



Dear Mr Thompson,

please find below our proposed **Bat and Bird Mortality Monitoring Plan** following Naturescot guidelines, as requested by the local authority ecologist.

Our plan will be fully implemented for the duration of the operational period to ensure compliance with policy EN7 of NPTC development plan.

Bat surveys will be undertaken between May – September, the findings of which will be submitted to the local authority, again in compliance with policy EN7.

Please see the proposal below.

Best regards,



Glyn Lloyd-Jones BSc (Hons), MSc, CBIol, MRSB

Iestyn Evans

Natural Resources Wales Bat Licence number S091520-1, S090746/1

Natural England Bat Licence Number:2016-22603-CLS-CLS

Bat and Bird Mortality Monitoring Plan

1 Introduction

Rotaheat Limited has obtained conditional planning permission to evaluate a single and small wind to heat system, with a nominal rated output of 7.5kW. The granted planning permissions is subject to two pre-commencement conditions, specifically:

1. A Bat and Bird Mortality Monitoring Plan shall be submitted to and approved in writing by the Local Planning Authority prior to the first operation of the turbine.
2. Full Details of a Bat Survey Schedule shall be submitted to and approved in writing by the Local Planning Authority prior to the first operation of the turbine.

Rotaheat Ltd have asked I&G Ecological Consulting Ltd to prepare the monitoring plan and schedule.

This monitoring plan follows the recommended guideline (Naturescot. Bats and onshore wind turbines). Naturescot guideline's state the guidelines are not intended for use in relation to single wind turbines, micro installations (under 50kW) or offshore wind farms. We have endeavoured to follow the spirit of the guidelines, adapting the guidelines to reflect that the development involves a single small 7.5kW vertical axis wind turbine.

1.1 Guidance Documents

The following documents have been referred to in preparing this plan

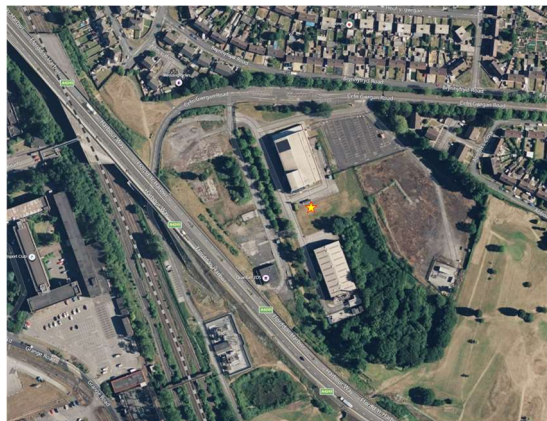
- Bats and onshore wind turbines: survey, assessment and mitigation, NatureScot et al, August 2021

1.2 Site

The site of the proposed turbine is adjacent to the Solar Heating Energy Demonstrator (SHED) located at:

- Heol Cefn Gwrgan, Port Talbot, West Glamorgan, SA13 2BZ

An aerial view of the site is depicted below



★ Location of proposed temporary system

2 Approach

The objective of the plan is to support Rotaheat to mitigate the mortality of birds and bats which may be attributed to the proposed wind turbine. If mortality is detected, the plan would trigger further mitigating action to be taken by Rotaheat.

Using Naturescot guidelines, an initial (stage 1) site risk assessment concludes that the proposed installation is a low site risk. This is based on the Project Size being small (under 10 turbines and turbines under 50m in height) and Habitat risk being Moderate.

This stage 1 risk assessment has been used to develop the approach consisting of:

1. A desk study of available information related to bats, birds and the local site. The study will include a SeWBREC data search, which will be requested prior to survey work being undertaken.
2. Pre-operational surveys will be undertaken prior to commissioning to provide background data on site's bat and bird activity. The pre-operational survey will include
 - a. a walked transect to review the habitat and identify potential bird and bat flight lines,
 - b. a roost survey to identify potential bat maternity roosts, and
 - c. a carcass search and mortality survey to establish a mortality baseline prior to operation.
3. Ongoing post-operational monitoring between June and September
4. Ongoing assessment and reporting of findings

The effort and methods used will be adapted by information gleaned from the desk study.

2.1 Operational monitoring period

Monitoring will continue during the operational period of the turbine and between the months of May and September. We will aim to assess changes in bat activity patterns and the efficacy of mitigation to inform any necessary curtailment if needed. Monitoring will cease when the turbine is decommissioned.

As the turbine is experimental in nature and to be operational for less than twelve months, the monitoring regime has been adapted to reflect this.

2.2 Deviations to Naturescot guidelines

Reflecting the Stage 1 risk assessment and the project size, we plan to adopt the deviations to the Naturescot guidelines.

- Monitoring of bat mortality will be conducted between May and September 2023 because this aligns with the period in which bats are most active and the turbine is planned to be decommissioned by March 2024. Monitoring of avian mortality will continue whilst the turbine is operational.

3 Method

3.1 Desk Study

The desk study (SeWBREC etc) will review all the available information on bats and birds relevant to a proposed turbine site and consider the various factors that influence risk to the species at the site. This should include:

- Recent aerial photographs (and other photographs), maps and habitat survey maps of the proposed site, and identify features of potential value to bats.
- The collation of relevant bat information within 5 km of the proposed wind turbine site, including species and roost records and the proximity of national and internationally designated sites for bats.
- The proximity of other wind turbines within 10km will also be considered.

The desk study will help inform what bat and bird species could be expected at the site, and allow the monitoring plan to be adapted if needed.

3.2 Bat surveys

The main information required from surveys is:

- The species assemblage. Bats will be identified to species, or where these cannot be separated with confidence, to species group e.g. *Myotis* sp. or *Nyctaloid* bats.
- The locations of roosts (particularly maternity and hibernation) and swarming sites in the surrounding area that could be affected by the wind turbine.
- The location and extent of commuting or foraging habitat used by bats. This needs to include not only the site itself, but also flight paths and habitats in the surrounding landscape that are likely to bring bats to the site. The information may also be useful where habitat management is considered as a mitigation measure for predicted impacts on other species (e.g., raptors).
- The amount of bat activity on the site, and its spatial and temporal distribution.

Multiple nights of surveying will be undertaken to determine accurately species presence and distribution within the site and to correctly categorise the relative level of activity of each species.

Surveys will take place over a full season of bat activity. Additional survey may be required:

- when prolonged unusual or inclement weather is considered likely to have significantly influenced bat activity during the surveys undertaken;
- at sites considered likely a priori to be important to local populations, e.g., close to areas designated as SSSI and/or SAC for their bat interest.

3.4 Walked transect

A walked transects will be undertaken to identify different habitats and topographical features on the site. The walked transect will help to identify flight lines and understand the numbers of bats present. Information on these can be collected at certain times i.e., dusk and dawn, using these observational methods. The walked transect will identify connections between nearby roosts (if any), linear features (or other potential flight paths, e.g., as used by *Nyctaloid* species) and potential key foraging areas across the development footprint. The existence of such routes might be inferred from other available information, such as the presence of a linear feature within the development footprint linked to a known roost site nearby, and such field knowledge will be incorporated into the survey design.

3.5 Roost surveys

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) within 200m plus rotor radius of the boundary of the proposed development will be subject to further investigation. The search area may need to be extended if there is a high level of habitat connectivity in the surrounding area and this is considered likely to attract bats into the turbine area from further afield. The survey will establish presence or absence of roosts and if bats are present the species, numbers (or estimated numbers), function of the roost and flight lines away from the roost.

3.6 Carcass searching

I&G Ecological Consulting Ltd will undertake systematic searches for bat and bird casualties on the ground below and immediately surrounding the wind turbine, this is recognised as the only current effective means of monitoring bat and bird fatalities.

Carcass searching involves looking out for casualties of bats and birds underneath the turbine blades. Searches will be carried out by appropriately trained staff and may be useful in identifying if an issue with bat and bird fatalities exists at a site. Should an issue with bat or bird fatalities be identified, a more intensive method, as detailed in Appendix 4 of Naturescot will be undertaken.

Searches will be undertaken as early as possible in the morning during high-risk periods such as periods of low wind, high temperatures and high humidity, focusing effort in this way helps to ensure that high risk periods are monitored and the effects of carcass decay and scavenging are minimised (Appendix 4). It is recognised that any assessment where searches are undertaken in only optimum conditions may provide a biased result in terms of the frequency and extent of mortality, Therefore the surveys will be undertaken during standard weather conditions as well as during optimal conditions to increase the voracity of the results.

To ensure a maximum level of observer efficiency a detailed grid search pattern will be adopted. In the second week of every month a daily (over five consecutive days) mortality check will be undertaken following best practice guidelines.

It is essential that the carcass removal rate by predators is also quantified. To this end, a static camera trap will be set up to monitor predation / scavenging. The camera will be deployed one week after the commissioning of the wind turbine and then at bi-monthly intervals for the duration of the operational period. Deployment of the camera will assist us in assessing the true mortality rate.

3.6.1 Methodology

All carcasses will be collected, counted and catalogued according to species.

Weather data will be recorded for each visit.

3.7 Acoustic Bat Activity Survey

Surveys will capture a sufficient number of nights with appropriate weather conditions for bat activity (i.e., temperatures of 10°C and above) at dusk, maximum ground level wind speed of 5m/s and no, or only very light, rainfall to fulfil the minimum requirements in Section 5.2.1. of Naturescot. Full spectrum automatic detectors will be deployed wherever possible, as a minimum. Zero-crossing detectors might be used only where insufficient full spectrum detectors are available. Where full spectrum detectors are used, sound analysis will be carried out of the original full spectrum files, and not of converted zero-crossing versions.

Automated detector surveys will commence half an hour before sunset and finish half an hour after sunrise to ensure that bat species that emerge early in the evening and return to roosts late, such as noctules, are recorded.

Automated detectors will be left in position to collect data all night.

Static detectors will be deployed on site for 10 nights in each of: spring (May), summer (June-mid-August) and autumn (mid-August-October).

Staff from I&G will endeavour to undertake surveys for 10 consecutive nights, but in practice weather conditions may preclude this particularly early or late in the year.

If 10 consecutive nights/dawns are not possible then this will be explained and the next available date with favourable weather conditions will be chosen.

Survey effort will be focused in the part of the development site where the turbine is to be located. Static detectors will be placed to provide a representative sample of bat activity at or close to the turbine. The selection of locations at which to place detectors should be based on professional judgement.

3.7.1 Methodology

Acoustic surveys using bat detectors will be undertaken to identify the species assemblage and the spatial and temporal distribution of activity. The range of methods used and survey effort involved will, to some extent, be informed by information gleaned from the desk study and will be site- and species-dependent.

3.8 Monitoring curtailment

The effects of any curtailment (if necessary) will also be monitored and reported upon.

3.9 Additional survey methods

In some cases, the data collected in the pre-construction survey may indicate the need for further, more specialised survey techniques. For example, if there is a roost of high importance of a medium or high-risk species that may be vulnerable to impacts of the proposed development, further surveys of the roosts and/or radio-tracking may be appropriate to provide comprehensive information on the bats' use of the site.

- Infrared cameras and low light video will be used to help identify potential roost sites to determine the need to follow up surveys.
- Thermal imaging cameras detect heat emitted from bats and will be used to monitor flight lines and foraging behaviour over greater distances.

All equipment will be checked at regular intervals to ensure peak operational efficiency.

4 Analysis

4.1 Analysis of results

Survey data will be collected, recorded and analysed to provide information that can be used to influence the proposals for any future turbines at this site, and to assess the likely impacts of the development throughout the year.

4.2 Reporting

4.2.1 Weather data

Weather data including wind speed, temperature and rainfall will be recorded nightly for all types of bat survey.

4.2.2 Assessing bat activity levels

Bat activity levels will be presented following Naturescot guidelines.

Note Ecobat is currently offline and unavailable for use. If Ecobat is unavailable for use during the project, I&G will use their judgement for to assess the level of bat activity relative to other sites we are familiar with.

4.2.3 Interpreting the results

An estimation of the vulnerability of bat populations to the turbine will be included within the report.

5 Mitigation

Should a high number of excess mortalities is recorded, then we will consider and propose appropriate mitigation strategies to be implemented. The mitigation strategies actions may include:

5. Pitching the blades out of the wind ("feathering") to reduce rotation speeds below 2 rpm while idling is not possible on a turbine with an Axial blade, such as the one to be deployed at this site.
6. Painting one of the axial blades black. This has been proven on standard radial turbines to prevent excess bird deaths but has not been proven on axial bladed turbines, such as the type planned to be commissioned by Rotaheat.
7. Raising the cut-in speed to 5m/s should further reduce casualties, especially in bat species as bats and their prey are less active in windier conditions. Arnett et al., 2013.
8. Curtail operations through limiting the hours of operation to avoid periods of heightened bat or bird activity such as around dusk.

6 Schedule

Pre-operational activities will be conducted during the first half of May, enabling the system to become operational by mid-May.

- A desktop study will be completed
- A detailed search within a 100m radius of the turbine will be conducted to identify and bird and bat carcasses.
- The same evening an acoustic survey will be completed over 1 night
- For one [or two?] subsequent days, detailed searches will be conducted within a 100m radius.

Post-operational activities, a monthly routine between June and September will consist of:

- A detailed search within a 100m radius of the turbine will be conducted to identify and bird and bat carcasses.
- The same evening an acoustic survey will be completed over 1 night
- For one [or two?] subsequent days, detailed searches will be conducted within a 100m radius.

An overview of the planned schedule is illustrated below.

