	802093
26	Larger woodland areas generally supporting unsuitable trees but likely to offer some foraging resources. Area is not in close proximity to the turbines, but if clearance required further surveys would be necessary.	Roosting - Moderate	373368	803590

4.3 BAT ACTIVITY SURVEY

Weather

Current guidance (NatureScot, 2021) 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 and wind speeds less than 5m/s.

Survey 1 was undertaken during late spring/early summer with temperatures generally average for the time of year. Night-time temperatures continued to drop close to the recommended limit of 8°C with a number of nights during late May/early June dropping below this limit during the night-time period. It should be noted that the Survey Area is located on exposed ground in the north-east of Scotland and the local bat population regularly experience such temperatures throughout the early part of the field season. Out of the 33 nights detectors were deployed during Survey 1, eight of these dropped below 8°C during the night with five of these cooler than 6°C when insect flight drops off significantly. It is, however, recognised that this cooler weather at the commencement of the survey season may have reduced the level of activity to some degree. In addition to temperature, wind speeds may also have limited bat activity on four nights, although higher wind speeds were encountered during hours of daylight with wind speeds generally dropping during night-time hours. Rain was generally light and infrequent throughout the survey period.

Survey 2 extended for 29 days where detectors were fully functional with the survey period supporting temperatures above 8°C for the duration of the survey period. Wind speeds were also low for the duration of the survey period with only very limited occasions when wind speeds approached or exceeded the recommended speed of 5m/s or 18km/h. Rain was again generally light and infrequent throughout the survey period.

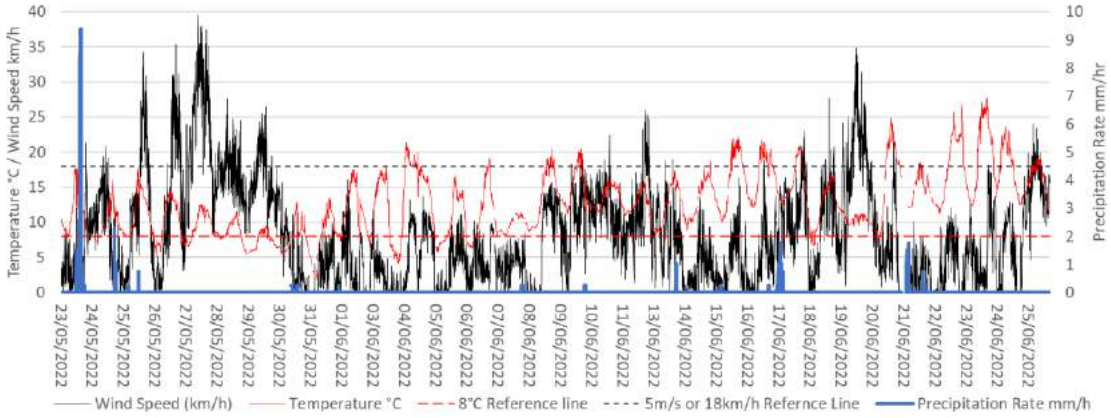

Chart 1a: Survey 1 weather data.

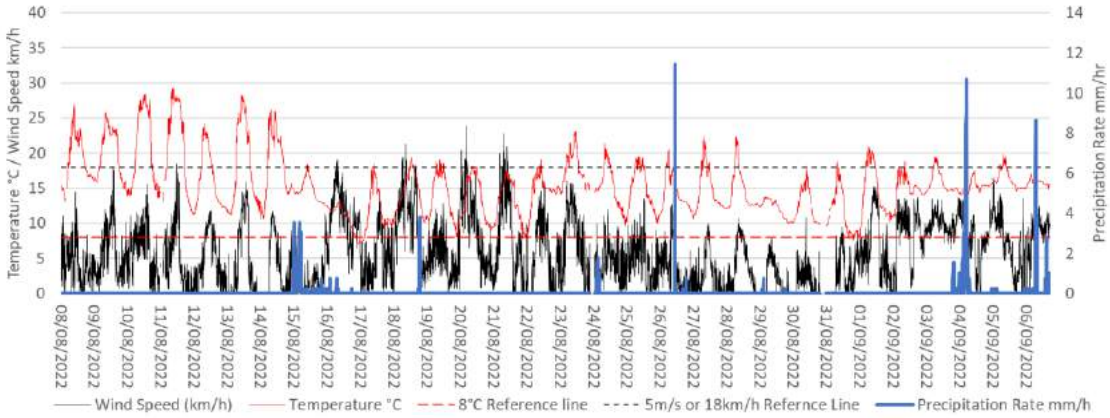

Chart 1b: Survey 2 weather data.

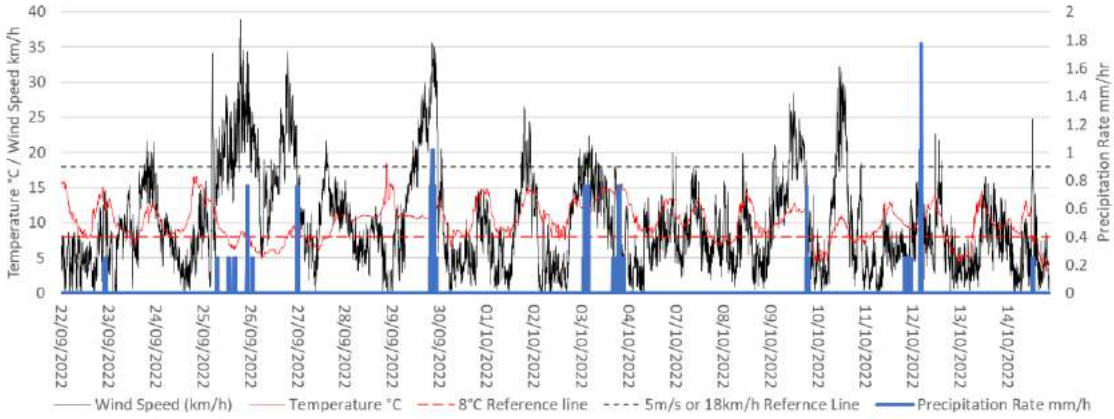

Chart 1c: Survey 3 weather data.

The final survey period in September through to early October supported generally suitable temperatures with five nights falling below the 8°C recommended limit during the night-time period. In these cases the temperature was generally above 8°C at dusk and dropped lower during the night-time period. Wind speeds were variable with high wind speeds experienced on a number of days and night-time wind speeds exceeding the 5m/s or 18km/h on a small number of occasions. Rainfall again fluctuated and was generally wetter than Survey 1 or 2 with significant rainfall during a number of nights, in particular on nights of 30th September, 3rd October and 12th October 2022.

Overall, the weather conditions were assessed as being broadly acceptable taking into account the northern latitude of the Survey Area, the altitude and the prolonged deployment of the detectors. However, some caution with respect to interpreting low activity rates during the first deployment and on a number of days during the third survey period is required due to the low temperatures and rainfall events.

Overall Activity

The results of the static detector surveys identified the presence of at least four species; common pipistrelle, soprano pipistrelle, brown long-eared bat and *Myotis* sp. In total, 1,851 passes were identified across the 13 detectors over three survey periods with the mean, median and distribution of calls across the locations and survey periods detailed in Table 5.

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

northern Scotland. In these circumstances, the median is likely to be a more useful summary of the typical activity than is the mean (Lintott & Mathews, 2018). As a result, median pass rates per hour are primarily the presented data, along with an indication of mean pass rates where relevant. Within the Survey Area, bat activity was variable across the survey sessions, but overall activity levels were relatively low with the majority of the locations supporting median and mean activity rates below 1 bat pass per hour and the vast majority of locations for all species.

Detectors located at Turbines 7 and 16 supported the most activity with median values of 1.09 and 0.82 respectively for all bat species (Chart 2 and Table 5). Location T13 supported the least activity with only a single pass recorded, although this unit failed during the summer survey period impacting on the amount of activity recorded.

In total, 1,869 bat passes were recorded across all detectors and survey sessions. Survey 2 supported the majority of activity with 1,653 calls (88%), Survey 1 supported 186 (10%) and Survey 3 the least at 30 calls (2%).

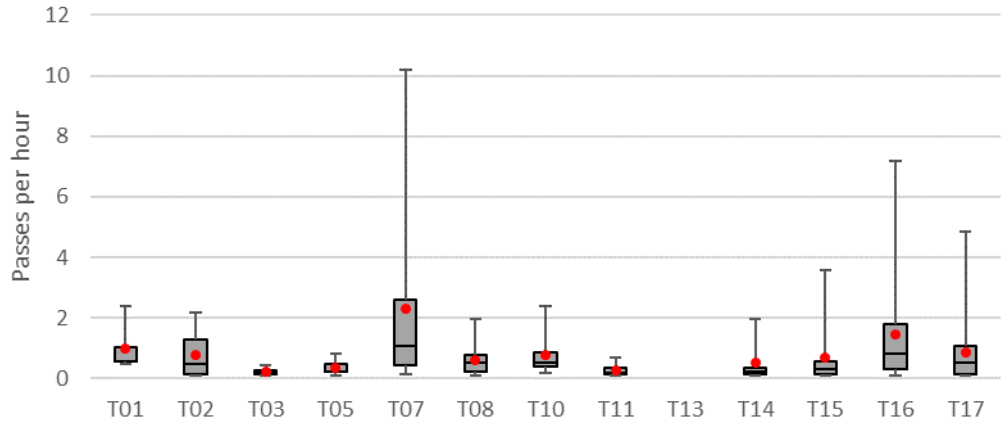

Chart 2: Boxplot for the number of bat (all species) passes per hour across detector locations over all survey periods. The 'box' shows the interquartile range, with median (central line) and upper and lower 25% ranges. The mean is also shown (red circle).

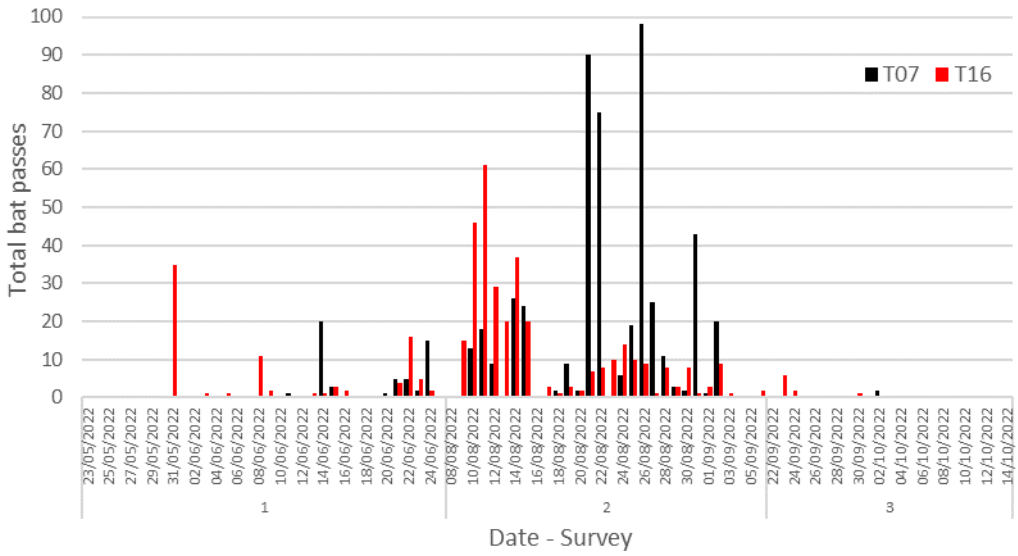

Chart 3: Activity from all species across survey periods at detector locations T07 and T16.

Table 5: Summary of bat passes across surveys at detector locations showing mean and median nightly pass rates over the entire survey period (excluding zero data nights). Median values above 0.5 are highlighted.

Detector Location	Common pipistrelle (n=907)			Soprano pipistrelle (n=904)			Myotis (n=18)			Brown long-eared (n=22)		
	No. of passes	Median nightly pass rate	Mean nightly pass rate	No. of passes	Median nightly pass rate	Mean nightly pass rate	No. of passes	Median nightly pass rate	Mean nightly pass rate	No. of passes	Median nightly pass rate	Mean nightly pass rate
T1	25	0.35	0.72	9	0.29	0.26	0	0	0	1	0.11	0.11
T2	62	0.33	0.49	56	0.45	0.52	0	0	0	0	0	0
T3	14	0.21	0.22	12	0.21	0.18	1	0.08	0.10	0	0	0
T5	14	0.17	0.20	21	0.21	0.22	0	0	0	1	0.12	0.11
T7	220	0.97	1.22	316	0.57	1.47	5	0.10	0.10	4	0.22	0.22
T8	50	0.27	0.32	65	0.41	0.43	1	0.08	0.10	2	0.12	0.12
T10	50	0.21	0.29	85	0.31	0.48	1	0.50	0.50	4	0.11	0.10
T11	14	0.14	0.16	23	0.16	0.23	0	0	0	0	0	0
T13	0	0	0	0	0	0	1	0.08	0.10	0	0	0
T14	24	0.16	0.33	33	0.20	0.39	0	0	0	1	0.11	0.11
T15	56	0.21	0.36	62	0.23	0.54	0	0	0	3	0.12	0.12
T16	261	0.46	1.04	147	0.32	0.70	6	0.75	0.75	4	0.11	0.11
T17	117	0.41	0.63	75	0.33	0.46	3	0.33	0.33	2	0.12	0.12

The activity recorded by detectors located at Turbines 7 and 16 was not uniform throughout the survey season and did not closely correlate with each other. Peaks of activity occurred at the location of detector T16 during the early part of Survey 2, while activity at T07 peaked in the middle to latter stages of Survey 2. When comparing weather conditions between these two time periods, no obvious influence is apparent. Wind speeds are slightly higher during the peak of activity at T07 (21st – 28th August 2022) but generally remained below the 5m/s threshold. Temperatures were also cooler during this period but always in excess of the 8°C threshold. This may suggest that the peaks of activity are related to calls from a small number, possibly a single bat, undertaking foraging in close proximity to the detector. If higher numbers of individual bats were present, then it would be expected that activity levels would be higher during other nights and across the wider Survey Area. It is worth noting that the frequency of bat passes even during the peak nights was not high with the maximum average pass rate at T07 recorded at 10.17 passes per hour on 26th August 2022 and 7.19 passes per hour on 11th August 2022.

Common Pipistrelle

Passes from common pipistrelle totalled 907 through all surveys, forming 49% of the total bat calls. The distribution of common pipistrelle calls across the survey area was similar to that of all species with the highest rates of activity at locations T07 and T16 (Figure 3). This distinction was very clear during the first survey season (Chart 4a) with almost all calls recorded at these two locations. During the summer survey session (Chart 4b) many locations supported some activity, although T07 and T16 remained the most active. The autumn survey session recorded almost no activity with a total of 4 bat passes recorded (Chart 4c).

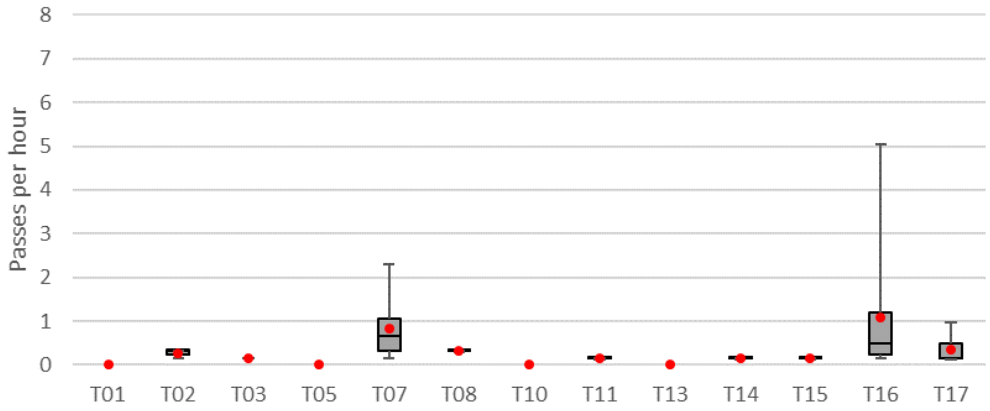

Chart 4a: Boxplot showing the median nightly pass rate (bat passes per hour) and mean (circles) of common pipistrelle bats during Survey 1.

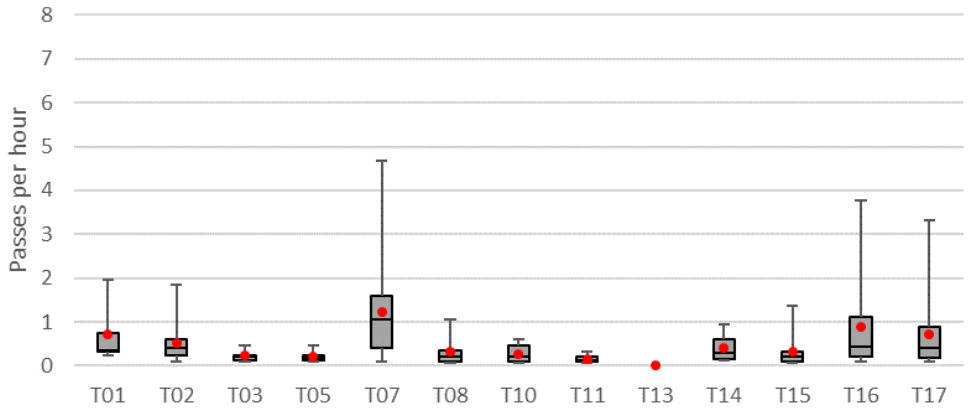

Chart 4b: Boxplot showing the median nightly pass rate (bat passes per hour) and mean (circles) of common pipistrelle bats during Survey 2.

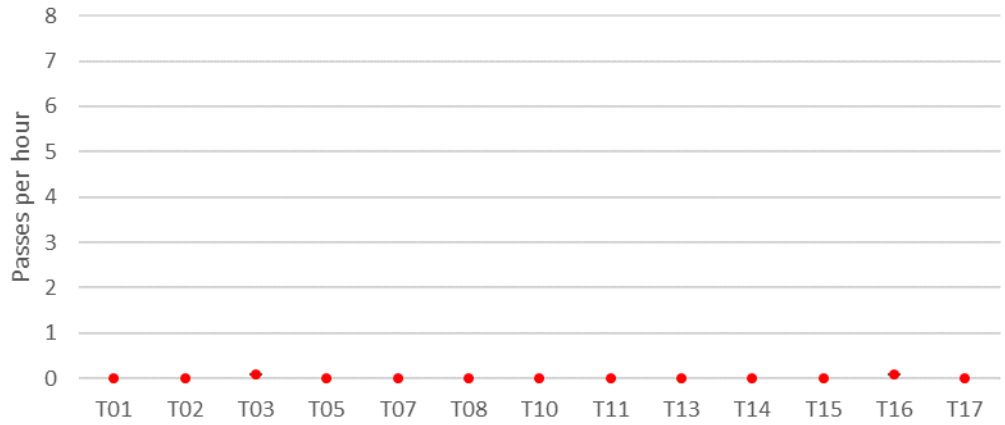

Chart 4c: Boxplot showing the median nightly pass rate (bat passes per hour) and mean (circles) of common pipistrelle bats during Survey 3.

With respect to the temporal distribution of common pipistrelle activity in relation to sunset almost no activity was recorded from common pipistrelle across the Survey Area within 1 hour of sunset. The time of recorded bat passes in relation to sunset can provide an indication of whether a roost is likely to be nearby. Where bats are recorded close to sunset, especially during or before the recognised emergence time (Russ, 2012b) of any particular species, this indicates that bats are likely to be using roosting sites close to the detector.

Only a single common pipistrelle call was recorded at T03 approximately 33minutes after sunset within the expected emergence time of the species. This call is assessed as a likely anomaly and combined with the timing of the other early passes, no roosts are considered likely to be in close proximity to the detector locations (Chart 5). It is worth noting that an apparent concentration of activity at T07 occurred between 60 and 90 minutes after sunset before activity levels reduced.

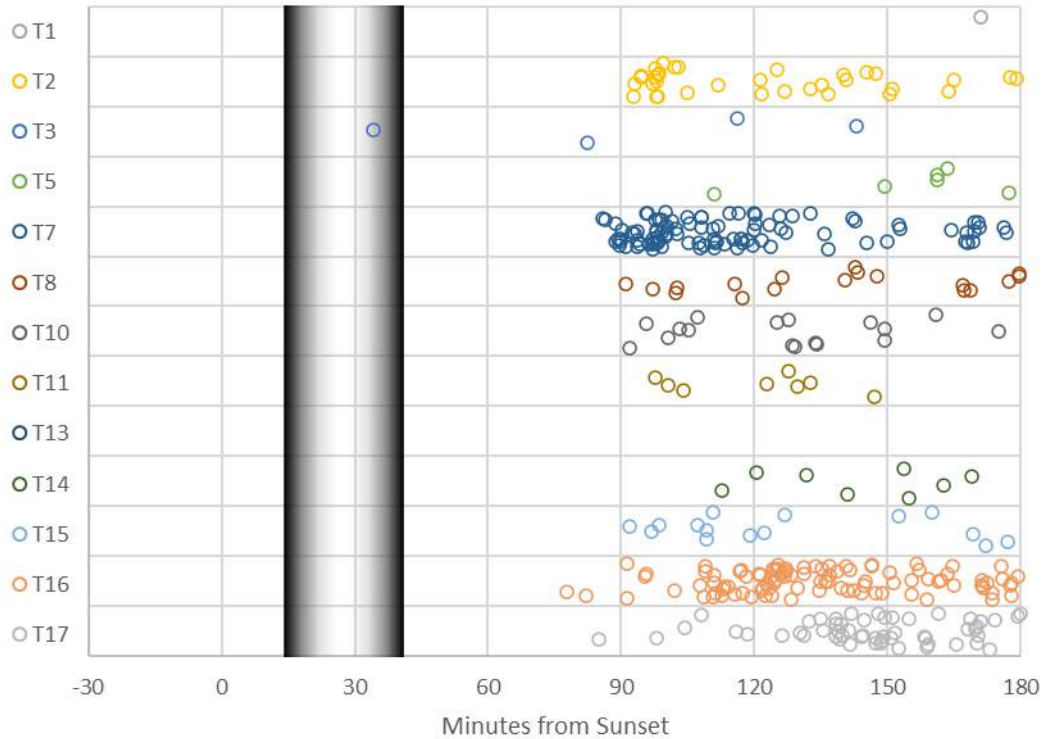

Chart 5: Temporal distribution of all common pipistrelle calls recorded within 3 hours after sunset in relation to time of sunset across detector locations.

Soprano Pipistrelle

Passes from soprano pipistrelle totalled almost the same as that of common pipistrelle at 904 through all surveys, also forming 49% of the total bat calls. The distribution of soprano pipistrelle calls across the survey area was similar to that of common pipistrelle with the highest rates of activity at locations T07 and T16 (Figure 4). This distinction was not as clear as that of common pipistrelle during the first survey season (Chart 6a) with relatively low activity rates recorded (total pass count of 74 across all detectors). During the summer survey session (Chart 6b) many locations supported some activity, with T07 supporting the most activity. Other active detector locations included T02, T14, T15, T16 and T17. Once again, the autumn survey session recorded almost no activity with a total of 18 bat passes recorded (Chart 6c).

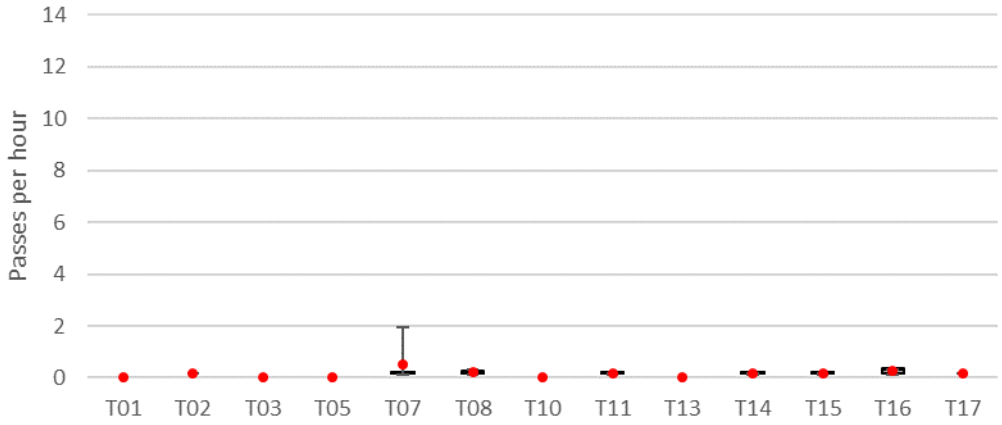

Chart 6a: Boxplot showing the median nightly pass rate (bat passes per hour) and mean (circles) of common pipistrelle bats during Survey 1.

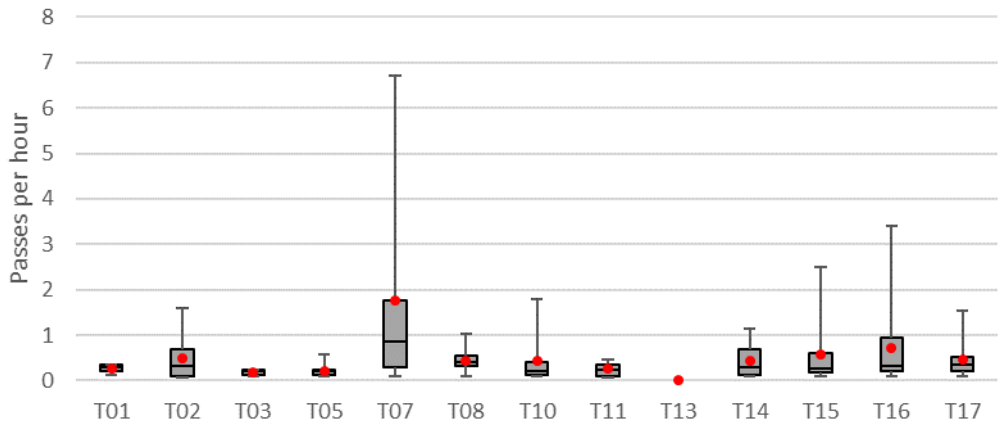

Chart 6b: Boxplot showing the median nightly pass rate (bat passes per hour) and mean (circles) of common pipistrelle bats during Survey 2.

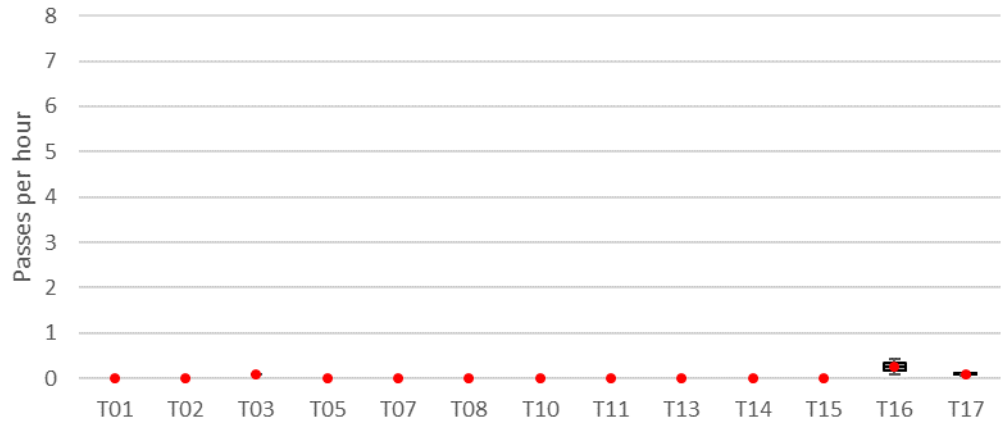

Chart 6c: Boxplot showing the median nightly pass rate (bat passes per hour) and mean (circles) of common pipistrelle bats during Survey 3.

The temporal distribution of soprano pipistrelle activity in relation to sunset was very similar to that of common pipistrelle with no activity recorded from the species across the Survey Area within 1 hour of sunset (Chart 7). Similar to that of common pipistrelle, an apparent concentration of activity at T07 occurred between 60 and 90 minutes after sunset before activity levels reduced. All other detector locations did not appear to support a peak in activity early in the evening.

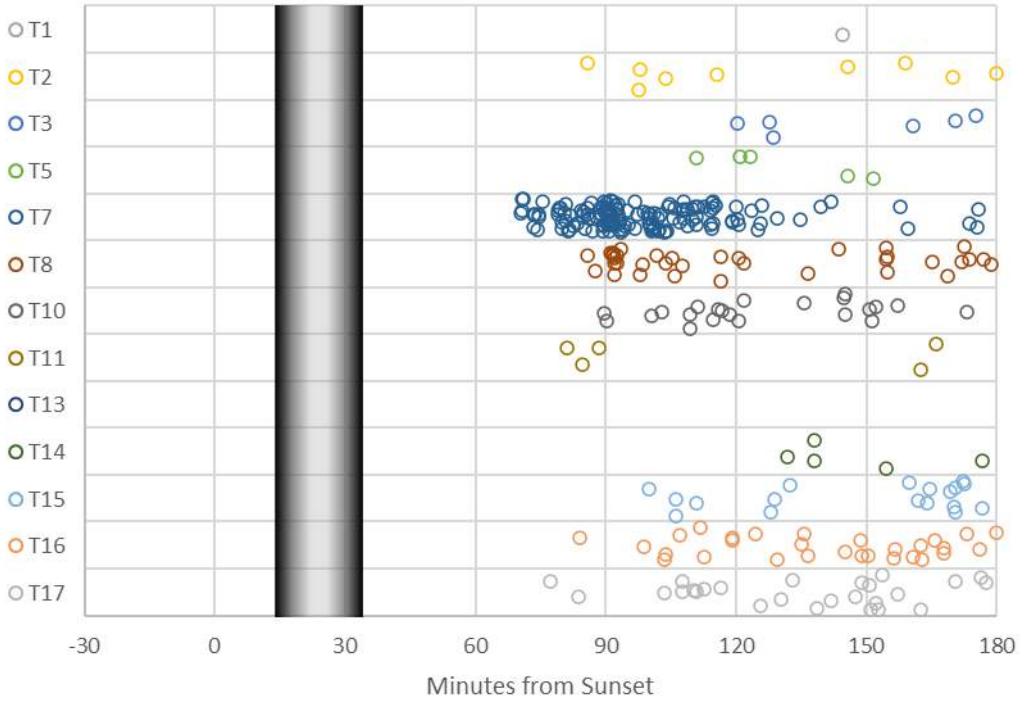

Chart 7: Temporal distribution of all soprano pipistrelle calls recorded within 3 hours after sunset in relation to time of sunset across detector locations.

Other Species

Two other species were identified as being present on Survey Area; brown long-eared bat and a *Myotis* bat. In total, the calls from these two species groups totalled 22 and 18 respectively. Activity from these species was not obviously concentrated at any of the detector locations (Chart 8 and 9). From the sonograms alone it is not possible to provide definitive identification

of *Myotis* species due to the similarities of the sonograms across the genus. However, reviewing the structure of all the *Myotis* calls, it is assessed as most likely the calls are form Natterer's bat. No calls of brown long-eared bats or *Myotis* bats were recorded during Survey 1 with a small number of calls from each species distributed across a number of the detector locations (Chart 8 and 9).

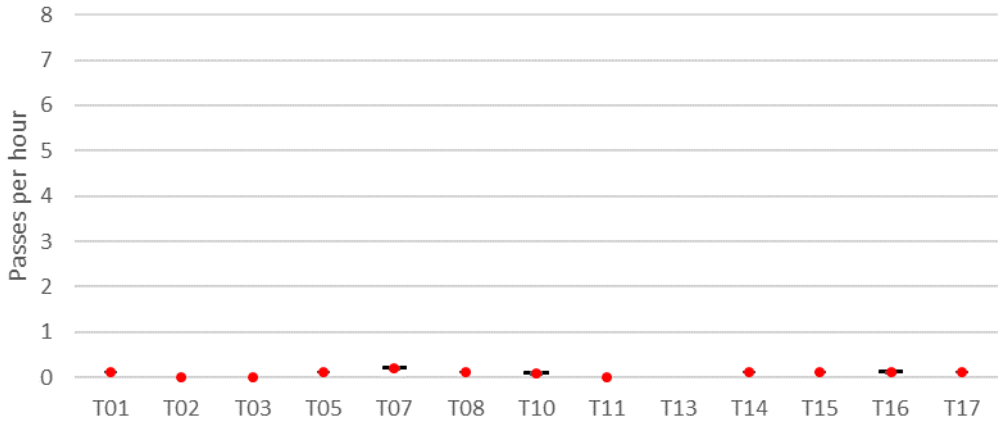

Chart 8: Boxplot showing the median nightly pass rate (bat passes per hour) and mean (circles) of brown long-eared bats across all survey periods.

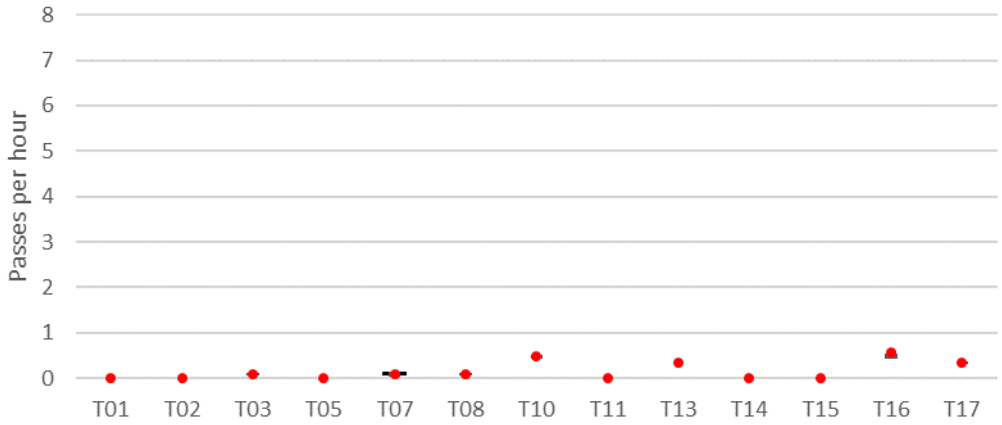

Chart 9: Boxplot showing the median nightly pass rate (bat passes per hour) and mean (circles) of *Myotis* bats across all survey periods.

The location of the Survey Area within northern Scotland is likely to result in reduced activity levels in relation to more southerly parts of the UK. Northern Scotland is also on the edge of the range for most of the UK bat species, and this must also be considered when assessing any impact both in terms of legislation and maintaining bats at a favourable conservation status on site.

In the absence of the Ecobat tool, comparisons to other surveys within the region cannot be undertaken. Based on the surveyors experience it is likely that overall the Survey Area supports Low-Moderate activity for the region, with most detector locations supporting Low activity. It is assessed that detector T07 supports Moderate activity with T16 Low-Moderate activity. However, based on the survey results the majority of the activity occurs during August with all other survey periods supporting very low activity.

5 DISCUSSION

The species present across the Survey Area are largely restricted to common and soprano pipistrelle with a low number of passes from brown long-eared bats and *Myotis* bats. This reflects the northern latitude of the Survey Area and is in line with the anticipated species assemblage considering the habitats present and are in line with the desk study results.

The potential collision risk for each species based on its behaviour and ecology and evidence of casualty rates in the UK and the rest of Europe can be combined with the relative abundance of the species, to indicate the potential vulnerability of populations of British bat species. The overall potential vulnerability of bat populations is identified as: low, medium or high.

It should be noted that both common and soprano pipistrelle are recognised as being at high risk from collisions with wind turbines due primarily to their use of open habitats both for foraging and commuting (NatureScot, 2021). However, their relative abundance is high and as a result their overall vulnerability to significant impacts is identified as being 'moderate'. Brown long-eared and *Myotis* (including Natterer's bat), although rarer bats, are identified as being of low risk of collision and overall the species vulnerability is assessed as being 'low'.

The analysis of the results in a comparative context is somewhat limited due to the lack of the Ecobat analysis tool. In addition, no nearby wind farm projects are present reducing the ability to make a comparative assessment further. However, overall it is assessed based on species distribution and activity levels that the Survey Area supports Low to Moderate activity for the region, with the majority of detector locations supporting Low activity. This overall activity level is mainly affected by results from detector locations T07 and to a lesser extent at T16. Activity levels were non-uniformly distributed throughout the survey periods with Spring and Autumn survey periods supporting very low activity and the majority of pipistrelle activity recorded between 10th August and 3rd September 2023 under low wind conditions.

The habitat assessment identified that the Survey Area offered limited potential to support significant roosts with potential sites largely restricted to the ruined shooting lodge located in the centre of the Survey Area. The woodland and scattered trees offered some suitability, but due to the exposed nature of the trees and the fact they were generally coniferous, the overall suitability for roosting bats, especially a significant roost, is considered low. The absence of any significant frequency of calls within an hour of recognised emergence times of the bat species present, further suggests that no significant roosts are likely to be present within the turbine envelope.

The coniferous woodland, scattered trees and small burns are, however, likely to offer suitable foraging and commuting routes, especially during periods of calm weather. Such features also provide relatively good connectivity to the surrounding lowland landscapes.

Table 6: Overall risk assessment (taken from NatureScot 2021).

Site Risk*	Ecobat activity category (or equivalent justified categorisation)					
	Nil (0)	Low (1)	Low-Mod (2)	Mod (3)	Mod-High (4)	High (5)
Lowest (1)	0	1	2	3	4	5
Low (2)	0	2	4	6	8	10
Med (3)	0	3	6	9	12	15
High (4)	0	4	8	12	15	20
Highest (5)	0	5	10	15	20	25

* The scores in the table are a product of multiplying site risk level and the Ecobat activity category when available.

The results of the surveys across the 2022 activity season confirmed this assessment with low activity levels across the Survey Area during the majority of the survey. The reasons for peaks of activity during August is unclear but is most likely to be related to the relatively warm and calm conditions during and preceding the period allowing pipistrelle bats to take advantage of potential peaks of insect prey across the upland habitats. Furthermore, young bats are likely to be flying further from maternity roosts with some maternity roosts beginning to disperse.

Taking into account the Site Risk level being identified as 'Low' (Table 1) and the worst case scenario of overall bat activity across the Survey Area being identified as 'Low-Moderate', this results in the overall risk assessment for the Survey Area being calculated as 4 (Table 6), with an overall assessment of Low.

The Site Risk value is based on the exclusion of zero-night activity and from the data it is evident that no activity was recorded on multiple nights across the surveys, as a result this level of activity is likely to be an overestimate. In line with current guidance, it is important to have an understanding of both "typical" and unusually high levels of bat activity at a site so that potentially important peaks in activity are not overlooked. It is therefore important that both the highest levels of activity, and the most frequent levels of activity (i.e. the median) are assessed separately.

When assessing that overall the median values of bat activity at all locations across all survey periods were below 1 bat pass per hour and for the majority of occasions below 0.5 bat passes per hour, it is unlikely that the Survey Area activity overall can be classified as anything other than Low. In some instances the pass rate extended up to 10 passes per hour for all species grouped together, but such occurrences were very limited.

No significant bat habitat features are present within the Survey Area, although it is likely that the watercourses, woodland edges and scattered trees provide a navigation and potentially a foraging resource. In line with good construction practice appropriate buffer distances of turbines from such features has largely been designed into the scheme, consequently reducing the likelihood of increased collision risk to bats. However, due to the presence of scattered mature Scot's pine trees and colonising non-native conifers some caution is required.

Taking into account all elements of the survey there are a number of key factors to consider:

- No significant roosts are likely to be present within the Survey Area, although the buildings present, primarily the ruined shooting lodge may support small roosts.
- The habitat risk of the Survey Area was assessed to be 'Low'.
- The Project Size was assessed to be 'Medium'.
- The overall assessed risk of the development was assessed to be '4', Low.
- Activity levels are very low across the majority of locations with T07 and T16 supporting slightly higher activity levels.

Based on the results from the surveys and focusing on the key factors described, the overall risk assessment of the proposed development is assessed to be in line with that identified by Ecobat as 'Low'. In the absence of Ecobat analysis this result is based on the interpretation of the survey data by Tracks Ecology Ltd.

It is predicted that any effects from the development would be limited to common and soprano pipistrelle and risks would be low with peaks of activity likely to occur during calm conditions when collision risk is greatly reduced due to low turning speeds of blades. Risk of a significant impact on the conservation status of common and soprano pipistrelle is assessed

as being very low. Furthermore, in such an open landscape the majority of activity is likely to be concentrated close to the ground along watercourses and associated riparian habitats.

6 MITIGATION

Although this assessment has identified that any impacts are likely to be limited, further reduction in this risk can be achieved through a number of mitigation approaches.

6.1 TURBINE LOCATION

To minimise the potential risk of collision or barotrauma, it is strongly recommended that all turbines are located away from watercourses and highly suitable riparian habitats as well as woodland edges, which are likely to be the main source of foraging and commuting activity of local bats. In addition it is recommended that areas of denser scattered trees are considered as potential foraging and commuting routes within this landscape. As discussed, this has largely been incorporated into the existing design. However, if the final turbine locations are subject to change, then it is recommended that distances from turbines to watercourses or significant ditches is maximised.

Current guidance (NatureScot, 2021) recommends that wind turbine blade tips should be more than 50 m away from features likely to be used by foraging and commuting bats, such as trees, watercourses and waterbodies. As a result, the final design should ensure that the tips of the blades are a minimum of 50m away from any identified bat habitat feature. Currently full details on hub height and blade length are unknown. It is important to ensure that the minimum distance from blade tip to a feature of 20m in height (e.g. mature woodland) and ground level features (e.g. watercourses) is maintained above 50m and ideally increased to 100m where the habitat feature is of good quality for foraging bats.

The calculation of standoff distance required is based on the following formula.

$$b = \sqrt{(50 + bl)^2 - (hh - fh)^2}$$

Where bl = blade length; hh = hub height; and fh = feature height (all in metres).

On the assumption that the final details of the proposed turbines are assessed in the context of standoff distance and the mitigation is employed, it is expected that the likely significant effects would be reduced to a level which would not be significant on the local populations of all four bat species present within the Survey Area and the favourable conservation status of the species will be maintained.

6.2 HABITAT MANAGEMENT

It is not known whether or not any habitat management proposals are included within the project. If any significant alterations to habitats within 100m of the proposed wind turbine locations is proposed, then any proposals should include an assessment of the potential for the management plan to increase risk of impacts on bats by drawing foraging or commuting bats in to close proximity to turbines.

It is recommended that non-native tree establishment within 100m of the turbine locations is controlled to prevent both spread of non-native species and also increasing the chances of bat activity within and around the canopies.

Where significant trees require removal these trees should be subject to update bat roost assessment surveys to ensure that no trees with potential roost features are removed without the further surveys where required.

Any significant impacts on the existing buildings within the Survey Area, including the ruined shooting lodge, ruined bothy and existing modern bothy are likely to require further surveys to confirm the presence of likely absence of bats prior to works being undertaken.

7 REFERENCES

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APPENDIX A – PHOTOGRAPHS

Plate 1: Typical static detector deployment within dry heath habitat.

Plate 2: Typical small burn with flushed grassland, bracken and dry heath habitats with scattered small trees.

Plate 3: Modern bothy located on existing track (TN5)

Plate 4: Typical dry heath landscape which covers significant sections of the Survey Area.

Plate 5: Mosaics of dry heath, flushes and encroaching Sitka spruce located in the north of the Survey Area close to Turbine 1.

Plate 6: View of ruined both in bracken and scattered woodland (TN20)

Plate 7: Ruined shooting lodge offering suitable bat roost potential.

Plate 8: Typical section of more mature semi-natural woodland with dry heath understorey.

APPENDIX B – FIGURES

Figure 1 – Designated Sites

Hill of Fare Wind Farm

Technical Appendix 8.1 - Bat Survey Report
Figure 1 - Designated Sites

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364000 366000 368000 370000 372000 374000 376000

808000 806000 804000 802000 800000 798000 796000

Loch Of Skene SPA
Loch of SkeneSSSI
Loch of ParkSSSI
River Dee SAC

Site boundary
Special Area of Conservation
Special Protection Area
Site of Special Scientific Interest
Ramsar Site

Ancient Woodland Inventory
Ancient (of semi-natural origin)
Long-Established (of plantation origin)
Other (on Roy map)

0 800 1,600 m

Scale @ A3 - 1:50,000

Drawing number: 22/013/ITP/001
Revision: 1
Date of production: 2023-05-08
Drawn by: JB - Tracks Ecology
Projection: British National Grid EPSG:27700

Figure 2 – Habitat Assessment and Static Detector Placement

Hill of Fare Wind Farm

Technical Appendix 8.1 - Bat Survey Report
Figure 2- Habitat Assessment and Static Detector Placement

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- Site boundary
- Proposed Turbines
- Detector Locations
- Target Notes

Habitats

- Dry heath
- Heath/bog
- Scattered woodland/scrub
- Bracken/flushed grassland
- Woodland
- Open water
- Building
- Heath/grassland
- Flushed grassland
- Watercourses

0 400 800 m

Scale @ A3 - 1:25,000

Drawing number: 22/013/ITP/002
Revision: 1
Date of production: 2023-05-08
Drawn by: JB - Tracks Ecology
Projection: British National Grid EPSG:27700

Figure 3 – Activity Survey Results – Common Pipistrelle

Hill of Fare Wind Farm

Technical Appendix 8.1 - Bat Survey Report
Figure 3 – Activity Survey Results – Common Pipistrelle

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Survey 1

Survey 2

Survey 3

363000 364000 365000 366000 367000 368000 369000 370000 371000 372000 373000 374000 375000 376000 3770

804000 803000 802000 801000

T01 T02 T03 T04 T05 T06 T07 T08 T09 T10 T11 T12 T13 T14 T15 T16 T17

Hill of Fare
Blackydubs
Craigrath
Hill of Corfeldy
Greymoss
Brown Hill
Barry Hill

Site Boundary
- Site boundary
- Proposed Turbines

Median Activity Rate (passes per hour)
- 0
- 0.01 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1
- 1 - 1.06

0 700 1,400 m

Scale @ A3 - 1:45,000

Drawing number: 22/013/ITP/003
Revision: 1
Date of production: 2023-05-08
Drawn by: JB - Tracks Ecology
Projection: British National Grid EPSG:27700

Figure 4 – Activity Survey Results – Soprano Pipistrelle

Hill of Fare Wind Farm

Technical Appendix 8.1 - Bat Survey Report
Figure 4 – Activity Survey Results – Soprano Pipistrelle

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363000 364000 365000 366000 367000 368000 369000 370000 371000 372000 373000 374000 375000 376000 3770

804000 803000 802000 801000

Survey 1

Survey 2

Survey 3

T01 T02 T03 T04 T05 T06 T07 T08 T09 T10 T11 T12 T13 T14 T15 T16 T17

Hill of Fare
Blackydubs
Craigrath
Hill of Corfeldy
Greymore
Brown Hill
Barry Hill

Site Boundary
- Site boundary
- Proposed Turbines

Median Activity Rate (passes per hour)
- 0
- 0.01 - 0.4
- 0.4 - 0.6
- 0.6 - 0.8
- 0.8 - 1
- 1 - 1.06

0 700 1,400 m

Scale @ A3 - 1:45,000

Drawing number: 22/013/ITP/004
Revision: 1
Date of production: 2023-05-08
Drawn by: JB - Tracks Ecology
Projection: British National Grid EPSG:27700

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