



Y Bryn Wind Farm

Appendix 6.4

Outline Operational Ecological Monitoring Plan

19 September 2023

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1. Introduction

This outline Ecological Monitoring Plan (OEMP) for Y Bryn Wind Farm has been prepared by Natural Power Consultants, on behalf of Y Bryn Wind Farm Ltd.

The proposed Y Bryn Wind Farm (hereafter referred to as the proposed development) is situated within Natural Resources Wales (NRW) land in the Penhydd Forest and Bryn Forest, near Maesteg, South Wales. The proposed development is located mostly within the Neath Port Talbot County Borough Council (NPTCBC) area, though part of the development extends into the Bridgend County Borough Council (BCBC) area. The proposed development would comprise of 18 turbines, an electrical compound with a substation and control equipment, internal tracks and access track to the local road network.

The aim of this outline OEMP is to support the application for the proposed development, through the provision of post consent operational monitoring based on the pre-consent baseline information. It must be noted that this document is draft in nature, given the status of the proposed development (i.e. pre-consent). It will be reviewed/updated as part of any associated planning condition discharge requirements and will remain a live document through the lifetime of the proposed development to allow amendments to management as agreed with relevant stakeholders. The OEMP would be implemented following the completion of the construction phase.

Delivery of the OEMP will be undertaken through the establishment of an Ecological Management Group (EMG) consisting of relevant stakeholders. The EMG would ideally include representation from:

- The developer;
- Landowner(s);
- The Local Planning Authorities; and
- Natural Resources Wales.

In addition to this OEMP, an outline Habitat Management Plan (HMP)¹ has been prepared to support the Proposed Development and both documents should be read in conjunction.

1.1. Baseline Information

1.1.1. Habitat Description

The proposed development comprises mostly of coniferous plantation, although there are areas of broadleaved and mixed woodland also present. Linear strips and patches of open ground exist usually adjacent to forestry tracks and/or within forestry rides, some of which are managed by annual cutting of the vegetation. Habitats within these open areas include marsh/marshy grassland and wet and dry dwarf shrub heath. Many of the open grassland and heath areas, where not managed are being encroached by bramble scrub, trees and bracken.

Cwmwernderi Reservoir is located in the centre of the southern section of the proposed development and is fed by small tributaries. There are occasional small waterbodies throughout the site and numerous small streams.

The Phase 1 Habitat survey results are provided in Appendix A, Figure 1, surveys were conducted in 2021 as part of the Ecology Assessment² following guidance³ in relation to bats and onshore wind farms.

¹ Natural Power (2023) Y Bryn Wind Farm Outline Habitat Management Plan (Document Reference 1276412).

² Natural Power (2023) Y Bryn Wind Farm Environmental Impact Assessment.

³ NatureScot (2021). Bats and onshore wind turbines: Survey, Assessment and Mitigation.

1.1.2. Bats

Eight species or species groups were recorded during static detector surveys undertaken as part of the assessment^{2,4}. These were common pipistrelle, soprano pipistrelle, Nathusius's pipistrelle, unidentified *Pipistrellus* species, noctule, brown long-eared bat, lesser horseshoe and *Myotis* species. The activity level on site is considered low for all species in all seasons at the median percentile. At the maximum percentile, activity level was considered low- moderate / moderate for Nathusius's pipistrelle (spring, summer), common pipistrelle (summer), soprano pipistrelle (summer, autumn), noctule (summer) and brown long – eared (summer autumn). Activity at the maximum percentile was considered to be moderate – high for one species (common pipistrelle) in autumn. For the high risk bats species, *Nyctalus* and *Pipistrellus* species, operational impacts caused by the proposed development as a result of collisions were considered to be of moderate negative magnitude and not significant.

1.1.3. Bird species

Within the assessment², breeding season surveys recorded flight lines from a total of 13 target species (plus one species group), most of which were raptors or gulls. A total of nine target species were recorded during non-breeding season surveys, seven of which were also recorded during the breeding season, the only target species not recorded during breeding seasons were golden plover and black-headed gull. Collision risk modelling (CRM) was undertaken for six bird species; great black-backed gull herring gull, lesser black-backed gull, goshawk, kestrel and red kite. Goshawk and buzzard were the only confirmed breeding raptors at the proposed development although sparrowhawk was also considered to have bred, though no nest was located. Nightjar were recorded breeding within the wind farm areas, but outside of the turbine development area.

Four bird species were considered to be important ornithological features in relation to collision; nightjar, herring gull, lesser black-backed gull and goshawk. For all four species, the potential effect as a result of collision risk was considered to be of low negative magnitude and not significant.

2. Aims

The main aim of monitoring is to investigate bat activity during the operation of the proposed development and to inform any requirement for further mitigation. In addition, carcass searches will be undertaken for birds during the same time period.

The proposed approach will therefore be as follows:

- To conduct static acoustic surveys at turbine locations;
- To conduct weekly bat carcass searches (with dogs) and associated searches under operational turbines between July – September (inclusive); and
- To conduct monthly bird carcass searches (with dogs) during the breeding bird season (March to August inclusive).

3. Monitoring

Operational monitoring is proposed to include activity monitoring for bats combined with focused carcass search monitoring for both bat and bird species. Monitoring will be undertaken on an annual basis at the site in operational years one to three with the requirement for further monitoring revisited and agreed with the EMG following completion of all surveys.

⁴ www.ecobat.org.uk

In each monitoring year a report of the findings will be produced along with any recommendations for review of the OEMP. Should changes be required, these would be discussed and agreed with the EMG and an updated version of the OEMP would be produced and resubmitted to all relevant consultees.

Weather data will be required for the bat surveys, and this could be obtained from the onsite system where available (such as Supervisory Control and Data Acquisition (SCADA) systems). As a minimum, overnight weather temperatures and wind speeds will be required for all acoustic survey periods, and during the 13-week period of carcass searches in order to identify whether there are links between weather conditions and collisions.

3.1. Bat Monitoring

Full spectrum static detectors will be placed on site for a minimum of 10 nights of survey in each of the bat active seasons (spring, summer, autumn). Wildlife Acoustic Song Meter SM4 detectors are preferred for direct comparability with baseline surveys, but other equivalent full spectrum detectors could be used instead should these not be available.

In 2021, 17 detectors were placed on site to provide baseline information in relation to bats. This was higher than the number of detectors required in guidance³ which states that one detector is required at or near turbine locations for up to ten turbines, plus a third of the additional number of turbines to be stationed at representative habitats across the site. Therefore, for an 18-turbine development, a minimum of 13 static detectors are required. Of the 17 detectors, 14 detectors were placed at locations in the wind farm areas near to turbine location, based upon the proposed layout that was current at the time. In addition to these 'ground level' detectors, another static detector was attached to the wind monitoring equipment present within the proposed development to provide data 'at height', and two further detectors were positioned in locations to the south of the proposed development. These were located beside two watercourses that were considered to have potential as flight corridors, connecting the turbine development area to known bat populations in Margam Park. These detectors were in addition to the recommended number of devices in guidance and were placed at these locations following an NPTCBC scoping response.

It is not proposed that static detectors are used during operational monitoring on the met mast (as this will be removed) or on the two additional watercourses. Gathering data from the 14 detectors based at turbine locations is considered to be proportionate and more relevant. Detector locations are provided in Table 3.1. During operational monitoring, detectors will be situated as close to these locations as possible.

Table 3.1: Static bat detector locations

Bat Detector Identifier	Easting/Northing	Nearest Turbine	Distance from Turbine
A	282501 193396	1	477 m
B	283597 193633	2	56 m
C	282837 192898	3	128 m
D	283722 192936	5	177 m
E	281920 190817	7	238 m
F	S81995 190480	7	107 m
G	282050 189912	8	262 m
H	282712 189376	10	78 m
I	283014 189014	11	95 m
J	281066 189889	12	122 m
K	282042 189182	15	125 m
L	280588 189217	17	315 m

Bat Detector Identifier	Easting/Northing	Nearest Turbine	Distance from Turbine
M	281426 188858	18	227 m
N	281776 188522	18	706 m

Source: Natural Power 2023

Detectors will be programmed to commence recording from one hour before sunset and continue until one hour after sunrise, to cover the active period for all species potentially encountered on site. Detectors will record data to a memory card to be downloaded and later analysed to identify species present.

Bat calls will be analysed using Kaleidoscope automatic identification software. The software provides automatic identifications which are assumed to be correct for common pipistrelle and soprano pipistrelle bats (and for identifying noise). Identification of other bat species records is considered less reliable and manual identification will be therefore performed on all non-noise acoustic records⁵. The analysis of the bat survey data will be undertaken following the methodology outlined in guidance³. A bat pass is defined as a sequence of bat pulses captured on a 15 second sound file. One sound file is counted as one bat pass. Different species within the same 15 second sound file are counted as separate bat passes.

An individual bat can pass a particular feature on several occasions while foraging. It is therefore important to acknowledge that a bat pass is an index of bat activity that describes the amount of use bats make of an area rather than a measure of the number of individuals in a population.

3.2. Carcass Searches

Carcass searches with dogs will aim to assess potential rates of mortality, and in conjunction with these searcher efficiency and carcass persistence surveys will be undertaken.

3.2.1. Carcass Detection Surveys (bat and bird species)

Carcass searching using trained sniffer dogs will be undertaken within Y Bryn site boundary to detect the presence of bat and bird casualties. Surveys will be undertaken within a search area of a minimum of 50 m x 50 m grid centred on turbine locations, the exact distance to be determined by the turbine blade lengths.

Prior to the start of searches, the survey area will be subject to a clean sweep to ensure that any carcasses obtained on search 1 are from the preceding week only.

The following information will be recorded:

- Turbine number;
- Date and time of when the carcass was found;
- Ten figure grid reference of carcass location;
- Distance from turbine;
- Orientation (by taking a compass bearing) relative to the turbine;
- Perpendicular distance from the transect line to the carcass;
- Photograph number;
- Species, age and sex if known;
- Condition (i.e. intact, scavenged, any obvious injuries, etc.);

⁵ For noise files, checks would be run on a subset of 200 to check that bat passes have not been classified as noise. Depending on the results additional checks may be undertaken on noise files.

- Pre-defined criteria to describe search visibility; and
- Any other comments/observations.

Once the required information has been recorded, carcasses will be collected by surveyors wearing latex gloves and placed within plastic containers to be stored in a freezer under licence, for later identification by hand and / or DNA.

Bat carcass search criteria

Searching for bats will be undertaken at each turbine base starting at sunrise once a week for 13 consecutive weeks, between July and September (inclusive).

Bird carcass search criteria

Searching for birds will be undertaken at each turbine base starting at sunrise once a month between March and August (inclusive). Where this time period overlaps with the weekly bat searches, surveys will be undertaken concurrently.

3.2.2. Additional trials (bat species only)

Additional trials will be undertaken in conjunction with carcass searches for bat species. This will allow the bat data to be analysed following methodology outlined in guidance³.

Searcher Efficiency Trials

In order to identify the efficiency of the search dogs, efficiency tests will be carried out using a minimum of 10 appropriate carcasses. Carcasses will preferably be bat, however due to difficulties associated with obtaining bat carcasses these may be substituted for mouse. Unobserved by the dog handler and search dog, up to 10 carcasses will be positioned in random points within the search radius of turbines. Latex gloves will be worn at all times during handling to avoid contamination with human DNA or cross contamination between samples. The handler and dog will then search the location as part of the standard carcass searches, recording any carcasses present within the search area.

Carcass Persistence Trials

Site-specific carcass persistence trials will be undertaken to quantify the probability that a carcass will remain on site between carcass searches using a minimum of 10 appropriate carcasses. Carcasses will preferably be bat, however due to difficulties associated with obtaining bat carcasses these may be substituted for mouse. Latex gloves will be worn at all times during handling to avoid contamination with human DNA or cross contamination between samples. Monitoring of placed carcasses will be undertaken by a combination of manual checking and the continuous deployment of trigger sensitive trail cameras. Carcasses will be considered to be removed when no body parts remain at the location or within a 5 m radius. If a carcass is moved in the immediate locale, the new location will be recorded and subsequently monitored.

Bat Carcass data analysis

Analysis of bat data using the carcass search result combined with the persistence and searcher efficiency trials will be undertaken following methodology as outlined in guidance³ (Appendix 2, Methodology B for when searches have been conducted less frequently than daily).

3.3. Proposed Carcass Threshold

It is proposed that in order to identify whether there is a need for additional mitigation or further survey, an average collision rate over the three years of survey will be considered in relation to a threshold which will reduce the

possibility of a stochastic event triggering mitigation in year one. An average collision rate is proposed rather than a yearly rate as proportionate and reasonable due to the potential for annual variation, particularly in relation to bat activity which can be due to external factors such as weather conditions. Following the completion of the carcass surveys, results will be presented to the EMG after each monitoring year. The average collision rate in relation to the threshold will be provided and discussed with the EMG after the third year of monitoring.

3.3.1. Bat threshold

The potential threshold that is proposed is based on a method for setting thresholds which has been implemented on two Welsh Wind Farms⁶, and by Scottish Power Renewables⁷ on several of their Scottish based wind farms^{8,9}. Modelling data is based on carcass searches and fatality thresholds applied at German wind farm sites^{10,11}. This identified that the maximum increase to natural bat mortality as a result of turbine fatalities, which is considered unlikely to have a significant impact on local bat populations is two carcasses per turbine per year. In relation to Y Bryn, the threshold would therefore be an average of 36 bats per season for the first three monitoring years. An average collision rate over three years is proposed in relation to the thresholds as this will reduce the possibility of a stochastic event triggering potential mitigation in year one.

3.3.2. Bird threshold

Bird species that were identified as at being at risk of collision within the Ornithology Assessment² are:

- Great black-backed gull;
- Herring gull;
- Lesser black-backed gull;
- Goshawk;
- Kestrel; and
- Red kite.

As population numbers are variable and will be dependent on a definition of local area, it is proposed that once consent is granted, this report will be updated to include mortality threshold for these species. The thresholds will be based on the most recent populations estimates, the geographical area of which will be agreed with consultees. Threshold numbers will be calculated using the population viability analysis (PVA) methodology¹². As with the bat threshold it is proposed that an average collision rate over three years will be considered in relation to the thresholds as this will reduce the possibility of a stochastic event.

⁶ Trysglwyn Wind Farm (Isle of Anglesey), Unnamed Wind Farm (Wales).

⁷ Peter Robson (Scottish Power Renewables) by email 28 September 2021

⁸ Scottish Power Renewables (November 2019). Clauchrie Windfarm Environmental Impact Assessment Report, Technical Appendix 8.4 Bat Mitigation and Monitoring Plan.

⁹ Scottish Power Renewables (June 2019). Arecleoch Windfarm Extension Environmental Impact Assessment Report, Technical Appendix 8.4 Bat Mitigation and Monitoring Plan.

¹⁰ Behr, O. (2015) 'Bat-friendly' operation of wind turbines – the current status of knowledge and planning procedures in Germany. Presentation at Wind Power and Wildlife Symposium, Stirling University

¹¹ Behr, Oliver & Brinkmann, Robert & Hochradel, Klaus & Mages, Jürgen & Korner-Nievergelt, Fränzi & Niermann, Ivo & Reich, Michael & Simon, Ralph & Weber, Natalie & Nagy, Martina. (2017). Mitigating Bat Mortality with Turbine-Specific Curtailment Algorithms: A Model Based Approach. 10.1007/978-3-319-51272-3_8.

¹² Morris, W.E. and Doak, D.F (2002) Quantitative Conservation Biology: Theory and Practice of Population Viability Analysis. OUP USA.

3.4. Reporting and Review

The results of the above surveys and any recommendations will be made available to the members of the EMG in a summary report after each monitoring year. Following operational year three, the need for additional surveys would be reviewed at the discretion of the EMG.

4. Mitigation

4.1. Bat buffer

As outlined within the EIA², a buffer between turbine locations and adjacent vegetation will be maintained. Details on this and the management required is provided within the HMP¹.

4.2. Feathering blades

Feathering turbine blades is a simple method to reduce impacts on bats without compromising energy generation and is a technique recommended by guidance³. It is proposed that feathering will be implemented to all turbine blades between April and October (inclusive) to reduce rotation speeds to below 2 rpm while idling for the operational lifetime of the wind farm.

4.3. Additional mitigation

Depending on the results of the carcass searches, additional mitigation may be required. The need for additional mitigation will be discussed with the EMG following the completion of three years of operational monitoring. The most effective method for reducing fatalities for bats is to apply curtailment on a per turbine basis, depending on the locations of any carcasses recovered. In relation to birds, this may involve shut down of certain turbines at certain times of day / year depending on species.

In addition, where carcass searches have identified mortality then the need for additional mitigation at the relevant turbine will be discussed with the EMG following annual reporting, with mitigation to be implemented the following year. One of the most effective methods for reducing bat fatalities at wind farms is to increase the cut-in speed of turbines^{13,14}. Whilst studies^{15,16} have observed that bat activity is significantly greater at wind speeds below 5 m/s – 6 m/s, assessment of the Y Bryn baseline bat data² identified that bat activity was highest when wind speeds were below 4 m/s.

13 Baerwald, E. F. et al. (2009) A large-scale experiment to reduce bat fatalities at wind energy facilities. *Journal of Wildlife Management* 73(7): 1077–1081

14 Arnett, E. B. et al. (2010) Altering turbine speeds reduces bat mortality and wind-energy facilities. *Frontiers in Ecology and the Environment* 9(4): 209–214

15 Rodrigues et al. (2008) Guidelines for consideration of bats in wind farm projects. EUROBATS Publication Series No. 3. UNEP, Germany

16 Jones et al. (2009) Scoping and method development report: Determining the potential ecological impacts of wind turbines on bat populations in Britain. Phase 1 Report. University of Bristol/BCT

Source: Natural Power 2023

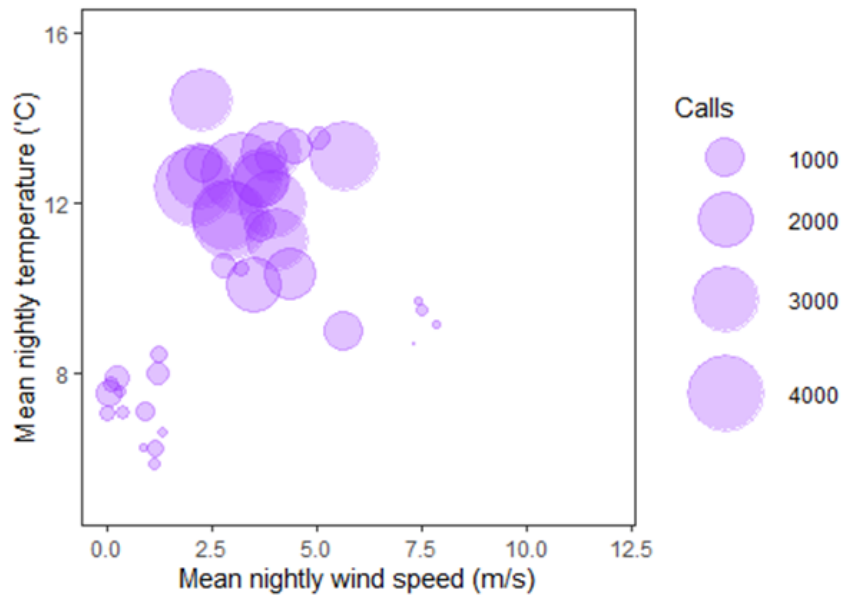


Figure 4.1: Bat calls (all species) at different temperatures and wind speeds

Therefore, increasing a turbine's cut-in to a wind speed at which local bat activity is reduced will limit the potential for bats to interact with moving turbine blades. Table 4.1 provides the number of calls from the Y Bryn baseline data that were recorded at different wind speeds.

Table 4.1: Number of bat calls by high risk bat species (with the percentage of the total given in brackets) above and below different wind speeds

Wind speed	3.0 m/s		3.5 m/s		4.0 m/s		Total calls
Species	Below	Above	Below	Above	Below	Above	
Noctule	51 (65)	27 (35)	26 (33)	52 (67)	20 (26)	58 (74)	78
Nathusius pipistrelle	54 (39)	83 (61)	47 (34)	90 (66)	27 (20)	110 (80)	137
Common pipistrelle	26,143 (60)	17,276 (40)	18,396 (42)	25,023 (58)	11,734 (27)	31,685 (73)	43,419
Soprano pipistrelle	1,136 (60)	748 (40)	792 (42)	1,092 (58)	526 (28)	1,358 (72)	1,884
Pipistrellus sp.	1,055 (52)	959 (48)	799 (40)	1,215 (60)	433 (21)	1,581 (79)	2,014
Total	28,439 (58)	19,093 (39)	20,060 (41)	27,472 (56)	12,740 (26)	34,792 (71)	47,532

Source: Natural Power

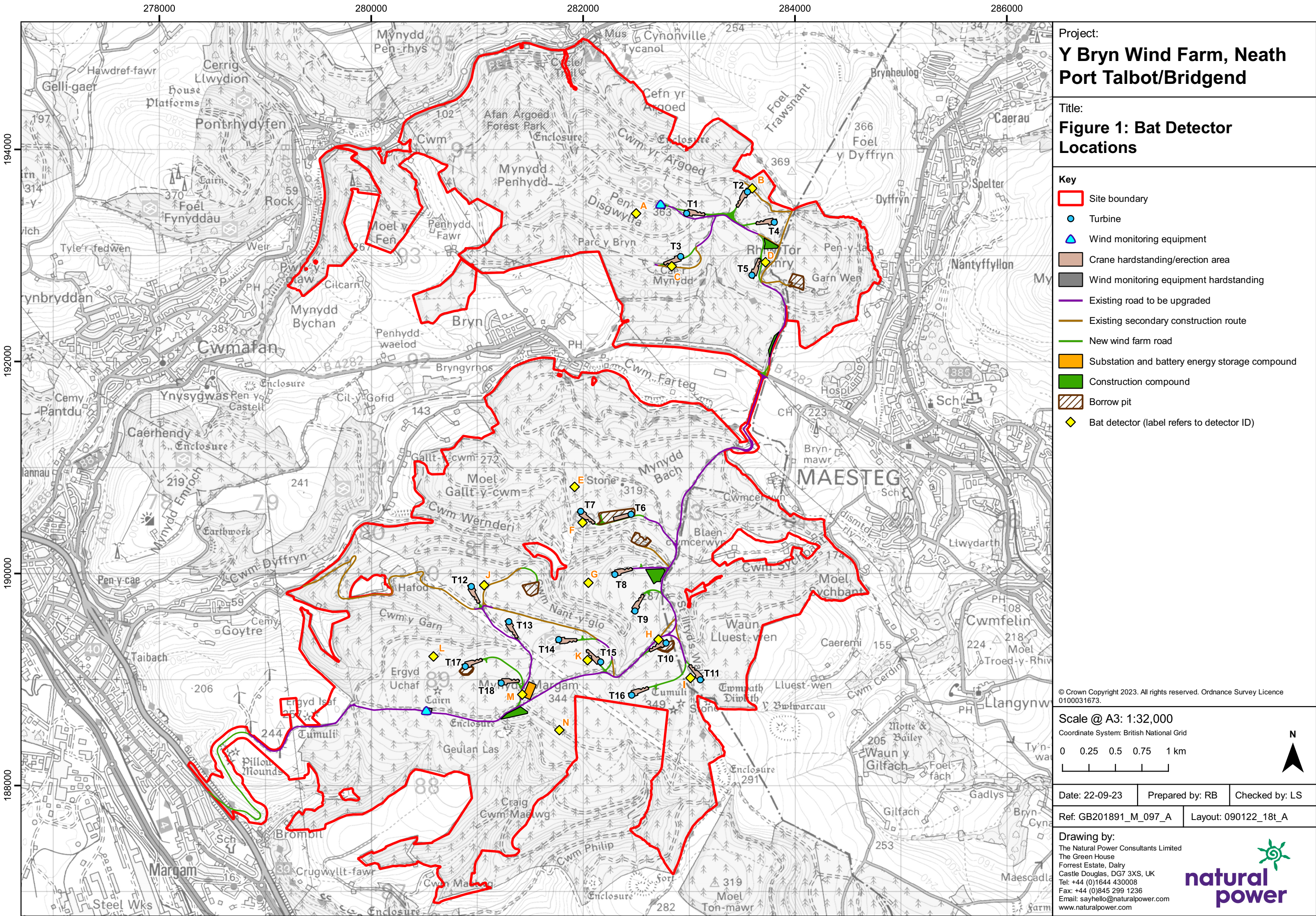
Based on the above results, appropriate mitigation could involve increasing the cut-in speed to wind speeds above 3.5 m/s when temperatures exceed 10 °C between July to end September inclusive. A speed of 3.5 m/s is considered proportionate and would allow maximum energy production whilst reducing any potential impacts to local bat species.

This approach would be targeted and considered on a per turbine basis. The requirement for mitigation in future years would be assessed on an annual basis and the need for curtailment would be dependent on the results of the carcass monitoring surveys and considered in discussion with the EMG.

Appendices

A. Figures

Figure 1. Site plan and location of bat detectors





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