# APPENDIX 6-2

## BAT SURVEY REPORT

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## APPENDICES

# 1. INTRODUCTION

MKO was commissioned to complete a comprehensive assessment of the potential effects on bats, as part of an application for planning permission for the Proposed Project. This report provides details of the bat surveys undertaken, including survey design, methods and results, and the assessment of potential effects of the Proposed Project on bats. Where necessary, mitigation is prescribed to minimise any identified significant effects.

Bat surveys undertaken throughout 2024 were carried out in accordance with the methodologies recommended by NatureScot 2021. Bat surveys employed a combination of methods, including desktop study, habitat and landscape assessments, roost inspections, manual activity surveys and static detector surveys at ground level. Surveys in 2024 were based on an indicative turbine layout of 8 no. turbines.

The assessment and mitigation provided in this report has been designed in accordance with NatureScot 2021. Consideration was also given to the Northern Ireland Environment Agency (NIEA) Natural Environment Division (NED) Guidance [1], which was produced in August 2021 (amended March 2024).

As detailed in Section 1.1.1 in Chapter 1, for the purposes of this Bat Report, the various project components are described and assessed using the following references: 'Proposed Project', 'Proposed Wind Farm', 'proposed turbines', 'Proposed Grid Connection', the 'Site', and 'Proposed Wind Farm site'.

A detailed description of the Proposed Project is provided in Chapter 4 of this EIAR.

## 1.1 Background

Wind energy provides a clean, sustainable alternative to fossil fuels in generating electricity. However, wind energy development can impact wildlife, directly through mortality and indirectly through disturbance and habitat loss. Bat fatalities have been reported at wind energy facilities around the world, raising concern about the cumulative impacts of such developments on bat populations (Arnett *et al.* 2016). No large-scale studies have been undertaken in Ireland to date. However, a study from the UK estimated bat fatalities at 0 – 5.25 bats per turbine per month (Mathews *et al.* 2016). While these results are not directly applicable to Ireland due to differences in bat species and behaviour, Ireland shares more similarities with bat assemblages of Great Britain, when compared to those of mainland Europe.

Investigative research in North America and mainland Europe have revealed the mechanisms for bat mortality at wind turbines. Fatalities arise from direct collision with moving turbine blades (Horn *et al.* 2008, Cryand *et al.* 2014) and barotrauma (Baer Wald *et al.* 2008), i.e., internal injuries caused by air pressure changes. Why bats fly in the vicinity of wind turbines has been attributed to several different behavioural and environmental factors, e.g. habitat associations, weather conditions and, species ecology.

Pre-construction bat surveys are undertaken to provide a baseline to gain an insight into bat activity in the absence of turbines and to predict and mitigate against any future risks identified. This report primarily focuses on surveys conducted within the Proposed Wind Farm site. The Proposed Grid Connection was assessed as part of the multidisciplinary survey effort detailed in Chapter 6 Biodiversity. Further details of the bridge assessment along the Proposed Grid Connection underground cabling route are outlined below. Survey design and analyses of results at the Proposed

[1] *Northern Ireland Environment Agency Natural Environment Division (NED) published Guidance on Bat Surveys, Assessment and Mitigation for Onshore Wind Turbine Developments in Northern Ireland (NIEA, 2021).*

Wind Farm was undertaken with reference to the latest policy and legislation, scientific literature and industry guidelines. Any spatial, temporal or behavioural factors that may put bats at risk were fully considered.



## 1.2 Bat Survey and Assessment Guidance

Several guidelines for surveying bats at wind energy developments have been produced in Europe, the UK and Ireland.

At a European level, the Advisory Committee to the EUROBATS Agreement, to which Ireland is a signatory, have produced *Guidelines for Consideration of Bats in Wind Farm Projects* which outlines an approach for assessing the potential impacts of wind turbines on bats during planning, construction and operation phases (Rodrigues, 2015). However, these guidelines are based on continental scenarios and include more diverse species and behaviours than those typical of Ireland. As such, EUROBATS guidance may recommend a level of survey that may prove inappropriate in Irish scenarios. Nevertheless, the guidance is evidence-based and provides a useful European context, within which Member States are encouraged to produce specific national guidance, focusing on local circumstances.

Bat Conservation Ireland produced *Wind Turbine/Wind Farm Development Bat Survey Guidelines* (BCI, 2012a). This document provides advice to practitioners and decision makers in Ireland on necessary qualifications for surveyors, health and safety considerations, pre-construction and post-construction survey methodologies and information to be included in a report. In the absence of comprehensive Irish research, these guidelines provide generalised methodology rather than detailed technical advice.

The second edition of the UK Bat Conservation Trust *Bat Survey Good Practice Guidelines* (Hundt, 2012) includes a chapter (Chapter 10) on survey methodologies for assessing the potential impacts of wind turbines on bats. The document provides technical guidance for consultants carrying out impact assessments. However, the recommendations are not based on any research findings specific to the UK. A third edition to the guidelines, published in early 2016, removed the chapter on surveying wind turbine developments. Prior to the publication of the BCT guidelines, Natural England's *Bat and Onshore Wind Turbines: Interim Guidance* provided an interpretation of the EUROBATS recommendations, as applied to onshore wind energy facilities in the UK (Natural England, 2014). In addition, the Chartered Institute of Ecology and Environmental Management (CIEEM) publishes advice on best practice as well as updates on the current state of knowledge in the *Technical Guidance Series* and in the quarterly publication *In Practice*.

In August 2021, NatureScot (formerly Scottish Natural Heritage), published *Bats and Onshore Wind Turbines: Survey, Assessment and Mitigation* (NatureScot, 2021). The 2021 version supersedes the 2019 version of the guidance. The purpose of this guidance is to help planners, developers and ecological consultants to consider the potential effects of onshore wind energy developments on bats. The emphasis is on direct impacts such as collision mortality, but there is reference throughout to the need for a full impact assessment requiring wider consideration of other (indirect) effects. The guidance replaces previous guidance on the subject; notably that published by Natural England and Chapter 10 of the Bat Conservation Trust publication, *Bat Surveys: Good Practice Guidelines (2nd edition),* (Hundt, 2012) and tailors the generic EUROBATS guidance on assessing the impact of wind turbines on European bats (Rodrigues *et al.* (2014)). The document guides the user through the key elements of survey, impact assessment and mitigation.

The NIEA (NED) recently published *Guidance on Bat Surveys, Assessment and Mitigation for Onshore Wind Turbine Developments in Northern Ireland.* This new guidance follows and builds upon the recently updated NatureScot 2021 guidance. The latter guidance has set the industry standard since its publication in 2019. The NED guidance does not aim to replace the NatureScot guidance, but it does provide additional clarifications and recommendations regarding survey requirements and impact assessment in an Irish context.

The survey scope, assessment and mitigation provided in this report are in accordance with NatureScot 2021 Guidance. This guidance has set the industry standard for best practice surveys at wind farms since its initial publication in 2019.



## 1.3 Irish Bats: Legislation, Policy and Status

Ireland has nine resident bat species, comprising more than half of Ireland's native terrestrial mammals (Montgomery *et al.*, 2014).

All Irish bats are protected under European legislation, namely the Habitats Directive (92/43/EEC). All Irish species are listed under Annex IV of the Directive, requiring strict protection for individuals, their breeding sites and resting places. The lesser horseshoe bat (*Rhinolophus hipposideros)* is further listed under Annex II of the Directive, requiring the designation of conservation areas for the species. Under this Directive, Ireland is obliged to maintain the favourable conservation status of Annex-listed species. This Directive has been transposed into Irish law through the European Communities (Birds and Natural Habitats) Regulations 2011(S.I. No. 477/2011, as amended).

In addition, Irish species are further protected by national legislation (Wildlife Acts 1976, as amended). Under this legislation, it is an offence to intentionally disturb, injure or kill a bat, or disturb its roost. Any work at a roost site must be carried out with the agreement of the National Parks and Wildlife Service (NPWS).

The NPWS monitors the conservation status of European protected habitats and species and reports their findings to the European Commission every 6 years in the form of an Article 17 Report. The most recent report for the Republic of Ireland was submitted in 2019. Table 1-1 summarises the current conservation status of Irish bat species and identified threats to Irish bat populations.

*Table 1-1 Irish Bat Species Conservation Status and Threats (NPWS, 2019). Pressures and Threats are ranked from medium importance (M) to high importance (H) in the 2019 Article 17 report.*

| Bat Species | Conservation Status | Principal Threats |
|---|---|---|
| Common pipistrelle *Pipistrellus pipistrellus* | Favourable | **A05** Removal of small landscape features for agricultural land parcel consolidation (M)<br>**A14** Livestock farming (without grazing) [impact of anti-helminthic dosing on dung fauna] (M)<br>**B09** Clear-–cutting, removal of all trees (M)<br>**F01** Conversion from other land uses to housing, settlement or recreational areas (M)<br>**F02** Construction or modification (e.g. of housing and settlements) in existing urban or recreational areas (M)<br>**F24** Residential or recreational activities and structures generating noise, light, heat or other forms of pollution (M)<br>**H08** Other human intrusions and disturbance not mentioned above (Dumping, accidental and deliberate disturbance of bat roosts (e.g. caving) (M)<br>**L06** Interspecific relations (competition, predation, parasitism, pathogens) (M)<br>**M08** Flooding (natural processes)<br>**D01** Wind, wave and tidal power, including infrastructure (M) |
| Soprano pipistrelle *Pipistrellus pygmaeus* | Favourable | |
| Nathusius' pipistrelle *Pipistrellus nathusii* | Unknown | |
| Leisler's bat *Nyctalus leisleri* | Favourable | |
| Daubenton's bat *Myotis daubentoni* | Favourable | |
| Natterer's bat *Myotis nattereri* | Favourable | |
| Whiskered bat *Myotis mystacinus* | Favourable | |
| Brown long-eared bat *Plecotus auritus* | Favourable | |
| Lesser horseshoe bat *Rhinolophus hipposideros* | Inadequate | |

## 1.4 Statement of Authority

MKO employs a dedicated bat unit within its Ecology team, experienced in scoping, carrying out and reporting on bat surveys, as well as producing impact assessments in relation to bats. MKO ecologists have relevant academic qualifications and are qualified in undertaking surveys to the levels required. MKO's Ecology team holds an open bat derogation licence from NPWS. The licence is intended for professionals carrying out surveys with the potential to disturb roosting bats (i.e. roost inspections). Graduate and seasonal ecologist staff are included under the licence under condition of being accompanied by more experienced colleagues.

Survey scoping was prepared by Aoife Joyce (B.Sc., M.Sc.). The daytime walkover survey and inspections were carried out by Nathan Finn (B.Sc., M.Sc.) and Frederick Mosley (B.A., M.Sc.). Manual activity surveys were carried out by Nathan Finn, assisted by Frederick Mosley and Cormac Roberts. Data manual ID were carried out by Frederick Mosley and Nathan Finn. This report was prepared by Nathan Finn and Ryan Connors (B.Sc., M.Sc.) and was reviewed and approved by Aoife Joyce. Staff's roles and relevant training are presented in Table 1-2 below.

*Table 1-2 Project team qualifications and training.*

| Staff | Role | Training |
|---|---|---|
| Aoife Joyce (B.Sc., M.Sc.) | Project Director | B.Sc. (Hons) Environmental Science, University of Galway.<br><br>M.Sc. (Hons) Agribioscience, University of Galway.<br><br>Advanced Bat Survey Techniques – Trapping, biometrics, handling (BCI), Bat Impacts and Mitigation (CIEEM), Bat Tree Roost Identification and Endoscope Training (BCI), Bats in Heritage Structures (BCI), Bats and Lighting (BCI), Kaleidoscope Pro Analysis (Wildlife Acoustics), Ecological Impact Assessments, Appropriate Assessment Screening Reports, Natura Impact Statements. |
| Ryan Connors (B.Sc., M.Sc.) | Bat Ecologist | B.Sc. (Hons) Zoology, University College Galway.<br><br>M.Sc. (Hons) Conservation Behaviour, Atlantic Technological University, Galway.<br><br>Surveying Trees for Bats (BRTS), Preliminary Ecological Appraisal (CIEEM), Structure & Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal), Emergence and Re-Entry Surveys (Internal), Kaleidoscope Pro Analysis (Internal), Winter Tree Identification (Internal), Wintering Bird Surveying (Internal). |
| Nathan Finn (B.Sc., M.Sc.) | Bat Ecologist | B.Sc. (Hons) Science, University of Galway.<br><br>M.Sc. (Hons) Environmental Science, University College Dublin.<br><br>Bat Detector and Survey Training (BCI), Kaleidoscope Pro Analysis (Internal), Endoscope Training (Internal), Structure & Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal), Emergence and Re-Entry Surveys (Internal). |

| | | |
|---|---|---|
| Frederick Mosley (B.A., M.Sc.) | Seasonal Bat Ecologist | B.A. (Hons) Biological and Biomedical Science Mod. Zoology, Trinity College, Dublin.<br><br>M.Sc. Marine Biology, University College Cork.<br><br>Kaleidoscope Pro Analysis (Wildlife Acoustics), Endoscope Training (Internal), Structure and Tree Inspection (Internal), Manual Transect Survey (Internal), Bat Habitat Appraisal (Internal), Emergence and Re-Entry Surveys (Internal). |
| Cormac Roberts | Ecology Intern | Currently in final year of B.Sc. Environmental Science with Ecology, Atlantic Technological University, Sligo<br><br>Assisted on over 40 dusk emergence and re-entry surveys across two bat activity periods (2024 and 2025), along with additional survey work completed outside of MKO. Experience includes Bat Habitat Appraisal (Internal), Structure & Tree Inspection (Internal), Manual Transect Survey (Internal), Emergence and Re-Entry Surveys (Internal), and Kaleidoscope Pro Analysis (Internal). |

# 2. PROJECT DESCRIPTION

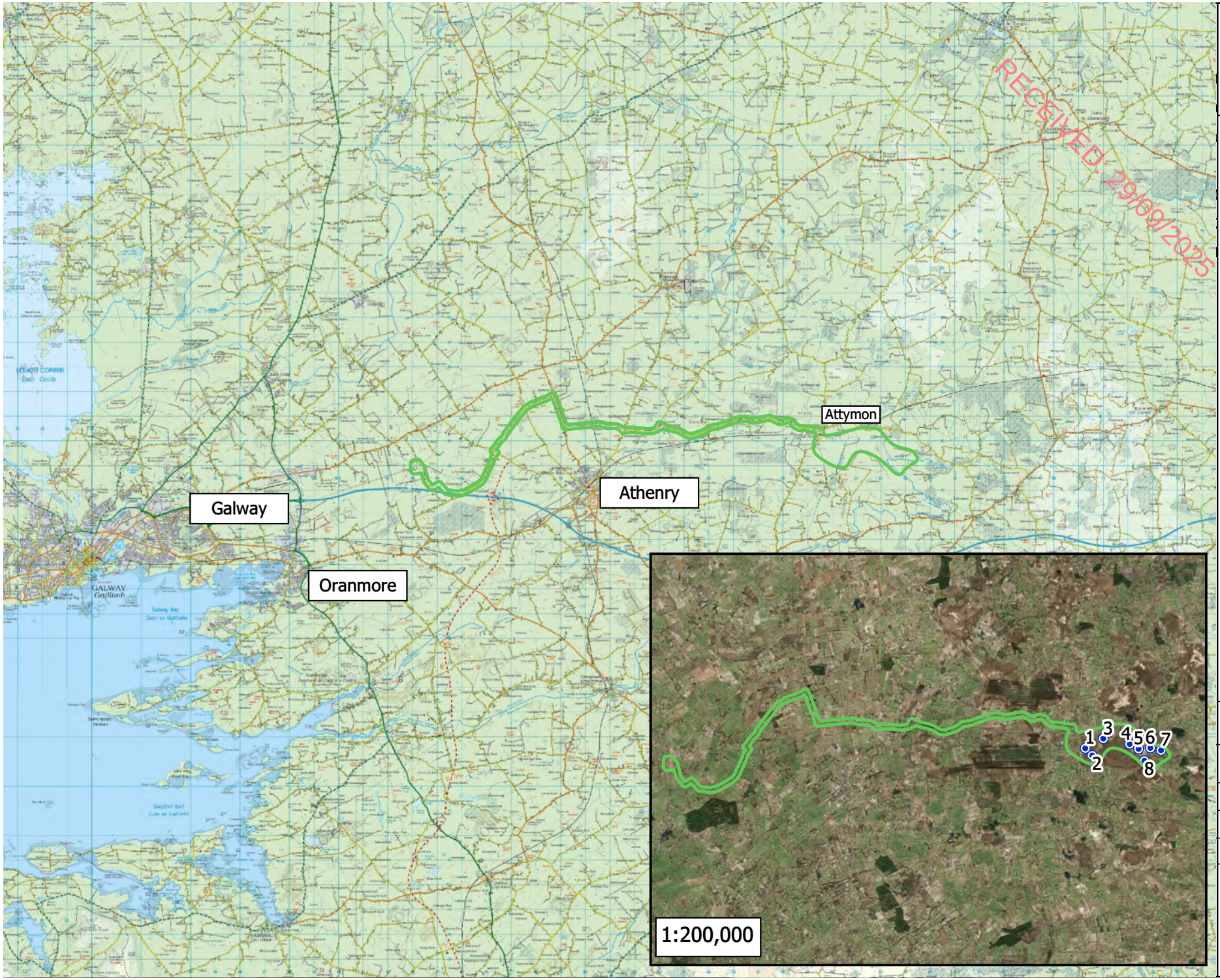


The Proposed Wind Farm site is located within a rural, agricultural setting in eastern Galway, approximately 9.7km east of Athenry, Co. Galway and 13km north of Loughrea, Co. Galway. The village of Attymon, Co. Galway is located approximately 1km northwest of the nearest proposed turbine (T01) and the village of New Inn is located approximately 4.6km southeast of the nearest proposed turbine (T07). The. The nearest Natura 2000 site to the Proposed Wind Farm, i.e., Special Area of Conservation (SAC) or Special Protection Area (SPA) is the Lough Corrib SAC located approximately 4.3km north of the nearest proposed turbine (T03). Elevations within the Proposed Wind Farm site range from ~77mOD (metres above Ordnance Datum) in the west to ~80m in the east.

The Proposed Grid Connection includes for 38kV underground cabling from the proposed onsite 38kV substation, in the townland of Attimonmore South, Co. Galway to the existing Cashla 220kV substation in the townland of Barrettspark, Co. Galway. The Proposed Grid Connection is primarily located along the public road corridor, with two short sections located across private land/tracks. The Proposed Grid Connection follows the L3115, L7152, L3111, L3107, L7126, L7122, L31030, L7108, L7109, and the R347 to the existing Cashla 220kV Substation. The townlands in which the Proposed Grid Connection will pass through are detailed in Table 1-1 of Chapter 1. Please see Section 4.3.2.1 for further detail on the Proposed Grid Connection underground electrical cabling route.

Current land-use on the Proposed Wind Farm site is predominantly comprised of peat cutting activities, commercial forestry, and pastoral agriculture land. Current land-use along the Proposed Grid Connection comprises of public road corridor, public open space, native woodland, private track, and private land principally used by agriculture. Land-use on the wider landscape comprises a mix of pastoral agriculture, peatlands, low-density residential, and small-scale commercial properties.

The site location is shown in on Figure 2-1.




RECEIVED: 29/09/2025

## Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout



Drawing Title

# Site Location

| | |
|---|---|
| Project Title: Gannow Renewable Energy Development | |
| Drawn By: RC | Checked By: AJ |
| Project No.: 240323 | Drawing No.: Figure 2-1 |
| Scale: 1:200,000 | Date: 2025-09-25 |

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# 3. METHODS

## 3.1 Consultation

A scoping exercise was undertaken as part of the EIAR for the Proposed Project. A Scoping Document, providing details of the Proposed Project was prepared by MKO and circulated to consultees in October 2024. As part of this exercise, prominent Irish conservation groups were contacted, including the Irish Wildlife Trust (IWT) and the National Parks and Wildlife Service (NPWS). Bat Conservation Ireland (BCI) were specifically invited to comment on the potential of the Proposed Project to affect bats. In addition, members of the Project Team, including Environmental Scientists, Ecologists and Ornithologists also met with the NPWS on the 6th of May 2025 to discuss the Proposed Project.

Details of consultation responses and the outcomes of the NPWS meeting specifically related to bats are provided in Section 4.1 below.

## 3.2 Desk Study

A desk study of published material was undertaken prior to conducting field surveys. The aim was to provide context to the Site in order to assist bat survey planning and assessment. This included the identification of designated sites, species of interest or any other potential risk factors within the Site and the surrounding region. The results of the desk study including sources of information utilised are provided below.

### 3.2.1 Bat Records

The National Bat Database of Ireland and National Lesser Horseshoe Bat Database holds records of bat observations received and maintained by Bat Conservation Ireland (BCI). These records include results of national monitoring schemes, roost records as well as ad-hoc observations. A search of the Databases was last carried out on the 3rd June 2025 and examined bat presence and roost records within the 10km grid squares surrounding and encompassing the Proposed Wind Farm (BCI 2012, Hundt 2012, NatureScot 2021). Additionally, a data request was sent to BCI and available bat records were provided on 16th June 2025.

### 3.2.2 Bat Species' Range

EU member states are obliged to monitor the conservation status of natural habitats and species listed in the Annexes of the Habitats Directive. Under Article 17, they are required to report to the European Commission every six years. In April 2019, Ireland submitted the third assessment of conservation status for Annex-listed habitats and species, including all species of bats (NPWS, 2019).

The 2019 Article 17 Reports were reviewed for information on bat species' range and distribution in relation to the location of the proposed development. The aim was to identify any high-risk species at the edge of their range (NatureScot, 2021).

### 3.2.3 Designated Sites

The NPWS map viewer and website provides information on rare and protected species, sites designated for nature conservation and their conservation objectives. A search was undertaken of sites designated for the conservation of bats within a 10km radius of a central point within the Proposed

Wind Farm site (IG Ref: M 61163 30196) (BCI 2012, Hundt, 2012, NatureScot 2021). This included European designated sites, i.e. SACs, and nationally designated sites, i.e. NHAs and pNHAs.

## 3.2.4 Landscape Features

### 3.2.4.1 Ordnance Survey Mapping

Ordnance survey maps (OSI 1:5,000 and 1:50,000) and aerial photographs were reviewed to identify any habitats and features likely to be used by bats. Maps and images of the Proposed Wind Farm site and general landscape were examined for suitable foraging or commuting habitats including woodlands and forestry, hedgerows, treelines and watercourses. In addition, any potential roost sites, such as buildings and bridges, were noted for further investigation.

### 3.2.4.2 Geological Survey Ireland

The Geological Survey Ireland (GSI) online mapping tool and University of Bristol Spelaeological Society (UBSS) Cave Database for the Republic of Ireland were consulted for any indication of natural subterranean bat sites, such as caves, within 10km of the Proposed Wind Farm site (BCI, 2012) (last searched on the 3rd June 2025). Furthermore, the archaeological database of national monuments was reviewed for any evidence of manmade underground structures, e.g. souterrains, that may be used by bats (last searched on the 3rd June 2025).

### 3.2.4.3 National Biodiversity Data Centre Bat Landscape Mapping

The National Biodiversity Data Centre (NBDC) map viewer presents “Bat Landscape” maps for individual species and for all species combined. Lundy *et al.* (2011) used Maximum Entropy Models to examine the relative importance of bat landscape and habitat associations in Ireland. The resulting map provides a 5-point scale, ranging from highest habitat suitability index (presented in red) to lowest suitability index (presented in green). However, squares highlighted as less favourable may still have local areas of abundance.

The location of the Proposed Wind Farm site was reviewed in relation to bat habitat suitability indices. The aim of this was to assess habitat suitability for all bat species within the Proposed Wind Farm site. It is worth noting that these results are based on a modelling exercise and not confirmed bat species records. Regardless, they may provide a useful indication of potential favourable bat associations within the Proposed Wind Farm site.

### 3.2.4.4 Additional Projects in the Wider Landscape

A search was conducted to identify permitted, operational and proposed wind energy developments within 10km of the proposed turbine locations. (NatureScot, 2021). This search adhered to methodologies outlined in Chapter 2, Section 3.8 of the NatureScot guidance. The Wind Energy Ireland (WEI) interactive wind map (windenergyireland.com) was reviewed in conjunction with wind farm planning applications from Galway County Council. Other infrastructure developments and proposals (e.g. large road projects and extractive industries) were also noted. Information on the location and scale of these developments was gathered to inform cumulative effects. More details on other infrastructure developments within the vicinity of the Site can be found in Chapter 2 of the main EIAR.

## 3.2.5 Multidisciplinary Surveys

Multidisciplinary walkover surveys were undertaken throughout 2023 and 2024 with a additional surveys carried out in 2025 (Table 3-1). The Site was systematically and thoroughly walked in a ground-truthing exercise with the habitats on the proposed site assessed and classified. The habitats (including

any culverts/bridges) were assessed for bat commuting, foraging and roosting suitability. The Proposed Grid Connection and turbine delivery route were visited as part of the multidisciplinary surveys outlined below and in Chapter 6 of the main EIAR.



Multidisciplinary walkover surveys were undertaken within the Site on the following dates:

*Table 3-1 Multidisciplinary Survey Effort*

| Multidisciplinary Survey | Dedicated Bat Survey |
|---|---|
| 25th September 2023 | 7th May 2024 |
| 30th July 2024 | 21st May 2024 |
| 5th September 2024 | 18th June 2024 |
| 17th September 2024 | 11th July 2024 |
| 18th September 2024 | 24th September 2024 |
| 25th September 2024 | 9th October 2024 |
| 20th August 2024 | 10th October 2024 |
| 21st August 2024 | 13th February 2025 |
| 7th October 2024 | 17th September 2025 |
| 8th October 2024 | |
| 10th October 2024 | |
| 13th February 2025 | |
| 17th September 2025 | |

## 3.3 Field Surveys

### 3.3.1 Bat Habitat Suitability Appraisal

Bat walkover surveys were carried out throughout 2024. During these surveys, habitats within the Proposed Wind Farm site were assessed for their suitability to support roosting, foraging and commuting bats. An assessment of the Proposed Grid Connection and turbine delivery route was also undertaken. Connectivity with the wider landscape was considered. Suitability was assessed according to Collins (2023) which provides a grading protocol for roosting habitats and for commuting and foraging areas. Suitability categories, divided into *High*, *Moderate*, *Low*, *Negligible* & *None*, are described fully in **Appendix 1**.

### 3.3.2 Roost Surveys

#### 3.3.2.1 Daytime Roost Inspections

A search for tree roosts was undertaken within 200m plus the maximum rotor radius (i.e. 81.5m) of the proposed turbine locations. (NatureScot, 2021) A search for roosts in structures was undertaken within a 500-metre radius of the proposed turbines. The aim of these searches was to determine the presence of Potential Roost Features (PRFs) for bats and the need for further survey work or mitigation. The Proposed Wind Farm site was visited in May, June, July, September and October 2024.

Four structures were identified as PRFs within the 500m search area and were assessed for their potential to support roosting bats (see **Appendix 1** for criteria in assessing roosting habitats). This comprised a detailed inspection of the interior, if accessible, and exterior to look for evidence of bat use, including live and dead specimens, droppings, feeding remains, urine splashes, fur oil staining and noises. The locations of all identified PRFs are provided in Table 3-2.

There are 10 no. watercourse crossings along the Proposed Grid Connection (6 no. with infrastructure present). The location of the watercourse crossings are presented in Chapter 4 and Appendix 4-1 of this EIAR. In addition, a motorway underpass a rail bridge and two further structures along the Proposed Grid Connection route were also assessed. The assessment of the watercourse crossing infrastructure are presented in Appendix 4. The Proposed Grid Connection was visited in October 2024 and in February and September of 2025

Any potential tree roosts were examined for the presence of rot holes, hazard beams, cracks and splits, partially detached bark, knot holes, gaps between overlapping branches and any other PRFs identified in the Bat Tree Habitat Key (BTHK, 2018). Where accessible, PRFs were inspected using a ladder, torch and endoscope to check for signs of bat use.

*Table 3-2 PRF locations within and around the Proposed Wind Farm site*

| Structure | IG Ref | Nearest turbine | Distance to nearest turbine | Suitability Assessment (Collins 2023) |
|---|---|---|---|---|
| Derelict building | M 62888 28973 | T8 | 445m | *High* |
| Farm Shed (no. 1) | M 62789 29443 | T6 | 165m | *Negligible* |
| Storage Shed & Offices | M 60178 28963 | T2 | 335m | *Negligible* |
| Farm Sheds (no. 2) & Ruined Structure | M 61694 30459 | T4 | 705m | *Low* |

### 3.3.2.2 Presence/Absence Surveys

Emergence surveys at dusk were undertaken on the evenings of 7th May and 18th June and focused on PRFs identified during the habitat appraisal within the Proposed Wind Farm site. The two additional structures, listed in Table 3-2 above, were assessed as having *Negligible* suitability for bats; therefore, no emergence surveys were undertaken for these following detailed inspections (Collins, 2023). During the emergence surveys, surveyors were equipped with Bat Logger M bat detectors (Elekon AG, Lucerne, Switzerland). The emergence surveys commenced at least 15 minutes before sunset and concluded at least 90 minutes after sunset. Table 3-3 summarises survey effort in relation to emergence surveys. Where possible, species identification was made in the field and any other relevant information was also noted, e.g., numbers, behaviour, features used, etc. All bat echolocation was recorded for subsequent analysis to confirm species identifications.

Surveyors were located at PRFs identified during the daytime roost inspection surveys with a focus on potential access point and roosting features. The purpose was to identify any bat species, numbers, access points and roosting locations within the PRF structure. Surveys were carried out in favourable weather conditions.

*Table 3-3 2024 Survey Effort - Emergence Surveys*

| Date | Surveyors | Sunrise/ Sunset | Type | IG Ref | PRF |
|---|---|---|---|---|---|
| 7th May 2024 | Nathan Finn & Frederick Mosley | 21:46 | Dusk Emergence | M 61693 30458 | Farm Sheds (no. 2) & Ruined Structure |
| 18th June 2024 | Nathan Finn & Cormac Roberts | 22:05 | Dusk Emergence | M 62888 28973 | Derelict building |

### 3.3.3 Manual Transect Surveys



Manual activity surveys comprised transects conducted after dusk in spring, summer and autumn 2024. A series of representative transect routes were selected throughout the Proposed Wind Farm site, with the aim of identifying bat species present, gathering information on bat behaviour, and recording important features used by bats. Transect routes were prepared with reference to the Proposed Wind Farm infrastructure layout, findings from desktop and walkover surveys, as well as health and safety considerations and access limitations. As such, transects generally followed existing roads and tracks. To ensure adequate coverage of turbine locations, some sections of the transects were partially driven, as it would not have been feasible to reach all turbines within the required survey window by walking alone. The driven transect portions followed the methodology described by Roche *et al.* (2012). Transect routes are presented in Figure 3-1 below.

Transects were walked/driven by two surveyors, recording bats in real time. In spring and summer, transects commenced immediately after the dusk emergence surveys, whereas the autumn transect commenced at dusk. All transects were completed within up to 3 hours after sunset. Surveyors were equipped with active full spectrum bat detectors, the Batlogger M bat detector (Elekon AG, Lucerne, Switzerland), and all bat activity was recorded for subsequent analysis to confirm species identifications. All surveys were carried out during weather conditions suitable for bat surveying (Collins, 2023). Details of the surveys are presented in Table 3-4 and described below.

*Table 3-4 2024 Survey Effort – Manual Surveys*

| Date | Surveyors | Survey Type | Sunset/ Sunrise | Start-End | Weather | Transect (km) |
|---|---|---|---|---|---|---|
| 7th May 2024 | Nathan Finn & Frederick Mosley | Dusk Emergence & Walked Transect | 21:16 | 21:01 – 00:17 | 12 - 15˚C; dry; calm; 10 – 75% cloud cover | 2km |
| 18th June 2024 | Nathan Finn & Cormac Roberts | Dusk Emergence & Walked Transect | 22:05 | 21:35 – 01:05 | 8 - 12 ˚C; dry; calm; 2 – 55% cloud cover | 1.5km |
| 24th September 2024 | Nathan Finn & Frederick Mosley | Walked/ Driven Transect | 19:29 | 19:29 – 22:29 | 9 - 12 ˚C; dry; calm; 80 – 95 % cloud cover | 7km (4.6km driven, 2.4km walked) |

### 3.3.4 Ground-level Static Surveys

NatureScot (2021) requires one detector per turbine up to 10, plus one detector for every three additional turbines. The scope of bat work was designed considering a proposed 8-turbine layout. One of the proposed turbines was assigned two preliminary positions, so an extra detector was deployed to cover both potential locations for this turbine. The deployment of 9 no. detectors ensured compliance with NatureScot guidance. As layout designs were modified throughout the bat survey season, an additional detector was introduced to address a possible location change for Turbine T02. This was achieved by placing detectors at both the original (Detector 2A) and the new (Detector 2B) potential turbine locations, with the final T02 location confirmed as being adjacent to Detector 2B. Furthermore, the position of Detector 5A was adjusted in the autumn, moving approximately 80m northeast–from an area of wet grassland to the edge of an area of conifer forestry–to better sample relevant habitats. A good spatial spread in relation to the proposed turbines and sample of the range of available habitats was achieved. Detector locations were based on indicative turbine locations provided before the spring deployment and differ slightly to the final proposed layout.

Automated bat detectors were deployed for at least 10 nights in spring (April-May), 20 nights of summer (June-mid August) and 10 nights of autumn (mid-August-October) (NatureScot, 2021/NIEA, 2021).

Keyhole felling will be required where turbines are proposed in areas of forestry. This involves only felling an area required to construct the turbine and associated infrastructure thus creating open areas, within the forest, around proposed turbines (WEI, 2012). The 'keyhole' size is typically 50m from turbine blade tip to forestry edge, and these keyhole areas remain open during the wind farm lifetime. Two of the proposed turbines (T04 and T05) will require keyhole felling. Further details on proposed key-hole locations can be found in Chapter 4 of the EIAR. Where keyholing is proposed, detectors were located along nearby forestry edge to more closely reflect the likely post-construction habitat. Static detector locations are described in Table 3-5 and presented in Figure 3-1.

*Table 3-5 Location of deployed detectors.*

| ID | Location (ITM) | Habitat | Linear Feature within 50 m | Corresponding/ Nearest Turbine |
|---|---|---|---|---|
| D01 | X 160062 Y 229504 | Cutover bog near scrub. | Scrub | T01 |
| D02A | X 160516 Y 229133 | Cutover bog near scrub. | Scrub. | T02 option A |
| D02B | X 560249 Y 729311 | Cutover bog. | None. | T02 option B |
| D03 | X 160807 Y 229922 | Scrub & Cutover bog. | Scrub and treeline. | T03 |
| D04 | X 561725 Y 730135 | Conifer forestry. | Conifer forestry edge. | T04 |
| D05A | X 562061 Y 729563 | Wet Grassland. | Scrub. | T05 option A |
| D05B | X 562123 Y 729621 | Wet grassland, conifer plantation edge. | Conifer forestry edge. | T05 option B |
| D06 | X 562637 Y 729624 | Improved agricultural grassland. | Scrub and hedgerow. | T06 |
| D07 | X 563095 Y 729530 | Improved agricultural grassland. | None. | T07 |
| D08 | X 562470 Y 729086 | Mosaic of wet heath, wet grassland, scrub and marsh | Scrub. | T08 |

Full spectrum bat detectors, Song Meter SM4BAT (Wildlife Acoustics, Maynard, MA, USA), were employed using settings recommended for bats, with minor adjustments in gain settings and band pass filters to reduce background noise when recording. Detectors were set to record from 30 minutes before sunset until 30 minutes after sunrise. The Song Meter automatically adjusts sunset and sunrise times using the Solar Calculation Method when provided with GPS coordinates.

Weather monitoring was undertaken concurrently with static detector deployments. One Vantage Pro 2 (Davis Instruments, CA, UCS) was deployed each season and night-time hourly data was tracked remotely to ensure a sufficient number of nights (i.e. minimum 10 no. for spring and autumn and 20 no. for summer) with appropriate weather conditions captured (i.e. dusk temperatures above 8˚C, wind speeds less than 5m/s and no or only very light rainfall). Table 3-6 summarises survey effort achieved for each of the detector locations in 2024.

*Table 3-6 2024 Survey Effort - Ground-level Static Surveys*

| Season | Survey Period | Total Survey Nights per detector location | Nights with Appropriate Weather |
|---|---|---|---|
| Spring | 7th May – 22nd May 2024 | 14 | 14 |
| Summer | 18th June – 11th July 2024 | 23 | 23 |
| Autumn | 24th September – 9th October 2024 | 15 | 14 |
| **Total Survey Effort** | | **52** | **51** |


## Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Static Detector Locations
- Spring Transect Route 7th May 2024
- Summer Transect Route 19th June 2024
- Autumn Walked and Driven Transect Route 24th September 2024
- Driven
- Walked



Drawing Title

# 2024 Survey Effort

| Project Title | |
|---|---|
| Gannow Renewable Energy Development | |
| Drawn By: RC | Checked By: AJ |
| Project No.: 240323 | Drawing No.: Figure 3-1 |
| Scale: 1:18,000 | Date: 2025-09-25 |

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## 3.4 Bat Call Analysis



All recordings were later analysed using bat call analysis software Kaleidoscope Pro v.5.6.8 (Wildlife Acoustics, MA, USA). The aim of this was to identify, to a species or genus level, what bats were present within the Proposed Wind Farm site. Bat species were identified using established call parameters, to create site-specific custom classifiers. All identified calls were also manually verified.

Echolocation signal characteristics (including signal shape, peak frequency of maximum energy, signal slope, pulse duration, start frequency, end frequency, pulse bandwidth, inter-pulse interval and power spectra) were compared to published signal characteristics for local bat species (Russ, 1999). *Myotis* species (potentially Daubenton's bat *(M. daubentonii),* Whiskered bat *(M. mystacinus),* Natterer's bat *(M. nattereri)*) were considered as a single group, due to the difficulty in distinguishing them based on echolocation parameters alone (Russ, 1999). The echolocation of Soprano pipistrelle *(P. pygmaeus)* and Common pipistrelle *(P. pipistrellus)* are distinguished by having distinct (peak frequency of maximum energy in search flight) peak frequencies of ~55 kHz and ~46 kHz respectively (Jones & van Parijs, 1993).

Individual bats of the same species cannot be distinguished by their echolocation alone. Thus, 'bat passes' was used as a measure of activity (Collins, 2023). A bat pass was defined as a recording of an individual species/species group's echolocation containing at least two echolocation pulses and of maximum 15s duration. All bat passes recorded in the course of this study follow these criteria, allowing comparison. Due to the volume of bat activity data recorded, where multiple bat passes were recorded within the same registration, rarer or harder to record species were identified. Underreporting of common species is possible using this method, and is accounted for within the assessment.

Echolocation calls by brown long-eared bats (*Plectous auritus*) are intrinsically quiet and hard to record by static equipment. All data collected, including Noise files and Auto ID files are checked to ensure all calls for this species have been captured. However, a level of underrepresentation is expected for this species and is accounted for in the assessment of activity levels.

Echolocation by lesser horseshoe bats (*Rhinolophus hipposideros*) is directional and can be missed by detectors, particularly manual detectors. MKO employs omni-directional microphones to limit under-recording for the species.

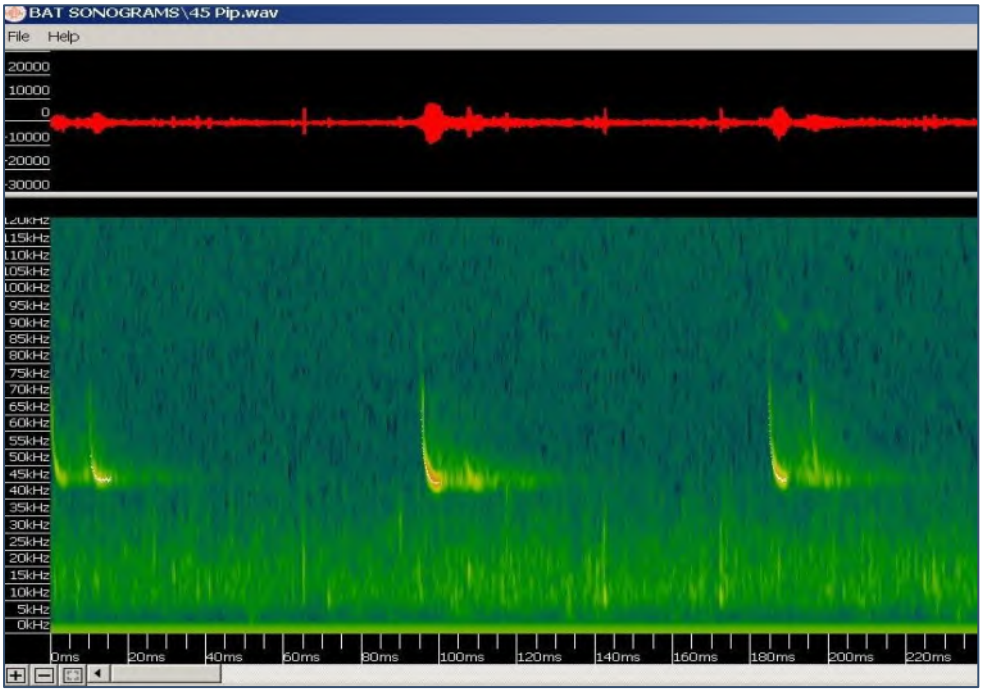



*Plate 3-1 Sonogram of Echolocation Pulses of Common pipistrelle (Peak Frequency 45kHz).*

### 3.4.1 Assessment of Bat Activity Levels



The online database tool Ecobat (mammal.org.uk) is recommended by NatureScot 2021 to assess bat activity levels within a proposed wind farm. This web-based interface, launched in August 2016, allows users to upload activity data and to contrast results with a comparable reference range, allowing objective interpretation. Uploaded data then contributes to the overall dataset to provide increasingly robust outputs. Ecobat generates a percentile rank for each night of activity and provides a numerical way of interpreting levels of bat activity in order to provide objective and consistent assessments. Table 3-7 defines bat activity levels as they relate to Ecobat percentile values (NatureScot, 2021).

*Table 3-7 Ecobat Percentile Score and Categorised Level of Activity (NatureScot, 2021).*

| Ecobat Percentile | Bat Activity Level |
|---|---|
| 81 to 100 | High |
| 61 to 80 | Moderate to High |
| 41 to 60 | Moderate |
| 21 to 40 | Low to Moderate |
| 0 to 20 | Low |

Ecobat was unavailable for a cross-site analysis of 2024 data as the platform has been undergoing maintenance since late 2022 with no proposed timeline of a relaunch. Ecobat has since relaunched at the end of 2024 after data evaluation had been undertaken, it was decided not to use the software for the Proposed Wind Farm site and rely on the site-specific analysis already undertaken.

Following preliminary analysis and manual verification using Kaleidoscope Pro, statistical analysis and visualisation was performed using RStudio (version 2023.12.1+402.) and R[2] (version 4.3.3). RStudio, an integrated development environment for the R programming language, was employed for data cleaning, exploration, and data visualisation. The 'ggplot2' R package was particularly instrumental in creating the data visualisations shown in the results section. Data was standardised into bat pass rates, calculated as bat passes per hour (total bat passes / night length) to account for seasonal changes in night length (Matthews et al. 2016). Activity is often variable between survey nights. Therefore, the median Nightly Pass Rate was used as the most appropriate measure of bat activity (Lintott & Mathews, 2018). During all calculations, data was rounded to at least three decimal places. When visualising the bat pass rates per season, survey effort was defined as detector hours (sum of recorded hours across all detectors). This was defined to circumvent any issues arising from differences in survey effort between detectors in a season.

The methodology used to assess activity levels across the Proposed Wind Farm site was adapted from Mathews *et al.* (2016), where activity ranges of pipistrelle species were defined using an average of maximum nightly pass rates (in total passes during the survey period) across the Proposed Wind Farm site, divided into tertiles. Widespread pipistrelle species' activity ranges were determined using an average of maximum nightly pass rates (total passes during the survey period) across the Proposed Wind Farm site, divided into quartiles. The same process was applied to Leisler's bats. For all other species groups maximum nightly pass rate (bpph) recorded across the Proposed Wind Farm site divided into quartiles was used. Activity levels were assessed separately for widespread pipistrelle species (*Pipistrellus pipistrellus, Pipistrellus pygmaeus*), noctules (*Nyctalus leisleri*), *Myotis* spp. and rare or hard to record species (*Plecotus auritus, Pipistrellus nathusii*). Median and maximum nightly activity (bpph) at each detector location were then categorized as Low, Medium, or High for each recorded season. Any figure below 25% of the maximum/average maximum nightly pass rate was considered Low activity, while figures above 75% were classified as High. Values falling between these two quartiles were defined as Medium.

[2] *R Core Team (2024). R: A Language and Environment for Statistical Computing. R Foundation for Statistical Computing, Vienna, Austria. <https://www.R-project.org/>.*

To prevent skewing the activity threshold towards high levels, any outliers (calculated as more than 3 standard deviations from the mean) recorded across the detectors were excluded. Table 3-8 presents activity ranges per species group identified.

*Table 3-8 Site-specific Activity Level Categories based on Maximum Bat Passes per Hour (bpph).*

| Assessment Level | Activity Threshold as Bat Passes per Hour (bpph) for Bat Species | | | | |
|---|---|---|---|---|---|
| | ***Pipistrellus* spp.** (*P. pipistrellus* and *P. pygmaeus*) | ***Nyctalus* spp.** | ***Myotis* spp.** | ***Pipistrellus nathusii*** | ***Plecotus auritus*** |
| Low | < 5.26 | 0.71 | < 0.33 | < 1.7 | < 0.85 |
| Medium | 5.26 – 15.78 | 0.71 – 2.13 | 0.33 – 0.98 | 1.7 – 5.1 | 0.85 – 2.55 |
| High | 15.78 < | 2.13 < | 0.98 < | 5.1 < | 2.55 |

Based on experience gained surveying a large number of development sites, the above calculated activity thresholds were considered to be high for all species surveyed. To provide a more precautionary and representative assessment of bat activity in agricultural grassland and conifer woodland habitats, the thresholds were adjusted based on MKO's experience with similar habitat types. The thresholds presented in Table 3-9 have been deliberately reduced to reflect a theoretical precautionary scenario, ensuring a conservative approach to assessing potential impacts.

*Table 3-9 Adapted Activity Level Categories*

| Assessment Level | Activity Threshold as Bat Passes per Hour (bpph) for Bat Species | | | | |
|---|---|---|---|---|---|
| | ***Pipistrellus* spp.** (*P. pipistrellus* and *P. pygmaeus*) | ***Nyctalus* spp.** | ***Myotis* spp.** | ***Pipistrellus nathusii*** | ***Plecotus auritus*** |
| Low | < 4.79 | 0.71 | < 0.33 | < 0.33 | < 0.5 |
| Medium | 4.79 – 14.36 | 0.71 – 2.13 | 0.33 – 0.98 | 0.33 – 2.5 | 0.5 – 1.5 |
| High | 14.36 < | 2.13 < | 0.98 < | 2.5 < | 1.5 < |

## 3.5 Assessment of Collision Risk

### 3.5.1 Population Risk

NatureScot (2021) provides a generic assessment of bat collision risk for UK species, based on species behaviour and flight characteristics. In the guidelines, this measure of collision risk is used, in combination with relative abundance, to indicate the potential vulnerability of British bat populations. No such assessment is provided for Irish bat populations.

In Plate 3-2, an adapted assessment of vulnerability for Irish bat populations to collision with wind turbine blades is provided. This adaptation of NatureScot Guidance Table 2 was based on collision risk and species abundance of Irish bat populations. Species' collision risk follows those described in NatureScot (2021). Relative abundance for Irish species was determined in accordance with Wray *et al.* (2010) using population data available in the 2019 Article 17 reports (NPWS, 2019). Feeding and commuting behaviours, and habitat preferences for bat species in Ireland were also considered.

| Relative Abundance | Low Collision Risk | Medium Collision Risk | High Collision Risk |
|---|---|---|---|
| Common species | | | Common pipistrelle<br>Soprano pipistrelle |
| Rarer species | Daubenton's bat<br>Brown long-eared bat<br>Lesser horseshoe bat | | Leisler's bat |
| Rarest species | Natterer's bat<br>Whiskered bat | | Nathusius' pipistrelle |
| | Low Population Vulnerability | Medium Population Vulnerability | High Population Vulnerability |

*Plate 3-2 Population Vulnerability of Irish Bat Species (Adapted from NatureScot, 2021).*

## 3.5.2 Site Risk

The likely impact of a proposed wind farm on bats is related to site-based risk factors, including habitat and development features. The cross-tablature result of habitat risk and project size determines the site risk (i.e. Low, Medium or High) (Plate 3-3) i.e. Table 3a (NatureScot, 2021). Table 5-1 in the results section describes the criteria and site-specific characteristics used to determine an indicative risk level for the Proposed Wind Farm site. All site assessment levels, as per NatureScot (2021) are presented in **Appendix 2**.

| | | Project Size | | |
|---|---|---|---|---|
| | | Small | Medium | Large |
| Habitat Risk | Low | 1 | 2 | 3 |
| | Moderate | 2 | 3 | 4 |
| | High | 3 | 4 | 5 |
| | | Low/Lowest Site Risk (1-2) | Medium Site Risk (3) | High/Highest Site Risk (4-5) |

*Plate 3-3 Site-risk Level Assessment Matrix (Table 3a, NatureScot, 2021)*

## 3.5.3 Overall Risk Assessment

An overall assessment of risk was made by combining the site risk level (i.e. Low/Medium/High) and the population risk (i.e. Ecobat bat activity outputs), as shown in the overall risk assessment matrix table (Plate 3-4) i.e. Table 3b (NatureScot, 2021). The assessment was carried out for both median and maximum activity categories in order to provide insight into typical bat activity (i.e. median values) and activity peaks (i.e. maximum values).

| Site Risk Level | Ecobat Activity Category | | | | | |
|---|---|---|---|---|---|---|
| | Nil (0) | Low (1) | Low-Moderate (2) | Moderate (3) | Moderate-High (4) | High (5) |
| Lowest (1) | 0 | 1 | 2 | 3 | 4 | 5 |
| Low (2) | 0 | 2 | 4 | 6 | 8 | 10 |
| Medium (3) | 0 | 3 | 6 | 9 | 12 | 15 |
| High (4) | 0 | 4 | 8 | 12 | 16 | 18 |
| Highest (5) | 0 | 5 | 10 | 15 | 20 | 25 |

| Low Overall Risk (0-4) | Medium Overall Risk (5-12) | High Overall Risk (15-25) |
|---|---|---|

*Plate 3-4 Overall Risk Assessment Matrix (Table 3b, NatureScot, 2021).*

This exercise was carried out for each high collision risk species. Plate 3-2 above outlines high collision risk species. Overall risk assessments were also considered in the context of any potential impacts at the population level, particularly for species identified as having high population vulnerability (Plate 3-2).

## 3.6 Limitations

A comprehensive suite of bat surveys has been undertaken at the Proposed Wind Farm site and along the Proposed Grid Connection in 2024 and 2025. The surveys undertaken at the Proposed Wind Farm site, in accordance with NatureScot Guidance, provide the information necessary to allow a complete, comprehensive and robust assessment of the potential impacts of the Proposed Wind Farm on bats receptors.

The information provided in this report accurately and comprehensively describes the baseline environment; provides an accurate prediction of the likely effects of the Proposed Project; prescribes mitigation as necessary; and describes the predicted residual impacts. The specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines.

No limitations in the scope, scale or context of the assessment have been identified. Overall, a comprehensive assessment has been achieved.

# 4. RESULTS

## 4.1 Consultation

### 4.1.1 Bat Conservation Ireland

No response received from Bat Conservation Ireland as of the 23rd June 2025.

### 4.1.2 Development Applications Unit - NPWS

A detailed scoping exercise was undertaken for the Proposed Project. A response from the Department of Housing, Local Government and Heritage provided recommendations on the 19th November 2024; however, this response did not include any specific recommendations for bats. A meeting with the Department was also held on the 6th May 2025. Aside from a general recommendation that the measures proposed in the Biodiversity Management and Enhancement Plan (BMEP) (Appendix 6-4) should, where possible, be implemented in advance of construction, no further bat-specific recommendations were made.

### 4.1.3 Irish Wildlife Trust

No response received from Irish Wildlife Trust as of the 23rd June 2025.

## 4.2 Desk Study

### 4.2.1 Bat Records

#### Bat Conservation Ireland

A data request was sent to Bat Conservation Ireland for records of bat activity within 10km and roosts within a 1km radius of an approximate central point within the Proposed Wind Farm site (Grid Ref: M 61163 30196). Available bat records were provided by BCI on 16th June 2025. The search included roosts, transects and ad-hoc observations. A number of ad-hoc observations (n=23) have been recorded. At least eight of Ireland's nine resident bat species were recorded within 10km of the Proposed Wind Farm. The results of the database search are provided in Table 4-1.

*Table 4-1 National Bat Database of Ireland Records within 10 km of the Proposed Wind Farm site*

| Record | Species | Grid Reference | Date | Location |
|---|---|---|---|---|
| Roost | *Plecotus auritus* | M5845130739 | N/A | Ballynanulty Bridge, Attymon, County Galway |
| | *Myotis daubentonii* | M5180020400 | N/A | Caherdangan bridge, Co. Galway |
| | Unidentified bat | M5180020400 | N/A | Caherdangan bridge Co. Galway |
| | *Plecotus auritus* | M5838 | N/A | Colmanstown Co Galway |

| Record | Species | Grid Reference | Date | Location |
|---|---|---|---|---|
| | M*yotis Daubentonii* | M5821633744 | N/A | Clogh Co Galway |
| | *Nyctalus leisleri, Pipistrellus pygmaeus, Pipistrellus pipistrellus* | M5221 | N/A | Garracloone South, Craughwell, Co. Galway |
| | *Nyctalus leisleri,Plecotus auritus,Pipistrellus pygmaeus,Pipistrellus pipistrellus* | M6731 | N/A | Ballinasloe, County Galway |
| | Unidentified bat | M6731 | N/A | Ballinasloe, Co. Galway |
| Transect | *Myotis natterreri,Myotis spp., Pipistrellus spp., Pipistrellus pygmaeus,Pipistrellus pipistrellus* | M583244 | N/A | Clougharevaun Bridge Transect |
| | *Myotis daubentonii* | M644204 | N/A | Lisduff Townland Transect |
| | *Myotis daubentonii*, Unidentified bat | M6080026100 | N/A | Rafford House Transect |
| | *Myotis daubentonii*, Unidentified bat | M6080026100 | N/A | Rafford House Transect spot 1 |
| | *Myotis daubentoniid* | M5996025720 | N/A | Rafford House Transect spot 10 |
| | *Myotis daubentoniid* | M6074026000 | N/A | Rafford House Transect spot 2 |
| | *Myotis daubentonii*, Unidentified bat | M6059025900 | N/A | Rafford House Transect spot 3 |
| | Unidentified bat, *Myotis daubentonii* | M6051025920 | N/A | Rafford House Transect spot 4 |
| | Unidentified bat, *Myotis daubentonii* | M6045025920 | N/A | Rafford House Transect spot 5 |
| | Unidentified bat, *Myotis daubentonii* | M6083726048 | N/A | Rafford House Transect spot 6 |
| | *Myotis daubentonii*, Unidentified bat | M6030025870 | N/A | Rafford House Transect spot 7 |
| | *Myotis daubentonii* | M6019025810 | N/A | Rafford House Transect spot 8 |
| | *Myotis daubentoniid* | M6009025770 | N/A | Rafford House Transect spot 9 |
| | Unidentified bat, *Myotis daubentonii* | M5473423259 | N/A | Rattys Bridge Transect |
| Ad-Hoc | *Myotis natterreri, Myotis spp., Pipistrellus spp., Pipistrellus pygmaeus, Pipistrellus pipistrellus* | M5223 | 26/05/2008 | Bat Conservation Ireland Bat Walks |
| | *Pipistrellus pygmaeus, Pipistrellus pipistrellus* | M5565235458 | 05/10/2009 | BATLAS 2010 |
| | *Myotis daubentonii, Myotis spp., Pipistrellus pygmaeus* | M5593237912 | 05/10/2009 | BATLAS 2010 |
| | *Pipistrellus pygmaeus* | M5681935217 | 05/10/2009 | BATLAS 2010 |

| Record | Species | Grid Reference | Date | Location |
|---|---|---|---|---|
| | *Pipistrellus pygmaeus* | M5425635995 | 05/10/2009 | BATLAS 2010 |
| | *Pipistrellus pipistrellus, Pipistrellus pygmaeus* | M5594237905 | 04/09/2019 | BATLAS 2020 |
| | *Myotis spp., Plecotus auritus, Pipistrellus pygmaeus, Pipistrellus pipistrellus* | M5427635995 | 04/09/2019 | BATLAS 2020 |
| | *Myotis spp., Plecotus auritus, Myotis daubentonii, Nyctalus leisleri, Pipistrellus pygmaeus, Pipistrellus pipistrellus* | M6817630745 | 04/09/2019 | BATLAS 2020 |
| | Unidentified bat, *Pipistrellus pipistrellus, Pipistrellus pygmaeus* | M5793024995 | 13/08/2019 | BATLAS 2020 |
| | *Pipistrellus pipistrellus, Pipistrellus pygmaeus,* Unidentified bat | M6267522360 | 13/08/2019 | BATLAS 2020 |
| | *Pipistrellus pipistrellus, Pipistrellus pygmaeus, Plecotus auritus* | M6578028344 | 13/08/2019 | BATLAS 2020 |
| | *Pipistrellus pipistrellus, Pipistrellus pygmaeus* | M6795937805 | 04/09/2019 | BATLAS 2020 |
| | *Pipistrellus pipistrellus, Pipistrellus pygmaeus, Plecotus auritus, Myotis mystacinus* | M5282323524 | 13/08/2019 | BATLAS 2020 |
| | *Pipistrellus pipistrellus, Pipistrellus pygmaeus, Nyctalus leisleri, Myotis natterreri* | M6747539160 | 08/08/2016 | Consultancy Surveys |
| | *Pipistrellus pipistrellus, Pipistrellus pygmaeus* | M5704025400 | 14/08/2012 | Consultancy Surveys |
| | *Pipistrellus pygmaeus, Pipistrellus pipistrellus, Nyctalus leisleri, Myotis mystacinus/brandtii* | M7000028000 | 30/06/2003 | Consultancy Surveys |
| | *Pipistrellus pipistrellus, Pipistrellus pygmaeus* | M6300025000 | 21/08/2006 | Consultancy Surveys |
| | *Pipistrellus pipistrellus, Pipistrellus pygmaeus, Nyctalus leisleri, Myotis mystacinus/brandtii* | M7000029000 | 30/06/2003 | Consultancy Surveys |
| | *Pipistrellus pygmaeus, Myotis natterreri* | M5300036000 | 29/09/2006 | Consultancy Surveys |
| | *Pipistrellus pipistrellus* | M5800024000 | 15/08/2006 | Consultancy Surveys |
| | *Pipistrellus pipistrellus, Pipistrellus pygmaeus, Nyctalus leisleri* | M638401 | 03/09/2020 | National Biodiversity Data Centre Bat Records |
| | *Pipistrellus pygmaeus, Nyctalus leisleri* | M531276 | 13/06/2022 | National Biodiversity Data Centre Bat Records |
| | *Myotis daubentonii* | M608261 | 05/08/2022 | National Biodiversity Data Centre Bat Records |

### National Bat Database and National Lesser Horseshoe Bat Database of Ireland

The National Bat Database of Ireland and National Lesser Horseshoe Bat Database was searched for records of bat activity and roosts within a 10km radius of a central point within the Proposed Wind Farm site centre (last search 3rd June 2025). Eight of Ireland's nine bat species were recorded in the hectads located within 10km of the Proposed Wind Farm site. The only species not recorded was the lesser horseshoe bat. The results of the database search are provided in Table 4-2.

*Table 4-2 NBDC Bat Records within 10km of Proposed Project*

| Hectad | Species | Database | Designation |
|---|---|---|---|
| M52, M53, M62, M63, M72, M73 | Brown Long-eared Bat (*Plecotus auritus*) | National Bat Database of Ireland | HD Annex IV, WA |
| M52, M53, M62, M63, M72, M73 | Common Pipistrelle (*Pipistrellus pipistrellus sensu stricto*) | National Bat Database of Ireland | HD Annex IV, WA |
| M52, M53, M62, M63, M73 | Daubenton's Bat (*Myotis daubentonii*) | National Bat Database of Ireland | HD Annex IV, WA |
| M52, M63, M72, M73 | Lesser Noctule (*Nyctalus leisleri*) | National Bat Database of Ireland | HD Annex IV, WA |
| M52, M53, M63 | Natterer's Bat (*Myotis nattereri*) | National Bat Database of Ireland | HD Annex IV, WA |
| M52, M72 | Pipistrelle (*Pipistrellus pipistrellus sensu lato*) | National Bat Database of Ireland | HD Annex IV, WA |
| M52, M53, M62, M63, M72, M73 | Soprano Pipistrelle (*Pipistrellus pygmaeus*) | National Bat Database of Ireland | HD Annex IV, WA |
| M52, M72 | Whiskered Bat (*Myotis mystacinus*) | National Bat Database of Ireland | HD Annex IV, WA |

## 4.2.2 Bat Species Range

The potential for negative impacts is likely to increase where there are high risk species at the edge of their range (NatureScot, 2021). Therefore, range maps presented in the 2019 Article 17 Reports (NWPS, 2019) were reviewed in relation to the location of the Proposed Wind Farm site.

The Proposed Wind Farm site is located outside the current known range for lesser horseshoe bat, and Nathusius' pipistrelle. The Proposed Wind Farm site is within the range of all other species.

## 4.2.3 Designated Sites

Within Ireland, the lesser horseshoe bat is the only bat species requiring the designation of Special Areas of Conservation (SACs). The Proposed Wind Farm site is located outside the current known range of this species (NPWS, 2019). The nearest proposed turbine is located approximately 4.3 km away from the nearest designated SAC for the lesser horseshoe bat (Lough Corrib SAC), however the roost for which it is designated is located approximately 56.5 km from the nearest proposed turbine.

Natural Heritage Areas (NHAs) and proposed Natural Heritage Areas (pNHAs) may be designated for any bat species. A search of NHAs and pNHAs within a 10km radius of a central point within the Proposed Wind Farm site centre found no sites designated for the conservation of bats.

### 4.2.4 Landscape Features and Habitat Suitability

A review of mapping and photographs provided insight into the habitats and landscape features present at the Proposed Project. In summary, the primary land uses within the Proposed Wind Farm site are peatland and improved agricultural grassland and the land use along the Proposed Grid Connection prises of public road corridor, public open space, private track, and private land principally used by agriculture.

A review of the GSI online mapper did not indicate the possible presence of any subterranean sites within the Proposed Wind Farm site. A search of the National Monuments Database revealed the presence of two ringforts and a quarry within the Proposed Wind Farm site (Table 4-3).

A search of the UBSS Cave Database for the Republic of Ireland found no caves within the Proposed Wind Farm site or within 10km of the Proposed Wind Farm site.

A review of the NBDC bat landscape map provided a habitat suitability index of 25.44 (Yellow) to 32.33 (Orange). This indicates that the Proposed Wind Farm site has Low to Moderate habitat suitability for bat species.

*Table 4-3 National monument sites within the Proposed Wind Farm site.*

| National Monument | Description |
|---|---|
| GA085-047 | Ringfort |
| GA085-045 | Ringfort |
| GA085-015 | Quarry |

### 4.2.5 Additional Projects in the Wider Landscape

There are no wind energy developments within 10km of the proposed turbine locations.

Nine other EIA planning applications were noted within 10km of the Proposed Wind Farm site:

- EIA Portal Ref: 2018047- The proposed road development would consist of a dual carriageway, a single carriageway, new link roads, the realignment of existing roads, diversion of electricity networks, and ancillary and consequential works associated therewith.
- EIA Portal Ref: 2019047- Alterations and additions to an existing materials Recovery Facility (Previous Pl. Ref.'s 13/1350 and 16/412) to accept increased tonnage of waste from previously permitted limit of 22,000 tonnes per annum to 50,000 tonnes pa and all associated works.
- EIA Portal Ref: 2019050- Strategic housing development consisting of 212 no. residential units, creche facility, new vehicular and pedestrian site access. Shared communal and private open space, site landscaping, car parking, services and all associated site development works.
- EIA Portal Ref: 2020003– increased tonnage throughout of the existing and permitted waste recycling facility from 80,000 tonnes of waste per annum (permitted under planning ref 15/1240) to 95,000 tonnes of waste per annum
- EIA Portal Ref: 2021256– Deerpark Industrial Estate, Oranmore, Co. Galway. H91 D934.
- EIA Portal Ref: 2022221– Permission to construct a serviced dwelling house and domestic garage.
- EIA Portal Ref: 2023111– Development at existing waste metal facility at Carrowmoneash, Oranmore, Co. Galway to provide for site, operations and

infrastructure improvements, to facilitate continuation of existing waste metal processing with an annual throughput of 60,000 tonnes pa.
- EIA Portal Ref: 2023152 – Construction of a 4-no. storey medical device manufacturing facility providing warehousing, production areas, administration offices and restaurant (GIA: 40,226.6 m2).
- EIA Portal Ref: 2025028 – Proposed continued use and lateral extension of an existing limestone quarry and continued use of an existing concrete manufacturing facility etc.

# 4.3 Field Surveys

## 4.3.1 Bat Habitat Suitability Appraisal

### 4.3.1.1 Proposed Wind Farm site

A total of 20 habitats were recorded within the Proposed Wind Farm site including:

- Raised Bog (PB1)
- Cutover bog (PB4)
- Bog woodland (WN6)
- Wet grassland (GS4)
- Wet grassland/wet heath mosaic (GS4/HH3)
- Transitional Wet grassland – Marsh (GS4-GM1)
- Improved agricultural grassland (GA1)
- Dry meadows and grassy verges (GS2)
- Immature woodland (WS2)
- Oak-ash-hazel woodland (WN2)
- Hedgerows (WL1)
- Treelines (WL2)
- Scrub (WS1)
- Spoil and bare ground (ED2)
- Recolonising bare ground (ED3)
- Buildings and Artificial Surfaces (BL3)
- Conifer forestry (WD4)
- Reed and large sedge swamps (FS1)
- Drainage ditches (FW4)
- Lowland/depositing river (FW2)

Further details on habitats within the Proposed Wind Farm site can be found in Chapter 6 of the main EIAR. The Proposed Wind Farm site is predominantly characterised by extensive areas of drained cutover raised bog, interspersed with agricultural and wet grasslands, patches of bog woodland, and private conifer plantations. Additionally, linear habitat features such as treelines and hedgerows are also present.

Results from the desktop review and walkover surveys were used to assess habitats for their suitability to support foraging and commuting bats, and roosting bats, according to Collins (2023). Suitability categories, divided into *High, Moderate, Low, Negligible* and *None and* are described fully in **Appendix 1.**

With regard to foraging and commuting bats, exposed areas of grassland and cutover bog habitats outlined above were considered *Low* suitability, i.e. *Habitat that could be used by small numbers of bats as flight-paths such as a gappy hedgerow or unvegetated stream, but isolated* (Collins, 2023). Areas of scrub, drainage ditches and immature woodland provide connectivity via linear features to the surrounding landscape. As such, they were assessed as having *Moderate* suitability i.e. *Habitat that is*

*connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water.* (Collins, 2023). Due to their varying levels of maturity and connectivity, treelines and hedgerows were assessed as having *Moderate* to *High* suitability. While areas of broadleaf woodland and lowland depositing rivers were assessed as having *High* suitability, i.e. *Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by bats for flight-paths such as river valleys, streams, hedgerows, lines of trees and woodland edge.* (Collins, 2023).

Trees within the Proposed Wind Farm site primarily includes a mix of mature and immature broadleaved species, along with areas of private coniferous forestry. Dominant broadleaved species recorded include ash, oak, hazel, hawthorn, and downy birch. Coniferous species were predominantly mature Sitka spruce.

With regards to roosting bats, no trees containing roosting potential were identified within the bat buffers. In relation to bat buffers, a minimum 50m buffer between turbine blade tip and nearest woodland (or other key habitat features) used by bats (e.g., hedgerows, treelines etc.) is recommended at all wind turbines (NatureScot, 2021). Further detail on bat felling buffers is outlined in in Section 6.1.3 below. Habitat suitability assessment for trees designated for removal are outlined in further detail in Section 4.3.2 below.

Other trees assessed that are not proposed for removal around the Proposed Wind Farm site varied in characteristics with some containing extensive ivy cover as well as branch damage, tear outs and wounds providing potential roosting features suitable for opportunistic and/or regular roosting. These trees will be retained as part of the Proposed Project.

Additionally, two structures were identified within the 500m roost search buffer, along with several others situated within the wider Proposed Wind Farm site (*buildings and artificial surfaces*). These are also further assessed for roosting potential in Section 4.3.2 below. All other habitats present were assigned a *Negligible* value for roosting bats i.e. *Negligible habitat features on site likely to be used by roosting bats* (Collins, 2023).

The proposed onsite 38kV substation is located in the western portion of the Proposed Wind Farm site within an area characterised by improved agricultural grassland (GA1). Hedgerows adjacent to the proposed substation were assessed as having *Moderate* suitability for commuting/foraging bats. No trees with PRFs were identified within the proposed substation construction footprint.

#### 4.3.1.2 Proposed Grid Connection

The Proposed Grid Connection is approximately 21.8km in length and is located primarily within the public road corridor (*buildings and artificial surfaces*), with three subsections (approximately 0.2km, 0.6km and 1.5km respectively) located in private land.

The underground electrical cabling route will originate at the proposed onsite 38kV substation and travel 0.2m out the Proposed Wind Farm site via the proposed site entrance. It will turn right out of the proposed site entrance and travel north on the L3115 for approximately 0.5km before turning left onto the L7152 south of the Attymon National School. The underground electrical cabling route will travel west on the L7152 for approximately 7km before turning left and travelling west on the L3111 for 1.6km where it turns right and travels north on the L3107 for 0.1km and then turns left and travels west on the L7126 for approximately 2.4km. The underground electrical cabling route will then turn right onto the R347 for approximately 1.4km. The underground cabling route will then turn left off the R347 onto the L7122 and travel for approximately 1.3km before entering private land. The underground electrical cabling will travel through private land for 0.6km before exiting onto the L31030 and travelling in a southwest direction for 1.5km. the route will then turn left onto the L3103 for 0.1km and then turn right onto the L7108. On the L7108, the route will stay to the left when the road splits after 0.2km and travel for 2km to a section of private land. After 1.5km the underground electrical cabling route will exit private land and turn right onto the L7109 and travel north for 1.5km before entering the existing Cashla 220kV substation.

Habitats found along and adjacent to the road include buildings and artificial surfaces (BL3) dry meadows and grassy verges (GS2), agricultural grasslands (GA1), wet grasslands (GS4), cutover bog (PB4) and conifer forestry (WD4). Hedgerows (WL1) and treelines (WL2) also border the road. Where the Proposed Grid Connection leaves the public road and enters private land, the habitats are further described in Chapter 6, Section 6.4.1.7.1.

The Proposed Grid Connection will primarily be confined to the existing road corridor. Within this corridor, commuting and foraging bats may utilise roadside hedgerows, treelines, and forestry edge habitats, which were assessed as having *Moderate* to *High* suitability (Collins, 2023). Other adjacent habitats, including agricultural grassland and grassy verges, were assessed as having *Low* suitability.

With regard to roosting bats, the majority of habitats along the road corridor were assessed as having no suitability (*None)*. Several trees with PRFs (assessed as *PRF-I*) were identified along roadside treelines; however, these occur outside the Proposed Project footprint, and no removals are required. Two farm sheds located in the western section of the route (IG Ref: M 43823 28092; M 44139 28146) were assessed and classified as having *Negligible* potential for roosting bats.

The Proposed Grid Connection underground cabling route will traverse 10 no. watercourse crossings, a motorway underpass and a rail bridge. All works will be confined to the existing road structure or completed using temporary construction methods such as flatbed formation within the existing road or horizontal directional drilling offset from the crossing structures, with no requirement to remove or alter structures that could support bats. The locations of the watercourse crossings are shown on the detailed layout drawings in Appendix 4-1 and details of each crossing method are presented in Chapter 4, Table 4-5. Roost assessments for the watercourse and rail/motorway crossing infrastructure are provided in Appendix 4.

#### 4.3.1.3 Turbine Delivery Route

As described in Chapter 4, Section 4.5.3 of this EIAR, no significant turbine delivery route accommodation works are required to facilitate the delivery of components to the Proposed Wind Farm site. Therefore, no loss of commuting, foraging or roosting habitat is anticipated as part of the turbine delivery route.

### 4.3.2 Roost Surveys

#### 4.3.2.1 Daytime Roost Inspections

Following a search for roosts in 2024, four structures containing potential suitable bat roost features were identified and inspected within the Proposed Wind Farm site. These include a derelict building, Farm shed (no.1), Storage shed and offices, and Farm sheds (no.2) and ruined structure.

The grading protocol described by Collins (2023) was used: structures with *High* roosting potential present one or more potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions, and surrounding habitat; structures with *Moderate* roosting potential could be used by bats due to their size, shelter, protection, conditions and surrounding habitat but unlikely to support a roost

of high conservation status; structures with *Low* potential present one or more potential roost sites that could be used by individual bats opportunistically at any time of the year.

All identified structures will be retained and avoided as part of the Proposed Project. Results of the daytime roost inspections are illustrated in Figure 4-1.

## Derelict Building

One of the surveyed structures was a two-storey derelict building constructed from cement blocks and concrete (IG Ref: M 62888 28973), located approximately 445m east of proposed turbine T08. A Preliminary Roost Assessment (PRA) was undertaken on 25th May 2024. Access to the upper floor was not possible due to a collapsed staircase and the poor condition of the first floor; however, much of the second storey was visible from the ground floor. No evidence of bats (e.g. droppings, staining, or feeding remains) was recorded during the assessment. Nevertheless, the structure contained several features with potential to support roosting bats. These included crevices beneath roof tiles and sheltered spaces among items remaining within the building, such as an old straw bed. Multiple access points were present, including open doors and windows, a chimney, and several gaps in the deteriorating roof.

Despite these open access points, the interior remained dark and enclosed, further enhancing its potential suitability as a roost. The structure was assessed as having *High* bat roosting potential. A dusk emergence survey was subsequently conducted on 18th June 2024, the results of which are detailed in Section 4.3.4.

*Plate 4-1 Northern aspect of the derelict building showing largest access points.*

*Plate 4-2 Interior of derelict building.*

## Farm Shed (no.1)

An open, active farm shed was identified during the roost surveys (IG Ref: M 62789 29443), located approximately 165m southeast of proposed turbine T06. A PRA was carried out on 7th May 2024. The structure comprises solid concrete block walls and a corrugated metal roof with wood cladding. It lacks insulation or internal lining. The open layout allows for substantial natural light penetration. Roosting opportunities for bats are extremely limited. The only potential features identified were minor crevices behind the corrugated sheeting and beneath stored trailers—both considered to offer *Negligible* suitability for roosting.

Access points include an open doorway, gaps in the corrugated sheeting, and a missing block in the wall. No evidence of bat presence or activity was recorded during the survey. Based on these findings, the structure was assessed as having *Negligible* roosting potential.

*Plate 4-3 Eastern aspect of Farm Shed (no. 1).*

## Storage Shed

A large storage shed was also assessed (IG Ref: M 60178 28963), situated approximately 335m southwest of proposed turbine T02. A PRA was undertaken on 22nd May 2024. The building consists of a concrete base wall, with upper sections and roofing formed from corrugated metal panels. Some roof sections comprise translucent plastic panels, providing interior lighting.

The building lacks features typically used by crevice-dwelling bats, such as suitable gaps or enclosed voids. No signs of bats or bat activity were observed during the assessment. The structure was determined to have *Negligible* suitability for roosting bats.

*Plate 4-4 Interior of storage shed*

*Plate 4-5 Exterior of storage shed*

## Farm Sheds (no.2) and Ruined structure

A compound comprising several small structures was identified approximately 705 metres north (IG Ref: M 61694 30459) of proposed turbine location T04 and was subject to a dusk emergence survey on 7th May 2024, as detailed in Section 4.3.3. The compound included a larger farm shed, a smaller ancillary shed, and the concrete wall remnants of a former building with no remaining roof or internal features. The larger farm shed was assessed as having *Low* suitability while the ruined structure was assessed as *Negligible* (Collins, 2023).

*Plate 4-6 Eastern aspect of the small shed.*

*Plate 4-7 Concrete structure remnants.*



## Ground-level Tree Assessment

The Proposed Wind Farm site encompasses a network of treelines and hedgerows that border existing tracks, roads, and agricultural grassland. Areas of conifer forestry and native woodland are also present.

The majority of trees within the Proposed Wind Farm site will be retained as part of the Proposed Wind Farm; however, there will be some requirement to remove vegetation to facilitate construction of the Proposed Project and the establishment of the required bat buffers (outlined in Section 6.1.3). Included below is a summary of trees/tree groups of note within the Proposed Project development footprint (including the bat felling buffer (requiring removal) of the proposed turbine locations, along the Proposed Grid Connection and the turbine delivery route). Their general location, PRFs and respective suitability for bat roosting, are outlined in Table 4-4, illustrated in Figure 4-1 and shown in Plates 4-8 to 4-25 below.

Trees within the coniferous areas were assessed as having no roosting potential (i.e. *None*, Collins, 2023), as they lacked suitable features typically associated with roosting bats (BTHK, 2018). Deciduous treelines and individual deciduous trees located within hedgerows, particularly those within the roost survey buffer and along Proposed Project infrastructure were also assessed. The majority of these linear features were composed of hedgerows with sparse, immature trees that did not contain PRFs. No trees with suitable PRFs were identified within the bat felling buffers (refer to Section 6.1.3) or within the footprint of the Proposed Wind Farm site or Proposed Grid Connection. Roosting suitability (Collins, 2023) varied from *None* (i.e. *Either no PRFs in the tree or highly unlikely to be any*) to *PRF-I* (i.e. *PRF is only suitable for individual bats or very small numbers of bats either due to size or lack of suitable surrounding habitats*). No *PRF-M* trees were identified within the Proposed Wind Farm site or the Proposed Grid Connection (i.e. *PRF is suitable for multiple bats and may therefore be used by a maternity colony*).

*Table 4-4 Summary of Ground-level Tree Assessment*

| Turbine | Inspection Date | PRFs | Trees/Hedgerows to be removed/retained. North, South, East or West of Turbine | Roosting Suitability |
|---|---|---|---|---|
| T01 | 11th July 2024 | None within bat felling buffer | 189m of linear scrub loss. | • *None* |
| T02 | 11th July 2024 | None within bat felling buffer | Small area of scrub to be removed. | • *None* |
| T03 | 11th July 2024 | None within bat felling buffer | Section of treeline (approx. 27m) to be removed. | • *None* |
| T04 | 21st May 2024 | None within bat felling buffer | Area of conifer plantation to be removed (approx. 2.6ha) | • *None* |
| T05 | 21st May 2024 | None within bat felling buffer | Area of conifer plantation to be removed (approx. 1.6ha) | • *None* |

| | | | | |
|---|---|---|---|---|
| T06 | 21st May 2024 | None within bat felling buffer | Section of hedgerow (approx. 77m) and linear scrub (approx. 189m) to be removed. | • *None* |
| T07 | 21st May 2024 | None within bat felling buffer | No linear habitat removal proposed. | • *None* |
| T08 | 11th July 2024 | None within bat felling buffer | Small area of scrub to be removed | • *None* |
| Proposed Grid Connection | 13th February 2025 | Broken limbs, wounds, knot holes, old-growth ivy | 83 m of hedgerow to be temporarily removed for cable installation and subsequently replanted. No PRFs identified to be removed as part of the Proposed Grid Connection works. | • *None to PRF-I* |
| Turbine Delivery Route | 13th February 2025 | Broken limbs, wounds, lifting bark, knot holes, old-growth ivy | No linear habitat removal proposed. Some PRF-I trees identified along the route; however, no tree felling is proposed as part of the proposed turbine delivery route | • *None to PRF-I* |

*Plate 4-8 Crab apple with tear out (PRF-I) south of T2 (outside felling buffer)*



*Plate 4-9 Ash tree with broken limb (PRF-I) south of T2 (outside felling buffer)*

*Plate 4-10 Beech tree with broken limb (See next) south of T2 (outside felling buffer)*

*Plate 4-11 Beech tree with broken limb (PRF-I) south of T2 (outside felling buffer)*

*Plate 4-12 Conifer forestry within the Proposed Wind Farm site assessed as None*

*Plate 4-13 Conifer forestry within the Proposed Wind Farm site containing no PRFs, assessed as None*

Plate 4-14 Downey birch with mature ivy (PRF-I) east of T3 (outside felling buffer)

Plate 4-15 Grey willow with cracked limb (PRF-I) east of T3 (outside felling buffer)



Plate 4-16 Grey willow within T6 bat felling buffer assessed as None

Plate 4-17 Downey birch west of T7 assessed as None

*Plate 4-18 Large ash tree with dense ivy cover (See next) in the west of the Proposed Wind Farm site (outside felling buffer)*



*Plate 4-19 Old growth ivy cover on ash tree assessed as PRF-I*

*Plate 4-20 Beech tree with broken limbs and wounds (PRF-I) along the Proposed Grid Connection*

*Plate 4-21 Ash tree with broken limbs (PRF-I) along the Proposed Grid Connection*

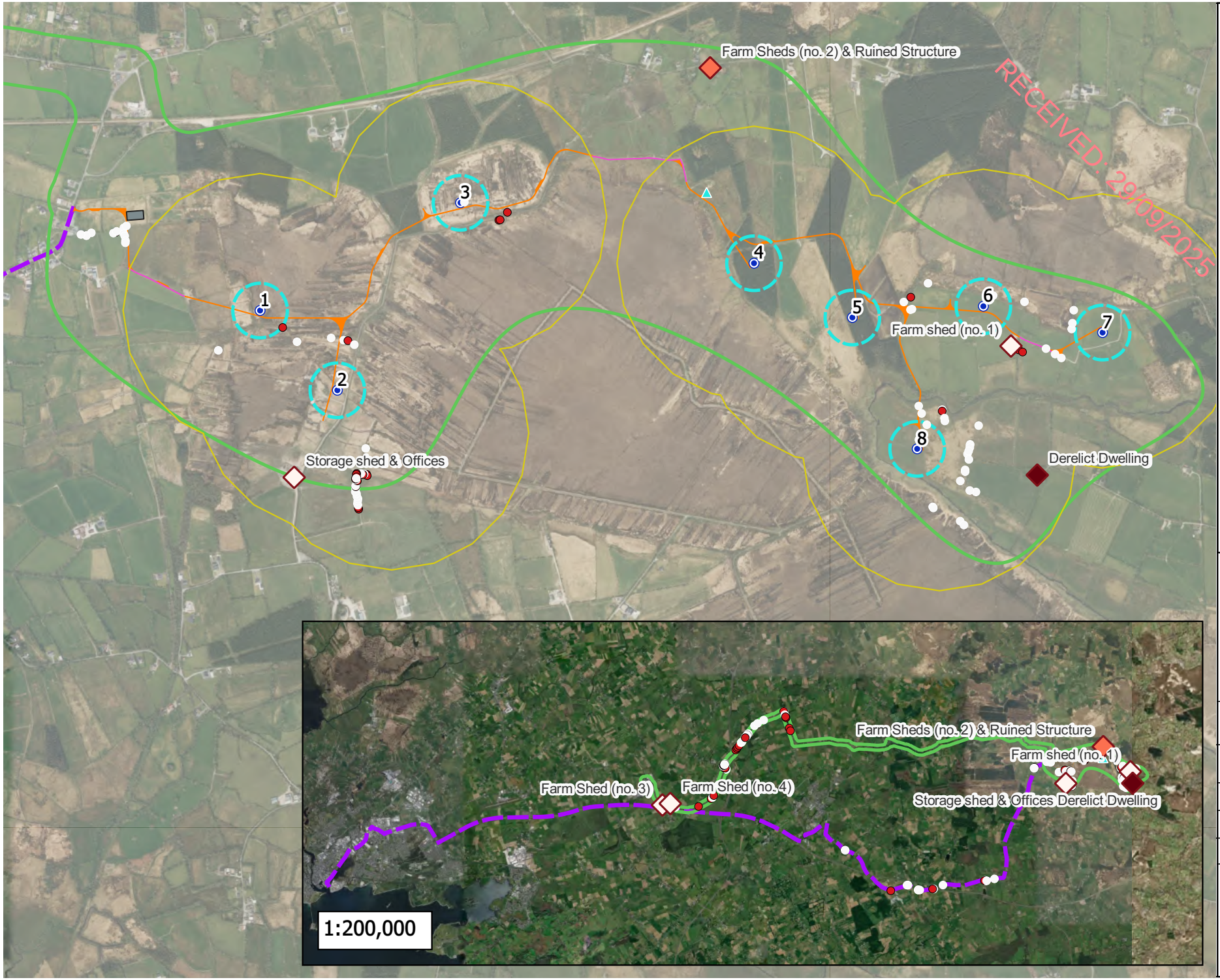
*Plate 4-22 Wound (PRF-I) in tree along the Proposed Grid Connection*

*Plate 4-23 Blackthorn with wound (PRF-I) along the Proposed Grid Connection*



*Plate 4-24 Tree with knot hole (PRF-I) along the turbine delivery route*

*Plate 4-25 Sycamore tree with lifted bark (PRF-I) along the turbine delivery route*




## Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- 500m Roost Search Buffer
- Bat Felling Buffer
- Proposed Onsite Substation
- Proposed New Roads
- Proposed Upgrades to Existing Roads
- Proposed Met Mast
- Proposed Turbine Delivery Route

Ground-level Tree Assessments

- None
- PRF

PRFs - Structures

- High
- Low
- Negligible



Drawing Title
**Roost Surveys - Trees & Structures**

| | |
|---|---|
| Project Title: Gannow Renewable Energy Development | |
| Drawn By: RC | Checked By: AJ |
| Project No.: 240323 | Drawing No.: Figure 4-1 |
| Scale: 1:18,000 | Date: 2025-09-25 |

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#### 4.3.2.2 Presence/Absence Surveys

Following the initial roost suitability assessments detailed in Section 4.3.2, two dusk emergence surveys were undertaken to confirm the presence or likely absence of roosting bats at structures identified as having *Low* and *High* potential to support roosts. These surveys were conducted during spring and summer 2024 to account for seasonal variation in bat activity. Structures assessed as having *Negligible* roosting potential, as detailed in Section 4.3.2, were not subject to further survey (Collins, 2023). The results are summarised in Table 4-5 below.

The spring survey, carried out on 7th May 2024, focused on the structure with *Low* potential located at IG Ref: M 61693 30458. During this survey, one common pipistrelle was observed emerging from vegetation attached to the structure, though no bats were seen emerging from within the structure itself. In addition, common pipistrelle, soprano pipistrelle, and Leisler's bats were observed commuting and foraging around the courtyard area, travelling both east to west and west to east, and utilising the treeline to the south.

The summer dusk emergence survey was conducted on 18th June 2024, focusing on the structure at IG Ref: M 62888 28973. A total of 17 bats were recorded emerging from the structure by surveyors and via night vision aid. Of these, five were identified as soprano pipistrelle, two as brown long-eared bat, and one as common pipistrelle. The remaining emerging bats were not picked up on the logger and could not be identified to species level. Despite the number of bats emerging, commuting and foraging activity in the surrounding area was relatively low during the survey. Although this structure was assessed as having *High* roosting potential (Collins, 2023), a single emergence survey was considered sufficient to confirm that the building is used by roosting bats. This approach was considered proportionate given the number of emergences observed during the first survey, the structure's location outside the footprint of all proposed infrastructure, ensuring it will be retained and avoided.

*Table 4-5 Manual activity surveys at PRFs.*

| PRF | IG Ref. | Date | Survey Type | Results |
|---|---|---|---|---|
| Farm Shed (no. 2) | M 61693 30458 | 7th May 2024 | Dusk Emergence | One common pipistrelle emerging from vegetation on structure |
| Derelict Building | M 62888 28973 | 18th June | Dusk Emergence | 17 bats emerging from various locations incl. upstairs windows and eaves. |

### 4.3.3 Manual Transect Surveys

Manual bat activity surveys took place in the Spring, Summer, and Autumn of 2024. Bat activity was recorded on all surveys, with a total of 241 bat passes (Plate 4-26). Soprano pipistrelle (n=139) was the species recorded most frequently, followed by Common pipistrelle (n=98). Brown long-eared bat (n=3), and Leisler's bat (n=1) were recorded in low numbers. Results of each transect survey are detailed in Table 4-6.

Manual activity surveys included both walked and driven transects conducted at dusk. In spring and summer, transect surveys were carried out following dusk emergence surveys at identified Potential Roost Features (PRFs), with the aim of assessing bat use of linear features and surrounding habitats. The autumn transect commenced at dusk and included both walked and driven components.

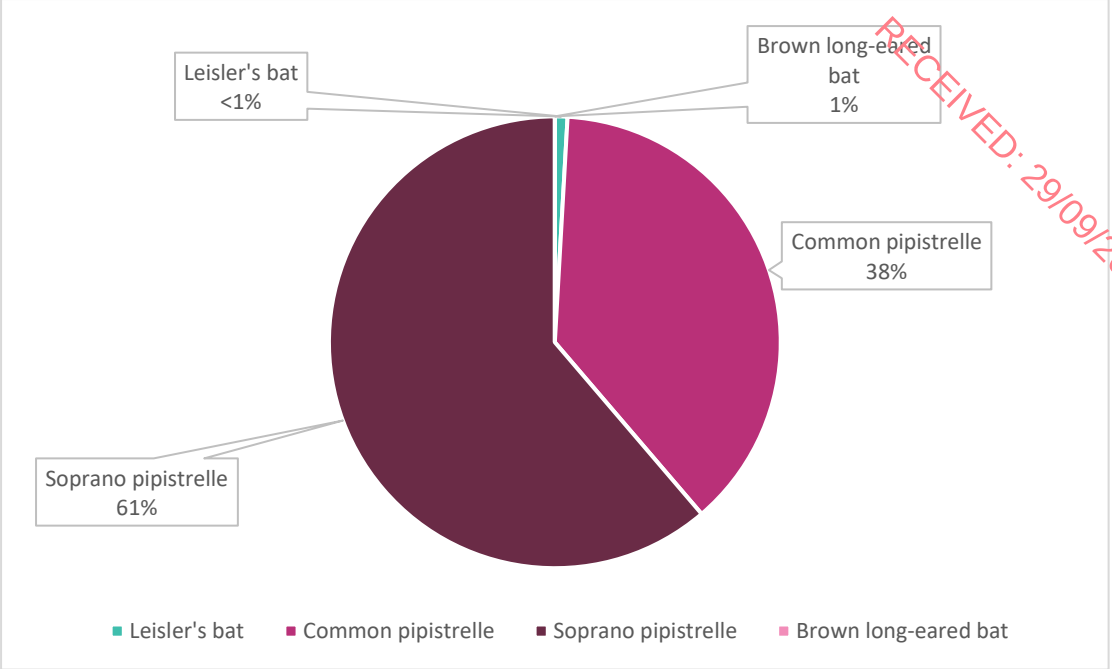


*Plate 4-26 Species composition across all manual activity surveys*

*Table 4-6 Manual Transect Results per Survey*

| | Spring | Summer | Autumn | Total |
|---|---|---|---|---|
| **Leisler's bat** | 1 | 0 | 0 | **1** |
| **Common pipistrelle** | 42 | 0 | 56 | **98** |
| **Soprano pipistrelle** | 68 | 1 | 70 | **139** |
| **Brown long-eared bat** | 0 | 2 | 1 | **3** |
| **Total** | **111** | **3** | **127** | **241** |

Species composition and activity levels varied across the survey periods. Transect survey results were calculated as bat passes per km surveyed (to account for differences in survey effort). Plate 4-27 presents the results for individual species per survey period. Figures 4-2 – 4-4 present the spatial distribution of bat activity across surveys. Bat activity was concentrated along treelines, hedgerows, and linear (road/track) habitats. Common and soprano pipistrelle were the most frequently recorded species during the spring and autumn 2024 surveys. In contrast, the summer survey recorded limited activity, primarily restricted to the area surrounding the derelict building that was surveyed immediately prior to the manual transect.

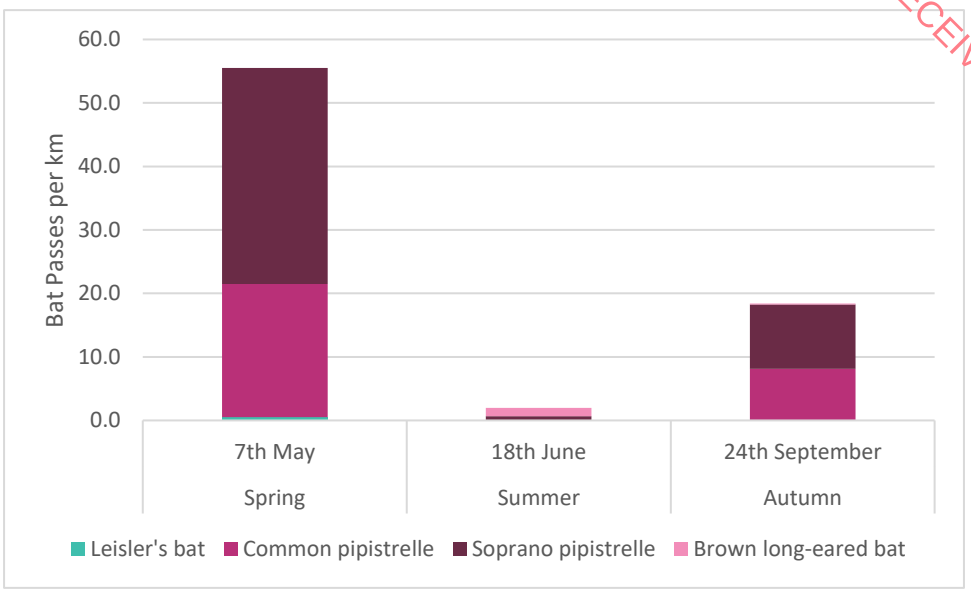


*Plate 4-27 2024 Transect Results – Species Composition Per Survey Period*


## Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Spring Transect Route
  7th May 2024

### Spring Manual Results

- Leisler's bat
- Common pipistrelle
- Soprano pipistrelle



N

Drawing Title
**Spring Manual Transect Results**

Project Title
Gannow Renewable Energy Development

| Drawn By | Checked By |
|---|---|
| RC | AJ |
| Project No. | Drawing No. |
| 240323 | Figure 4-2 |
| Scale | Date |
| 1:18,000 | 2025-09-25 |

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## Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Summer Transect Route 19th June 2024

### Summer Manual Results

- Soprano pipistrelle
- Brown long-eared bat



N

Drawing Title
**Summer Manual Transect Results**

Project Title
Gannow Renewable Energy Development

| Drawn By | Checked By |
|---|---|
| RC | AJ |
| **Project No.** | **Drawing No.** |
| 240323 | Figure 4-3 |
| **Scale** | **Date** |
| 1:18,000 | 2025-09-25 |

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## Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout

Autumn Walked and Driven Transect Route 24th September 2024

- Driven
- Walked

Autumn Manual Results

- Common pipistrelle
- Soprano pipistrelle
- Brown long-eared bat



N

Drawing Title
**Autumn Manual Transect Results**

Project Title
Gannow Renewable Energy Development

| Drawn By | Checked By |
|---|---|
| RC | AJ |
| Project No. | Drawing No. |
| 240323 | Figure 4-4 |
| Scale | Date |
| 1:18,000 | 2025-09-25 |

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Website: ww.mkoireland.ie

### 4.3.4 Ground-level Static Surveys

In total, 57,965 bat passes were recorded across all deployments. In general, Common pipistrelle (n=27,794) and Soprano pipistrelle (n=25,185) occurred most frequently. Leisler's bat (n=3,439) was significantly less. Instances of brown long-eared bat (n=613), *Myotis* spp. (n=581), and Nathusius' pipistrelle (n=353) were recorded in much lower numbers. Plate 4-28 presents species composition across all ground-level static detectors.

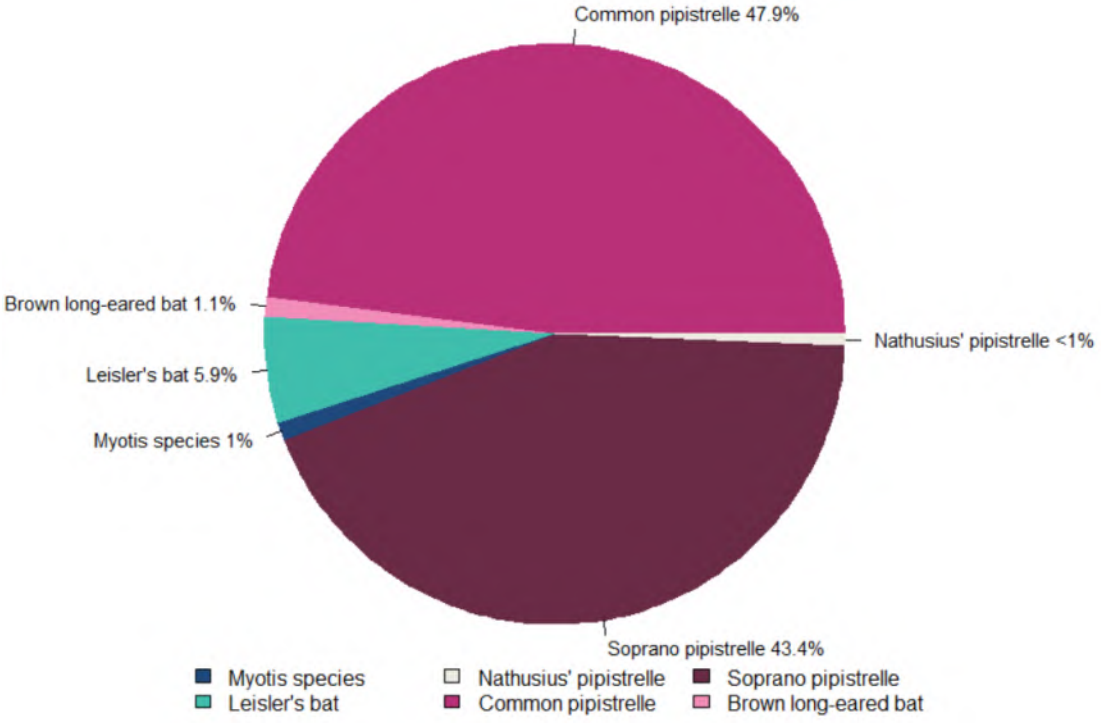



*Plate 4-28 Bat Species Composition Recorded Across All Detectors (total bat passes).*

Bat activity was calculated as total bat passes per hour (bpph) per season to account for any bias in survey effort, resulting from varying night lengths between seasons. Table 4-7 presents these results for each species.

In 2024, bat activity was highest for common pipistrelle during the spring, while activity in summer and autumn showed a more balanced distribution between common and soprano pipistrelles. However, a significant drop in activity was recorded for both species during the autumn period. Leisler's bat activity remained relatively consistent across all seasons. In contrast, Myotis species and brown long-eared bats exhibited an increase in activity during the autumn. Nathusius' pipistrelle was infrequently recorded overall, though it was slightly more prevalent in the spring.

*Table 4-7 Static Detector Surveys: Species Composition Across All Deployments (Total Bat Passes Per Hour, All Nights).*

| | Spring | Summer | Autumn |
|---|---|---|---|
| ***Total survey hours*** | **114.5** | **163.5** | **186.6** |
| *Myotis* spp. | 0.11 | 0.23 | 0.09 |
| Leisler's bat | 1.69 | 1.19 | 0.20 |
| Nathusius' pipistrelle | 0.33 | 0.03 | 0.01 |
| Common pipistrelle | 15.89 | 9.31 | 0.92 |
| Soprano pipistrelle | 7.45 | 13.54 | 1.04 |
| Brown long-eared bat | 0.16 | 0.18 | 0.11 |



The Median Bat Pass Rate per detector, per survey period is shown in Plate 4-29 (varied axis scale) and demonstrates clear seasonal and spatial variation in bat activity. In spring, detector D01 recorded the highest activity by a significant margin (112.4 bpph), making it the most active location across all seasons. All other detectors recorded notably lower levels of activity (<20 bpph), with D04 registering just 0.1 bpph. During summer, D01 remained the most active (31.7 bpph), though activity was more evenly distributed across other detectors. D04 (23.2 bpph) and D05A (20.8 bpph) also showed comparatively high levels of activity. In autumn, overall bat activity declined substantially. D01 continued to be the most active detector (4 bpph), followed by D05B (2.7 bpph). As in spring, D04 recorded minimal activity.

The Median Nightly Pass Rate (i.e. total bat passes per hour, per night) was used to determine typical bat activity at the Site (Plate 4-30). Activity was often variable between survey nights. Therefore, the Median Nightly Pass Rate was used as the most appropriate measure of bat activity (Lintott & Mathews, 2018). Zero data, when a species was not detected on a night, was also included.

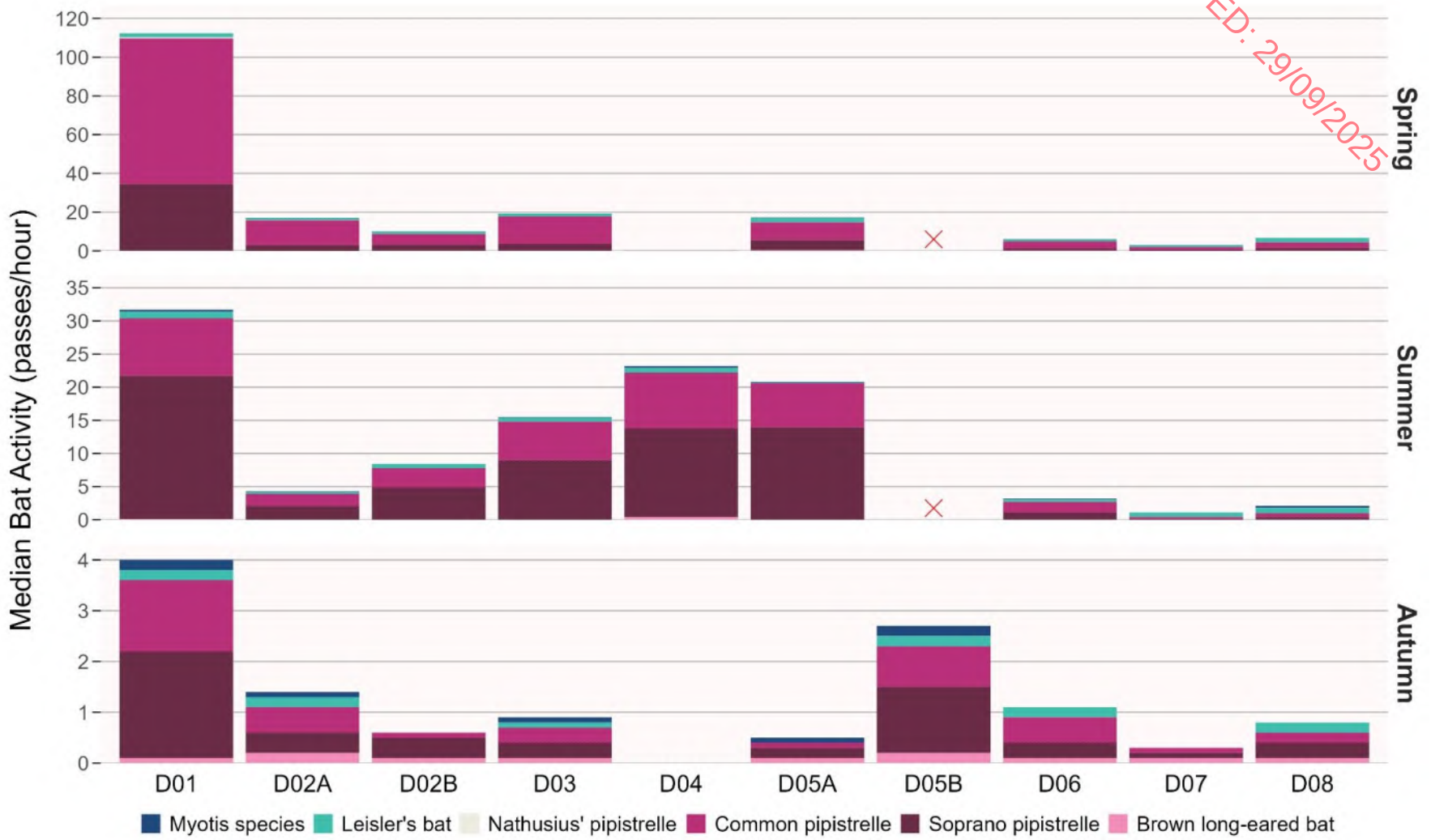



*Plate 4-29 Static Detector Surveys – Median Nightly Pass Rate (bat passes/hour), including absences, per detector per season. Note: Y-axis scales vary; 'X' indicates no detector deployed at that location.*

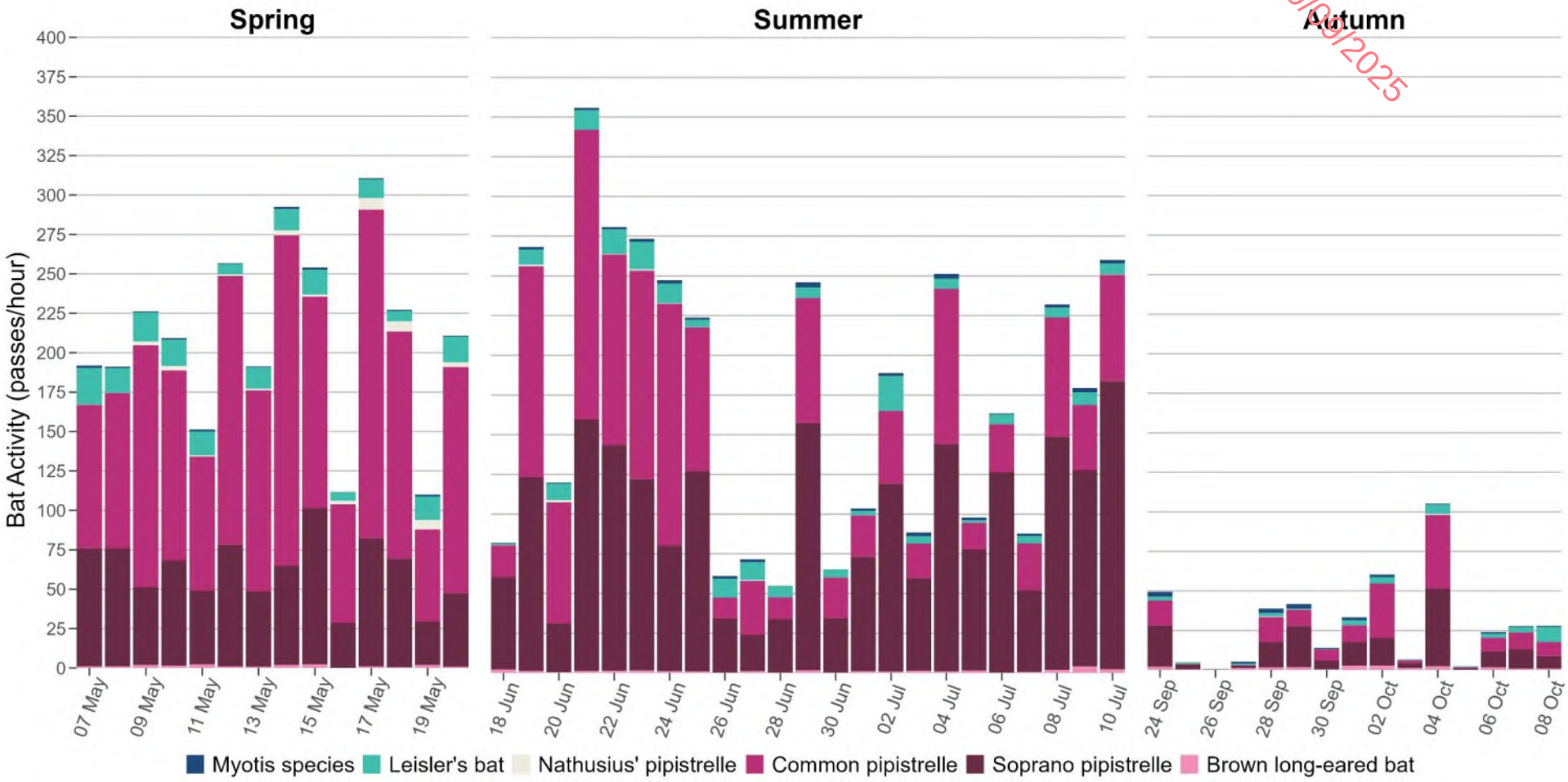



*Plate 4-30 Static Detector Surveys: Median Bat Pass Rate (bpph) Including Absences, Per Season Per Night*

# 4.4 Assessment of Bat Activity Levels

## 4.4.1 Adapted Site-specific Ranges

*Low*, *Medium* and *High* activity levels were assigned to median and maximum pass rates (bpph) identified during spring, summer and autumn at the detectors deployed across the Proposed Wind Farm site, as adapted from Mathews *et al.* (2016). Table 4-8 shows the results of the site-level assessment as calculated on a site-specific activity level. Where no maximum activity at a detector is reported, no data was recorded for that species throughout the deployment.

### Leisler's Bat

Leisler's bat generally exhibited *Medium* median activity in spring, declining to *Low* during summer and autumn. *High* median activity was observed at detectors D05A (2.5 bpph) and D08 (2.3 bpph) in spring. No other instances of *High* median activity were recorded for the species across 2024. *Medium* activity was also recorded in summer at D01 (1.0 bpph) and D08 (0.8 bpph), with the *High*est maximum activity observed at D01 (8.4 bpph). Median activity at all locations dropped to *Low* in autumn.

### Common Pipistrelle

Common pipistrelle activity was predominantly *Low* to *Medium* during spring and summer. A single instance of *High* median activity was recorded at D01 in spring (75.2 bpph), which also exhibited the *High*est maximum activity (125.1 bpph). *Medium* activity was observed at D02, D03, and D05A in spring, and at D01, D03, D04, and D05A in summer. All other detectors recorded *Low* median activity.

### Soprano Pipistrelle

Soprano pipistrelle activity patterns were similar to those of common pipistrelle. *High* median activity was recorded at D01 in both spring (34.4 bpph) and summer (21.6 bpph), with corresponding *High* maximum values in spring (85.5 bpph) and autumn (76.6 bpph). *Medium* median activity was observed at D05 in both spring and summer, and at D02B, D03, D04, and D05A in summer. All remaining locations recorded *Low* median activity.

### *Myotis* spp.

*Myotis* species consistently showed *Low* median activity across all detectors and seasons, ranging from 0.0 to 0.1 bpph. However, isolated *High* maximum activity levels were recorded at D01 and D04 in summer and autumn, and at D08 in summer, ranging from 1.0 to 1.3 bpph.

### Brown Long-eared Bat

This species exhibited *Low* median activity throughout the year at all detectors. Notably, *High* maximum activity was observed at D04 in summer (3.4 bpph) and at D07 in autumn (2.0 bpph).

### Nathusius' Pipistrelle

Median activity levels for Nathusius' pipistrelle were *Low* across all sites, except for D01 in spring, which recorded a *Medium* median activity of 0.7 bpph. *High* maximum activity was recorded at D01 in both spring and autumn, with the *High*est peak at D02 in spring (6.8 bpph).

## Summary

Overall, bat activity across the Proposed Wind Farm site was generally *Low* to *Medium*, with occasional *High* activity levels recorded at specific detectors, primarily during spring. Common and soprano pipistrelles were the most active species, particularly at detector D01, while *Myotis spp.*, brown long-eared bat, and Nathusius' pipistrelle exhibited consistently *Low* activity. Further details on the assessment of bat activity is outlined in Section 5 below.

*Table 4-8 Assessment of Activity Levels. Low, Moderate, High. Where no data is shown, no detector was present for that period (e.g., D05B in spring and summer).*

| | Season | Bat activity (bpph) | D01 | D02A | D02B | D03 | D04 | D05A | D05B | D06 | D07 | D08 | Activity Level |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Myotis sp.** | Spring | Median | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.1 | | 0.1 | 0.1 | 0.1 | Low (1) |
| | | Maximum | 0.6 | 0.2 | 0.3 | 0.3 | 0.0 | 0.4 | | 0.6 | 0.4 | 0.4 | Low-moderate (2) |
| | Summer | Median | 0.3 | 0.1 | 0.0 | 0.1 | 0.3 | 0.1 | | 0.1 | 0.0 | 0.3 | Low (1) |
| | | Maximum | 1.0 | 0.6 | 0.1 | 0.4 | 1.1 | 0.4 | | 0.3 | 0.4 | 1.0 | Moderate (3) |
| | Autumn | Median | 0.2 | 0.1 | 0.0 | 0.1 | 0.0 | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 | Low (1) |
| | | Maximum | 1.3 | 0.3 | 0.2 | 0.4 | 1.0 | 0.5 | 0.7 | 0.4 | 0.2 | 0.3 | Moderate (3) |
| **Leisler's bat** | Spring | Median | 2.0 | 1.3 | 1.3 | 1.5 | 0.0 | 2.5 | | 1.1 | 1.0 | 2.3 | Moderate (3) |
| | | Maximum | 6.1 | 3.1 | 3.3 | 4.5 | 2.2 | 4.2 | | 2.8 | 1.9 | 4.4 | High (5) |
| | Summer | Median | 1.0 | 0.3 | 0.6 | 0.6 | 0.7 | 0.1 | | 0.4 | 0.7 | 0.8 | Low (1) |
| | | Maximum | 8.4 | 1.9 | 2.7 | 1.9 | 4.3 | 2.7 | | 1.4 | 4.1 | 4.1 | Moderate-high (4) |
| | Autumn | Median | 0.2 | 0.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.2 | 0.2 | 0.0 | 0.2 | Low (1) |
| | | Maximum | 1.3 | 0.5 | 1.0 | 0.3 | 0.4 | 1.2 | 5.3 | 1.5 | 3.2 | 0.8 | Moderate (3) |
| **Nathusius' pipistrelle** | Spring | Median | 0.7 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | Low (1) |
| | | Maximum | 5.5 | 6.8 | 0.4 | 0.2 | 0.0 | 0.2 | | 0.6 | 0.1 | 0.3 | Low-moderate (2) |
| | Summer | Median | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 | Low (1) |
| | | Maximum | 1.3 | 0.0 | 0.3 | 0.1 | 0.4 | 0.1 | | 0.3 | 0.1 | 0.0 | Low-moderate (2) |
| | Autumn | Median | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | Low (1) |
| | | Maximum | 0.0 | 0.3 | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.3 | 0.0 | 0.1 | Low (1) |
| **Common pipistrelle** | Spring | Median | 75.2 | 12.9 | 5.6 | 14.3 | 0.1 | 9.2 | | 3.7 | 1.5 | 3.0 | Low-moderate (2) |
| | | Maximum | 125.1 | 67.6 | 22.0 | 23.2 | 13.9 | 19.2 | | 11.5 | 2.4 | 6.0 | Moderate-high (4) |
| | Summer | Median | 8.7 | 1.8 | 2.9 | 5.8 | 8.4 | 6.7 | | 1.6 | 0.3 | 0.6 | Low-moderate (2) |
| | | Maximum | 60.6 | 20.0 | 23.3 | 42.1 | 37.0 | 61.4 | | 8.4 | 1.3 | 12.0 | Moderate-high (4) |
| | Autumn | Median | 1.4 | 0.5 | 0.1 | 0.3 | 0.0 | 0.1 | 0.8 | 0.5 | 0.1 | 0.2 | Low (1) |
| | | Maximum | 7.4 | 4.6 | 1.1 | 16.2 | 1.8 | 0.8 | 22.7 | 18.9 | 1.1 | 2.3 | Low-moderate (2) |
| **Soprano pipistrelle** | Spring | Median | 34.4 | 3.0 | 3.1 | 3.5 | 0.0 | 5.2 | | 1.1 | 0.5 | 1.4 | Low-moderate (2) |
| | | Maximum | 85.5 | 6.8 | 19.4 | 14.6 | 5.6 | 12.6 | | 4.6 | 1.4 | 2.5 | Moderate (3) |
| | Summer | Median | 21.6 | 2.1 | 4.9 | 9.0 | 13.4 | 13.9 | | 1.1 | 0.1 | 0.4 | Low-moderate (2) |
| | | Maximum | 76.6 | 5.3 | 54.1 | 45.7 | 66.4 | 47.0 | | 15.9 | 1.1 | 2.6 | Moderate-high (4) |
| | Autumn | Median | 2.1 | 0.4 | 0.4 | 0.3 | 0.0 | 0.2 | 1.3 | 0.3 | 0.1 | 0.3 | Low (1) |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Maximum | 8.4 | 1.2 | 3.9 | 20.4 | 2.6 | 2.1 | 14.3 | 22.5 | 0.3 | 1.0 | Low-moderate (2) |
| **Brown long-eared bat** | Spring | Median | 0.1 | 0.0 | 0.1 | 0.1 | 0.0 | 0.4 | | 0.2 | 0.0 | 0.1 | Low (1) |
| | | Maximum | 0.5 | 0.2 | 0.4 | 0.5 | 0.1 | 1.0 | | 0.8 | 0.3 | 0.4 | Low-moderate (2) |
| | Summer | Median | 0.1 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | | 0.0 | 0.0 | 0.0 | Low (1) |
| | | Maximum | 0.6 | 0.4 | 0.4 | 0.3 | 3.4 | 0.7 | | 0.7 | 0.1 | 0.6 | Low-moderate (2) |
| | Autumn | Median | 0.1 | 0.2 | 0.1 | 0.1 | 0.0 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | Low (1) |
| | | Maximum | 0.5 | 0.2 | 0.5 | 0.5 | 0.7 | 0.4 | 1.4 | 0.3 | 2.0 | 0.3 | Low-moderate (2) |

## 4.5 Importance of Bat Population Recorded at the Proposed Wind Farm site

Ecological evaluation within this section follows a methodology that is set out in Chapter three of the *'Guidelines for Assessment of Ecological Impacts of National Roads Schemes'* (NRA, 2009).

All bat species in Ireland are protected under the Bonn Convention (1992), Bern Convention (1982) and the EU Habitats Directive (92/43/EEC). Additionally, in Ireland bat species are afforded further protection under the Birds and Natural Habitats Regulations (2011) and the Wildlife Acts 1976 (as amended). Bats as an Ecological Receptor have been assigned ***Local Importance (Higher value)*** on the basis that the habitats within the Proposed Wind Farm site are utilized by a regularly occurring bat population of Local Importance.

The Proposed Wind Farm site is located in proximity of one European Site (Lough Corrib SAC) designated for the protection of Lesser horseshoe bats. However, the roost for which this SAC is designated is more than 56.5km away from the nearest proposed turbine. Furthermore, the Proposed Wind Farm site lies outside the current known range of lesser horseshoe bats in Ireland as defined by Article 17 (NPWS, 2019). No lesser horseshoe bats were recorded during either manual transect or static detector surveys undertaken at the Proposed Wind Farm site in 2024. Given the core foraging range of the species (~2.5km) it is highly unlikely that the population associated with the designated roost utilise the Proposed Wind Farm site.

Within the Proposed Wind Farm site, two bat roosts were identified: a small common pipistrelle roost comprising a single individual, and a mixed roost hosting 17 bats, including soprano pipistrelles, brown long-eared bats, and common pipistrelles. The structures in which these roosts reside will be retained and avoided as part of Proposed Wind Farm. In addition, several trees within the Proposed Wind Farm site provide potential roosting habitat. All trees containing PRFs will also be retained and avoided as part of the Proposed Project.

No roosting site of National Importance (i.e. site greater than 100 individuals) was recorded within the Proposed Wind Farm site during the 2024 surveys.

# 5. RISK AND IMPACT ASSESSMENT



This risk and impact assessment has been undertaken in accordance with NatureScot Guidance. As per the NatureScot Guidance, wind farms present four potential risks to bats:

- Collision mortality, barotrauma and other injuries
- Loss or damage to commuting and foraging habitat
- Loss of, or damage to, roosts
- Displacement of individuals or populations

For each of these four risks, the detailed knowledge of bat distribution and activity within the Proposed Wind Farm site has been utilized to predict the potential effects of the Proposed Wind Farm on bats.

## 5.1 Collision Mortality

### 5.1.1 Assessment of Site-Risk

The likely impact of a proposed wind farm on bats is related to site-based risk factors, including habitat and development features. The site risk assessment, as per Table 3a of the NatureScot guidance, is provided in Table 5-1 below.

*Table 5-1 Site-risk Level Determination for the Proposed Development (Adapted from NatureScot, 2021)*

| Criteria | Site-specific Evaluation | Site Assessment |
|---|---|---|
| Habitat Risk | Two roosts of low-medium conservation value (≤20 individuals) were identified within the Proposed Wind Farm site. One comprised a single common pipistrelle, while the other supported a mixed-species roost with 17 individuals, including common pipistrelle, soprano pipistrelle, and brown long-eared bats.<br><br>A number of trees with PRFs were recorded within the Proposed Wind Farm site. However, none are located adjacent to proposed turbine locations or within the Proposed Wind Farm footprint.<br><br>The habitats within the Proposed Wind Farm site provide suitable commuting and foraging habitat for bats and is connected to the wider landscape by linear features such as tree lines, hedgerows and streams. Despite the presence of these linear features, it does not provide an extensive and diverse habitat mosaic of high quality or meet any of the criteria of a High risk site as set out in Table 3a of NatureScot, 2021. | Medium |
| Project Size | Following the criteria set out in NatureScot, 2021 the Proposed Wind Farm is of small scale as it consists of <10 turbines (8 no. turbines). However, since these turbines exceed 100m in height, the Proposed Wind Farm falls into the Medium project size category.<br><br>The Proposed Wind Farm is not a strategic infrastructural development and is well below the number of turbines that would constitute a Large development (NatureScot, 2021). The project has therefore been assessed as being of Medium size.<br><br>There are no wind energy developments within 10km of the proposed turbine locations. | Moderate |
| **Site Risk Assessment (from criteria in Plate 3-3)** | | **Medium Site Risk (3)** |

The Proposed Wind Farm site is predominately located within an area of agricultural/wet grasslands, peatlands and areas of private conifer forestry. As per Table 3a of the NatureScot Guidance (2021), the Proposed Wind Farm site has a *Moderate* habitat risk and *Medium* project size (Small scale development including 8 turbines but comprised of turbines >100m in height). The cross tabulation of a ***Medium*** project on a ***Moderate*** risk site results in an overall risk score of ***Medium*** (NatureScot Table 3a).

### 5.1.2 Assessment of Collision Risk

The following high-risk species were recorded during the dedicated surveys:

- Leisler's bat,
- Common pipistrelle
- Soprano pipistrelle
- Nathusius' pipistrelle

The Overall Risk Assessment for high collision risk species is provided in the sections below. Overall Risk was determined, in accordance with Table 3b of NatureScot 2021 guidance (**Appendix 3**), by a cross-tablature of the site risk level (i.e. Medium). The assessment was carried out for both median and maximum activity categories in order to provide insight into typical bat activity (i.e. median values) and activity peaks (i.e. maximum values). NatureScot recommends that the most appropriate activity level (i.e. median or maximum) be utilised to determine the overall risk assessment for a species.

As per NatureScot guidance there is no requirement to complete an Overall Risk Assessment for low-risk species. During the extensive suite of surveys undertaken the following low risk species were recorded:

- *Myotis spp.*
- Brown long-eared bat

Overall activity levels for brown long-eared bat and *Myotis spp.* were generally *Low*. Therefore, no significant collision related effects are anticipated. Loss of habitat is assessed further in Section 5.2 and 5.3. below. Activity levels for these species will continue to be assessed during operational monitoring as outlined in Section 6.2. Further mitigation will be implemented after Year 1 if deemed necessary.

#### 5.1.2.1 Leisler's bat

The Proposed Wind Farm site is within the current range of the Leisler's bat (NPWS, 2019). Leisler's bats are classed as a rarer species of a high population vulnerability which have a high collision risk (Plate 3-2). Leisler's bats were only recorded once during the manual activity surveys to the east of T07, outside the Proposed Wind Farm site. Leisler's bat activity accounted for <6% of total species composition at the Proposed Wind Farm site. When assessed in the context of the identified site risk and in line with Table 3b (NatureScot, 2021), overall activity risk for Leisler's bat was found to be ***Medium*** in spring and ***Low*** in summer and autumn at median activity levels. Maximum activity was ***High*** in the spring and ***Medium*** in summer and autumn. (See Table 5-2 below).

Based on site visit and survey data, including transects, it is determined that the Typical Activity (i.e. Median) is reflective of the nature of the Proposed Wind Farm site, which is primarily agricultural/wet grassland, peatland and areas of private conifer forestry with low levels of bat activity recorded during the walked transects undertaken at the Proposed Wind Farm site.

Thus, the overall collision risk level for the local population of Leisler's bat is generally assessed as ***Low-Medium*** across all seasons and detectors with the exception of D05 and D08, which was assessed as having a ***High*** individual collision risk level in spring.

*Table 5-2 Leisler's Bat - Overall Risk Assessment*

| Survey Period | Site Risk | Typical Activity (Median) | Typical Risk Assessment (as per Table 3b NatureScot 2021) | Activity Peaks (Maximum) | Peak Risk Assessment (as per Table 3b NatureScot 2021) |
|---|---|---|---|---|---|
| Spring 2024 | Medium (3) | Moderate (3) | Typical Risk is Medium (9) | High (5) | Peak Risk is High (15) |
| Summer 2024 | | Low (1) | Typical Risk is Low (3) | Moderate-High (4) | Peak Risk is Medium (12) |
| Autumn 2024 | | Low (1) | Typical Risk is Low (3) | Moderate (3) | Peak Risk is Medium (9) |



### 5.1.2.2 Soprano pipistrelle

The Proposed Wind Farm site is within range for soprano pipistrelle bat (NPWS, 2019). Soprano pipistrelle are classed as a common species of a medium population vulnerability which have a high potential collision risk (Plate 3-2). Soprano pipistrelle was recorded during all activity surveys across the Proposed Wind Farm site. When assessed in the context of the identified site risk and in line with Table 3b (NatureScot 2021) overall activity risk for soprano pipistrelle was found to be ***Medium*** at median activity levels for spring and summer, and ***Low*** in autumn. Peak activity levels were ***Medium*** for all seasons, as outlined in Table 5-3 below.

Based on site visit and survey data, including transects, it is determined that the Typical Activity (i.e. Median) is reflective of the nature of the Proposed Wind Farm site, which is primarily agricultural/wet grassland, peatland and areas of private conifer forestry with low levels of bat activity recorded during the walked transects undertaken at the Proposed Wind Farm site.

Thus, the overall collision risk level for the local population of soprano pipistrelle is generally assessed as ***Low*** to ***Medium*** across all seasons and detectors with the exception of D01, which was assessed as having a ***High*** individual collision risk levels in spring and summer.

*Table 5-3 Soprano Pipistrelle - Overall Risk Assessment*

| Survey Period | Site Risk | Typical Activity (Median) | Typical Risk Assessment (as per Table 3b NatureScot 2021) | Activity Peaks (Maximum) | Peak Risk Assessment (as per Table 3b NatureScot 2021) |
|---|---|---|---|---|---|
| Spring 2024 | Medium (3) | Low-Moderate (2) | Typical Risk is Medium (6) | Moderate (3) | Peak Risk is Medium (9) |
| Summer 2024 | | Low-Moderate (2) | Typical Risk is Medium (6) | Moderate-High (4) | Peak Risk is Medium (12) |
| Autumn 2024 | | Low (1) | Typical Risk is Low (3) | Low-Moderate (2) | Peak Risk is Medium (6) |

### 5.1.2.3 Common pipistrelle

The Proposed Wind Farm site is within the current range of the common pipistrelle bat (NPWS, 2019). Common pipistrelle are classed as a common species of a medium population vulnerability which have a high collision risk (Plate 3-2). Common pipistrelle were recorded during all activity surveys across the Proposed Wind Farm site. When assessed in the context of the identified site risk and in line with Table 3b (NatureScot 2021); overall activity risk for common pipistrelle at Typical Activity levels was found to be ***Medium*** in spring and ***Low*** in summer and autumn. Peak risk levels for common pipistrelle was found to be ***Medium*** in all seasons. (See Table 5-4 below).

Based on site visit and survey data, including transects, it is determined that the Typical Activity (i.e. Median) is reflective of the nature of the Proposed Wind Farm site, which is primarily agricultural/wet

grassland, peatland and areas of private conifer forestry with low levels of bat activity recorded during the walked transects undertaken at the Proposed Wind Farm site.

Thus, the overall collision risk level for the local population of common pipistrelle is generally assessed as ***Low*** to ***Medium*** across all seasons and detectors with the exception of D01, which was assessed as having a ***High*** individual collision risk level in spring.

*Table 5-4 Common Pipistrelle - Overall Risk Assessment*

| Survey Period | Site Risk | Typical Activity (Median) | Typical Risk Assessment (as per Table 3b NatureScot 2021) | Activity Peaks (Maximum) | Peak Risk Assessment (as per Table 3b NatureScot 2021) |
|---|---|---|---|---|---|
| Spring 2024 | Medium (3) | Low-Moderate (2) | Typical Risk is Medium (6) | Moderate-High (4) | Peak Risk is Medium (12) |
| Summer 2024 | | Low-Moderate (2) | Typical Risk is Low (6) | Moderate-High (4) | Peak Risk is Medium (12) |
| Autumn 2024 | | Low (1) | Typical Risk is Low (3) | Low-Moderate (2) | Peak Risk is Medium (6) |

### 5.1.2.1 Nathusius' pipistrelle

The Proposed Wind Farm site is outside the current range of the Nathusius' pipistrelle bat (NPWS, 2019). Nathusius' pipistrelle bats are classed as a rarer species of a high population risk which have a high collision risk (Plate 3-4). Nathusius' pipistrelle bats were not recorded during the activity surveys undertaken at the Proposed Wind Farm site. When assessed in the context of the identified site risk and in line with Table 3b (NatureScot, 2021) overall activity risk for Nathusius' pipistrelle was found to be ***Low*** at median activity levels across all seasons. Maximum activity levels were ***Medium*** in spring and summer and ***Low*** in autumn (See Table 5-5 below).

Based on site visit and survey data, including transects, it is determined that the Typical Activity (i.e. Median) is reflective of the nature of the Proposed Wind Farm site, which is primarily agricultural/wet grassland, peatland and areas of private conifer forestry with low levels of bat activity recorded during the walked transects undertaken at the Proposed Wind Farm site.

Thus, there is ***Low*** collision risk level assigned to the local population of Nathusius' pipistrelle.

*Table 5-5 Nathusius' pipistrelle - Overall Risk Assessment*

| Survey Period | Site Risk | Typical Activity (Median) | Typical Risk Assessment (as per Table 3b NatureScot 2021) | Activity Peaks (Maximum) | Peak Risk Assessment (as per Table 3b NatureScot 2021) |
|---|---|---|---|---|---|
| Spring 2024 | Medium (3) | Low (1) | Typical Risk is Low (3) | Low-Moderate (2) | Peak Risk is Medium (6) |
| Summer 2024 | | Low (1) | Typical Risk is Low (3) | Low-Moderate (2) | Peak Risk is Medium (6) |
| Autumn 2024 | | Low (1) | Typical Risk is Low (3) | Low (1) | Peak Risk is Low (3) |

## 5.1.3 Collision Risk Summary

Site-level collision risk for high collision risk bat species was typically ***Low*** to ***Medium***. Overall bat activity levels were typical of the nature of the Proposed Wind Farm site, which is predominantly agricultural/wet grassland, peatlands and areas of conifer forestry with low levels of bat activity recorded during the static detector surveys and the transects undertaken.

However, following per-detector R-analysis, Detectors D01, D05A and D08 recorded ***High*** Median Activity levels in either spring or summer (see Table 5-6). During manual transect surveys, Leisler's bat activity was rarer, while soprano and common pipistrelle activity was more evenly distributed across the Proposed Wind Farm site. Nathusius' pipistrelle was not recorded during the manual transects.

While ***High*** median activity was recorded at three locations, it is noted that habitats at these locations will change during the construction phase of the Proposed Project with the required implementation of the bat felling buffers (Section 6.1.3). A monitoring and mitigation strategy has been devised for the Proposed Project, in line with the case study example provided in Appendix 5 of the NatureScot 2021 Guidance and based on the site-specific data. After year 1 monitoring, if a curtailment requirement is identified, a curtailment programme, in line with relevant guidelines, will be devised around key activity periods and weather parameters, as well as a potential increase in buffers if deemed necessary.

*Table 5-6 Detector Location Recording High Median Activity in 2024 for High-risk Bat Species*

| Detector ID | Turbine | Species | High Median Activity Survey Period |
|---|---|---|---|
| D01 | T01 | Common pipistrelle | Spring 2024 |
| D01 | T01 | Soprano pipistrelle | Spring 2024 |
| D01 | T01 | Soprano pipistrelle | Summer 2024 |
| D05A | T05 | Leisler's bat | Spring 2024 |
| D08 | T08 | Leisler's bat | Spring 2024 |

## 5.2 Loss or Damage to Commuting and Foraging Habitat

In the absence of appropriate design, the loss or degradation of commuting/foraging habitat has potential to reduce feeding opportunities and/or displace bat populations. The Proposed Wind Farm site is predominantly located on improved agricultural/wet grassland, peatlands and areas of conifer forestry.

The implementation of the Biodiversity Management and Enhancement Plan (BMEP, Chapter 6, Appendix 6-4) will deliver significant positive measures for bats within the Proposed Wind Farm site. In particular, approximately 3,521m of new hedgerow habitat will be planted, strategically located to link existing areas of bat activity and support long-term habitat connectivity. These measures will enhance ecological corridors across the site, providing new foraging and commuting opportunities once established.

The Proposed Wind Farm will result in some removal of existing linear habitat. Approximately 466m of hedgerow and treeline habitat will be lost to accommodate turbines, associated bat buffers, access roads, and ancillary infrastructure. When combined with the removal of additional features such as scrub and forestry edge habitat relevant to bat commuting corridors, the total net loss of linear habitat amounts to 1,966m. Further details on vegetation clearance and replanting are provided in Chapter 4, Section 4.3.1.7 of this EIAR. This loss will be offset through the proposed replanting, which will provide approximately 3,521m of new habitat and deliver a net gain of around 1,555m (79%) in linear habitat across the Proposed Wind Farm site. Although a short- to medium-term reduction in connectivity may occur until the planting is fully established, no permanent loss of commuting or foraging habitat is anticipated.

The habitat within the location of the proposed onsite 38kV substation consists primarily of improved agricultural grassland. Two small sections of hedgerow, totalling approximately 12m, will be removed where the proposed new road intersects the field boundary. Considering the proposed replanting

around the substation, no permanent loss of commuting or foraging habitat associated with the substation is anticipated.

The Proposed Grid Connection will be primarily located within the existing public road corridor. A total of 83 m of hedgerow will be temporarily removed to facilitate cable installation; however, this will be reinstated following construction, ensuring no net loss of linear features. As such, no permanent loss of commuting or foraging habitat is anticipated.

As described in Chapter 4, Section 4.5.2 of this EIAR, no accommodation works along the turbine delivery route are proposed. Therefore, no significant effects on commuting and foraging bats associated with the turbine delivery route are anticipated.

Given the extensive area of habitat that will remain undisturbed throughout the Proposed Wind Farm site and the avoidance of the most significant areas of faunal habitat (i.e. mature treelines and hedgerows), no significant effects with regard to loss of commuting and foraging habitat are anticipated.

## 5.3 Loss of, or Damage to, Roosts

The Proposed Wind Farm is predominantly located within agricultural and wet grasslands, peatlands, and areas of conifer forestry. Roost surveys carried out in 2024 identified both structures and trees with potential roost features (PRFs). The project design has been informed by these surveys and incorporates avoidance measures to ensure that confirmed roosts and all identified PRFs are retained and safeguarded, thereby protecting roosting habitat throughout construction and operation.

Two structures within the Proposed Wind Farm site were confirmed to support small bat roosts during the 2024 surveys: a derelict building supporting soprano pipistrelle, common pipistrelle and brown long-eared bats, and a farm shed supporting a single common pipistrelle. Both structures will be retained in situ and excluded from the development footprint, ensuring the continued availability of these roosting resources. In addition, while several trees containing PRFs were identified within the Proposed Wind Farm site, none occur within the bat felling buffer or areas of proposed infrastructure, and no tree removals affecting PRFs are required.

The proposed onsite 38kV substation is located within improved agricultural grassland with no trees containing PRFs. Some vegetation removal will be necessary to accommodate access roads and ancillary infrastructure, but no roosting features will be lost. Similarly, the Proposed Grid Connection underground cable will follow existing roads and verges; although PRFs were identified in trees adjacent to the roadway (outside the footprint), no removal is proposed. The turbine delivery route also requires no accommodation works and will not affect potential roosting habitat.

The Proposed Grid Connection will traverse 10no. watercourse crossings, as well as a motorway underpass and a rail bridge. All works will either be confined to the existing road infrastructure or completed using temporary construction methods such as horizontal directional drilling (Launch pads set-back from crossing infrastructure) or flatbed formation within the existing road network. In addition, two farm sheds along the route were assessed as having *Negligible* potential to support roosting bats; both will be retained in situ and unaffected by the Proposed Project. As such, no significant effects on potential roosting bats associated with the Proposed Grid Connection are anticipated.

Overall, the combination of sensitive project design, retention of confirmed roosts, and application of the BMEP ensures that no significant effects in relation to loss of, or damage to, roosting habitat are anticipated.

## 5.4 Displacement of Individuals or Populations



The Proposed Wind Farm is predominantly located on agricultural/wet grasslands, peatlands and areas of conifer forestry. There will be no net loss of linear landscape features for commuting and foraging bats and there will be no loss of any roosting site. The habitats on the Proposed Wind Farm site will remain suitable for bats and no displacement of individuals or populations is anticipated.

Following a number of roost assessments on the Proposed Grid Connection watercourse and rail/motorway crossing infrastructure, no evidence of roosting bats was identified; however, there remains potential for opportunistic roosting by individual bats at 4no. crossing points (Appendix 4). All works pertaining to the Proposed Grid Connection crossing points will either be confined to the existing road infrastructure or completed using temporary construction methods such as horizontal directional drilling (Launch pads set-back from crossing infrastructure) or flatbed formation within the existing road network. No works are proposed on the underside or abutments of the crossing infrastructure. Potential noise and vibration associated with temporary works at crossing points are not expected to be out of character with existing traffic/rail activity or typical roadworks, to which any potential roosting bats in the area would already be accustomed. Given the short-term nature of these works, significant disturbance or displacement of bats is not anticipated.

# 6. BEST PRACTICE AND MITIGATION



This section describes the best practice and site-specific mitigation measures that are in place to avoid and reduce the potential for significant effects on local bat populations.

## 6.1 Standard Best Practice Measures

### 6.1.1 Noise Restrictions

During the construction phase, plant machinery will be turned off when not in use and all plant and equipment for use will comply with the Construction Plant and Equipment Permissible Noise Levels Regulations (S.I. No. 632 of 2001, as amended).

### 6.1.2 Lighting Restrictions

Where lighting is required, directional lighting will be used to prevent overspill on to woodland/forestry edges. Exterior lighting, during construction and post construction, shall be designed to minimize light spillage, thus reducing the effect on areas outside the Proposed Wind Farm site, and consequently on bats i.e. Lighting will be directed away from mature trees/treelines around the periphery of the site boundary to minimize disturbance to bats. Directional accessories can be used to direct light away from these features, e.g. through the use of light shields (Stone, 2013). The luminaries will be of the type that prevent upward spillage of light and minimize horizontal spillage away from the intended lands.

The proposed lighting around the Proposed Wind Farm site shall be designed with consideration of the Institute of Lighting Professionals Guidance Note 08/23 Bats and Artificial Lighting at Night (ILP, 2023).

In addition, the applicant commits to using lighting during construction, operation, and decommissioning only where necessary, in line with the updated Dark Sky Ireland Lighting Principles:

- All lighting will be justified and used only when required.
- Warm colour temperatures will be used to minimise impacts on wildlife and the night sky.
- Glare and brightness will be minimised to protect visual comfort.
- Luminaires will be angled downward with appropriate beam control to avoid over-lighting.
- Lower mounting heights will be used where possible to better contain light.
- Lighting will incorporate timers, dimmers, or PIR sensors to reduce energy use and emissions.
- Natural areas such as trees, waterbodies, and nesting habitats will not be illuminated.

With regard to the potential for lighting to increase collision risk, it is noted that there will be limited illumination of the turbines in the form of aviation lighting. Post construction monitoring will be carried out (as outlined below) to assess any potential changes in bat activity patterns and collision risk. Significant effects as a result of lighting are not anticipated; however, if in the course of this monitoring, any potential for significant effects on bats is identified, the site-specific mitigation measures will be reviewed and any changes necessary will be implemented to avoid any such impacts.

### 6.1.3 Bat Felling Buffers

In accordance with NatureScot and NIEA Guidance, a minimum 50m buffer to all habitat features used by bats (e.g., hedgerows, tree lines etc.) should be applied to the siting of all wind turbines (See example provided in Plate 6-1 below). However, Eurobats No. 6 guidance and NIEA, 2021

recommends increased buffers of 100m and 200m around woodland/forestry areas, however, there is no scientific evidence to support these increased buffer distances in Ireland or the UK.



NatureScot recommends that a distance of 50m between turbine blade tip and nearest woodland (or other key habitat features) is adequate mitigation. This 50m buffer will be implemented from the outset and monitored as per the post-construction monitoring. The success of the buffer mitigation will be assessed as part of post construction monitoring (outlined in Section 6.2 below) and updated where necessary.

The formula below is presented to provide appropriate mitigation in relation to bats, and the relevant input required from turbine parameters, is the combination of the blade length and hub height. The bat buffer calculation takes into account theoretical precautionary conditions that creates the maximum potential footprint as per Scenario 1 outlined in Chapter 1, Section 1.7.3. The proposed wind turbines to be installed on the site will have the following dimensions:

- Turbine Tip Height – 178m to 185m
- Hub Height – 101m to 104m
- Rotor Diameter – 149m to 163m

There will be a requirement to remove linear vegetation i.e. treelines/hedgerows, to facilitate the required bat buffers at the Proposed Wind Farm site. This mitigation measure is included within the forestry felling identified in Chapter 4, Section 4.3.1.7 of the EIAR, is based on Scenario 1 which is the scenario which gives rise to the largest bat buffer radius for bat mitigation and is assessed within the EIAR. The bat buffer calculations were performed on all potential scenarios. The scenario which yielded the largest bat buffer was Scenario 1. Scenario 1 yielded a bat buffer of 97.5 metres. Scenario 2, Scenario 3, and Scenario 4 would result in a reduction in the buffer requirement. The precautionary scenario has therefore been considered in the bat impact assessment. Figure 4-15 in Chapter 4 of the EIAR shows the extent of the area to be removed as part of the overall felling requirement. These vegetation-free areas will be maintained during the operational life of the proposed turbines.

It is necessary to calculate the distance between the edge of the habitat feature and the centre of the tower (b). Using the formula:

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

Where, bl =Blade length, hh = hub height, fh = feature height all in metres. E.g. (below) b = 69.3m (Plate 6-1). Based on the turbine parameters provided, the formula calculates a bat felling buffer of 87m.

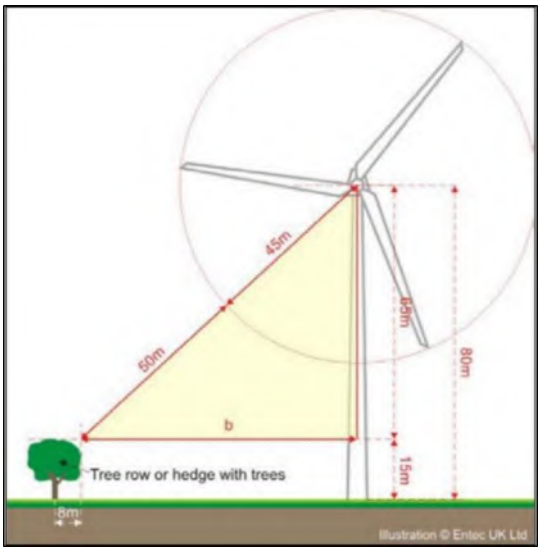



*Plate 6-1 Calculate buffer distances (Natural England, 2014).*

### 6.1.4 Biodiversity Management and Enhancement Plan

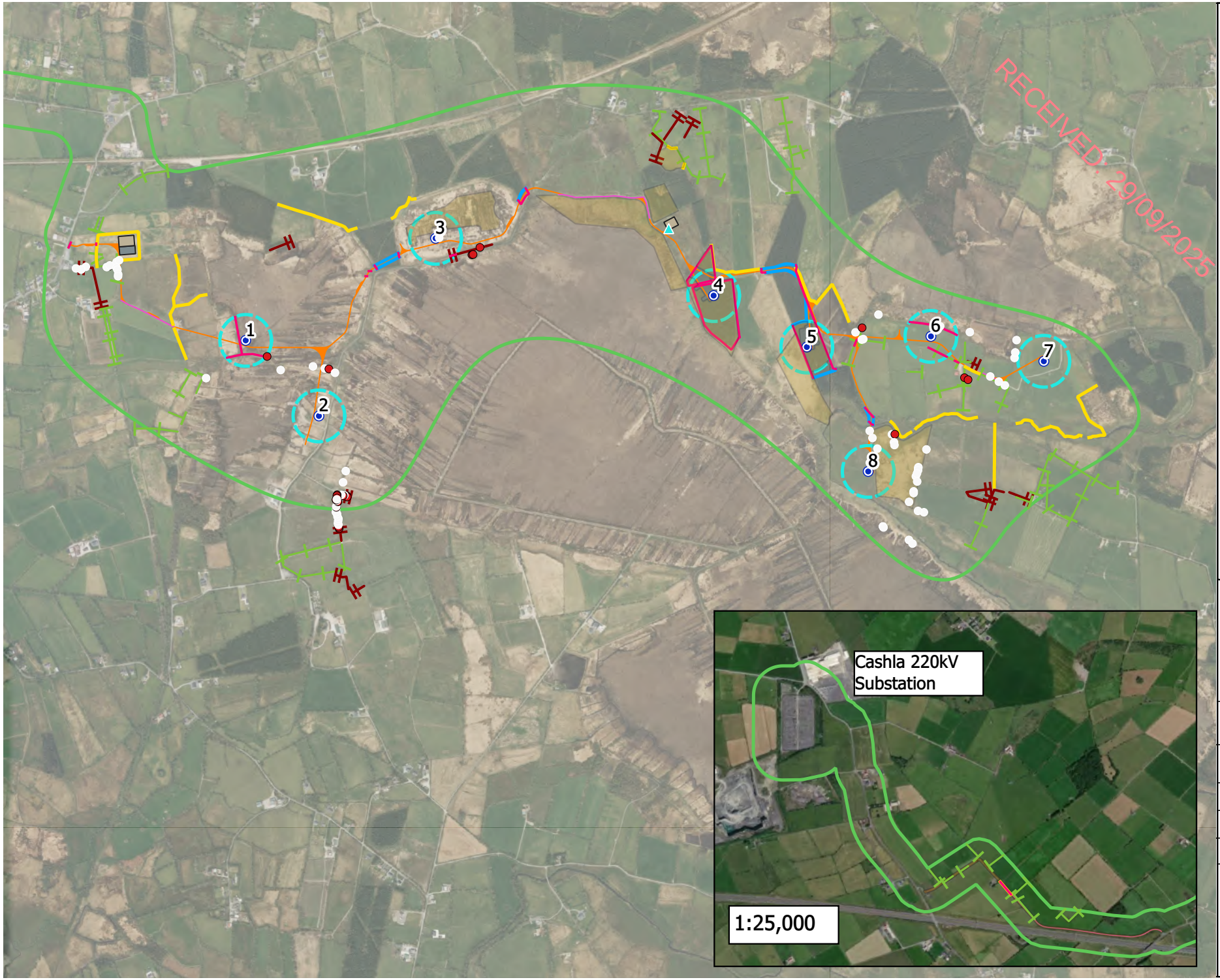


In the absence of appropriate design, the loss or degradation of commuting/foraging habitat has potential to reduce feeding opportunities and/or displace bat populations. However, the Proposed Wind Farm is predominantly located within agricultural/wet grasslands, peatland, areas of conifer woodland with linear landscape features such as hedgerows, treelines and drains also present which will be largely retained or avoided.

The Proposed Project will result in a net loss of approximately 1,966m of linear habitat within the Site (Figure 6-1). This figure accounts for the direct removal of hedgerow and treeline habitat (approx. 466m), the loss of additional linear features such as scrub and forestry edge habitat (approx. 2,334m) and also reflects the creation of new linear edge habitat resulting from proposed felling activities (approx. 834m). Vegetation removal within the turbine bat buffers has been designed to comply with NatureScot guidance aimed at reducing bat fatalities (see Section 6.1.3). Further details are provided in Chapter 6 and Appendix 6-4 BMEP.

While some hedgerow and treeline habitat will be lost (466m), key linear landscape features in the wider area will be retained. As such, no significant effects on local bat populations are anticipated. To offset potential losses and enhance opportunities for commuting and foraging bats, approximately 3,521m of native hedgerow habitat will be planted within the Site. Refer to the BMEP outlined in Appendix 6-4 of the EIAR for hedgerow/treeline planting details.

Overall, the proposed planting of approximately 3,521m of new native hedgerow will result in a net gain of approximately 1,555m of linear habitat within the Proposed Wind Farm site. This represents a 79% increase in linear landscape features compared to those lost. These new habitats have been strategically designed to link isolated linear features with areas of greater connectivity and will enhance both foraging and commuting opportunities for local bat populations. All planting will use species native to the local area. Further details are provided in Appendix 6-4 BMEP.




## Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Bat Felling Buffer
- Proposed Met Mast
- Proposed Onsite Substation
- Proposed Temporary Construction Compounds
- Proposed New Roads
- Proposed Upgrades to Existing Roads
- Felling Footprint

Baseline Linear Habitat Features

- Hedgerows (WL1)
- Treelines (WL2)
- Linear Habitat Gain from Proposed Felling Activities
- Proposed Linear Habitat Loss
- Proposed Linear Replanting

Ground Level Tree Assessments

- None
- PRF



Drawing Title
Proposed Linear Vegetation Removal and Replanting

Project Title
Gannow Renewable Energy Development

| Drawn By | Checked By |
|---|---|
| RC | AJ |
| Project No. | Drawing No. |
| 240323 | Figure 6-1 |
| Scale | Date |
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### 6.1.5 Blade Feathering

NIEA Guidelines also recommend that, in addition to buffers applied to habitat features, all wind turbines are subject to 'feathering' of turbine blades when wind speeds are below the cut-in speed of the proposed turbine. This means that the turbine blades are pitched at 90 degrees or parallel to the wind to reduce their rotation speed to below two revolutions per minute while idling. This measure has been shown to significantly reduce bat fatalities (by up to 50%) in some studies (NIEA, 2021).

In accordance with NIEA, 2021, blade feathering will be implemented as a standard across all proposed turbines when wind speeds are below the cut-in speed of the turbine.

## 6.2 Bat Monitoring Plan

Overall risk levels for high collision risk bat species were typically *Low* to *Medium.* This risk level is reflective of the nature of the Proposed Wind Farm site, which is agricultural/wet grassland, peatlands and blocks of private conifer forestry with low levels of bat activity recorded during the transects undertaken.

However, taking a precautionary approach and given that high collision risk was recorded at median and peak activity levels, an adaptive monitoring and mitigation strategy has been devised for the Proposed Wind Farm, in line with the case study example provided in Appendix 5 of the NatureScot, (2021) and based on the site-specific data.

### 6.2.1 Operational Monitoring

To assess the effects of the Proposed Project on bat activity, at least 3 years of post-construction monitoring is proposed. Post-construction monitoring will include static detector surveys, walked survey transects and corpse searching to record any bat fatalities resulting from collision.

The results of post-construction monitoring shall be utilised to assess any potential changes in bat activity patterns and to monitor the implementation of the mitigation strategy as outlined in Section 6 above. If the monitoring identifies a curtailment requirement (i.e. significant bat fatalities encountered), a curtailment programme, in line with relevant guidelines, will be devised around key activity periods and weather parameters, as well as a potential increase in buffers.

At the end of each year, the efficacy of the mitigation and monitoring plan will be reviewed, and any identified efficiencies incorporated into the programme. This approach allows for an evidence-based review of the potential for bat fatalities at the Proposed Wind Farm, post construction, to ensure that the necessary measures, based on a new baseline post-construction, are implemented for the protection of bat species locally. The effectiveness of any mitigation/curtailment needs to be monitored in order to determine (a) whether it is working effectively (i.e. the level of bat mortality is incidental), and (b) whether the curtailment regime can be refined such that turbine down-time can be minimised whilst ensuring that it remains effective at preventing casualties.

The below subsections provide additional detail on the proposed survey effort, timing, and mitigation.

#### 6.2.1.1 Monitoring Year 1

##### Bat activity surveys

The post-construction surveys will be carried out as per the pre-construction survey effort. Static monitoring will take place at each turbine during the bat activity season (between April and October) (NatureScot, 2021, NIEA, 2021). Full spectrum recording detectors will be utilised for the same duration

as during pre-application surveys and at the same density (NatureScot, 2021). As described in Section 3.5 above, the assessment of bat activity levels will include the use of 'Ecobat' (or similar alternative), a web-based interface, allowing uploaded activity data to be contrasted with a comparable reference range, allowing objective and robust interpretation. Walked survey transects will also be conducted.



Key weather parameters and other factors that are known to influence collision risk will be monitored and shall include:

- Windspeed in m/s (measured at nacelle height)
- Temperature (ºC)
- Precipitation (mm/hr)

#### Carcass searches

Carcass searches, to monitor and record bat fatalities, shall be conducted at each turbine in accordance with NIEA Guidance. This shall include searcher efficiency trials and an assessment of scavenger removal rates to determine the appropriate correction factor to be applied in relation to determining an accurate estimate of collision mortality. Surveys should cover all activity seasons, and the use of a trained dog detection team will be carried out to ensure maximum efficiency.

### 6.2.1.2 Monitoring Years 2 & 3

Monitoring surveys shall continue in Year 2 and 3, and where a curtailment requirement has been identified, the success of the curtailment strategy shall be assessed in line with the baseline data collected in the preceding year(s). The performance of any curtailment programme in terms of its ability to respond to the changes in bat abundance based on temperature and wind speed shall be analysed to confirm it is neither significantly over- nor under- curtailing during different periods of bat activity.

At the end of each year, the efficacy of any mitigation/curtailment programme shall be reviewed, and any identified efficiencies incorporated into the programme. The requirement for continued post-consent monitoring will also be considered. Should no bat fatalities be recorded in Year 1, curtailment (where applicable) in Year 2 and Year 3 could be reduced/re-evaluated or removed with monitoring continuing to inform this strategy.

## 6.3 Residual Impacts

Taking into account the sensitive design of the project and the implementation of best practice and adaptive mitigation measures, no significant long-term residual effects on bats are anticipated with regard to:

1. *Collision mortality, barotrauma and other injuries,*
2. *Loss or damage to roosts, and*
3. *Displacement of individuals or populations.*

However, a minor short-term negative residual effect at the local geographic scale is anticipated in relation to the loss of commuting and foraging habitat, due to the removal of hedgerows/treelines required to facilitate construction of the Proposed Wind Farm (including bat buffers). This effect is considered short-term, as the loss will be offset through a comprehensive hedgerow/treeline enhancement and replanting programme, with newly planted trees expected to establish and restore full habitat functionality within 1–7 years (EPA, 2022). As such, a minor short-term reduction in ecological connectivity may occur during this period.

## 6.4 Cumulative Effects



The Proposed Project was considered in combination with other projects and/or plans (existing approved and pending decision), in the surrounding area that could result in cumulative impacts on bats. This included a review of online Planning Registers and served to identify past, present and future plans and projects, their activities and their predicted environmental effects. The projects and/or plans considered are detailed in Section 2.8 in Chapter 2 of the EIAR.

While the Proposed Project will not result in long-term residual significant effects on bats when considered in isolation, a short-term residual effect is anticipated during the establishment phase of replanted linear habitats (e.g. treelines or hedgerows). There are no existing, permitted or proposed wind farms within 10km of the proposed turbine locations. There are nine further EIA projects including one extractive industry located within this radius. A review of available application and EIAR documentation for these projects found no significant overlap in timing or scale of habitat removal that would give rise to cumulative effects on bat populations in combination with the Proposed Project.

While short-term habitat disruption may occur within the Site, no combined or synergistic effects have been identified with surrounding developments. Once the proposed replanting is established, no long-term residual cumulative effects on bats are predicted.

# 7. CONCLUSION



This report provides a full and comprehensive assessment of the potential for impact on bat populations at the Site. The surveys and assessment provided in this report are in accordance with NatureScot guidance. Following consideration of the residual effects (post mitigation) it is noted that the Proposed Project will not result in any long-term significant effects on bats. Furthermore, the Proposed Project will deliver ecological enhancements, including a net gain of approximately 1,555m in linear habitat features within the Proposed Wind Farm site and a net increase of 1.9 hectares in native woodland, both of which will contribute positively to bat habitat availability and connectivity in the long term.

Provided the Proposed Project is constructed and operated in accordance with the design, best practice, and mitigation outlined in this report, significant long-term effects on bats are not expected at any geographic scale.

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# APPENDIX 1

## *BAT HABITAT SUITABILITY ASSESSMENT*

# HABITAT SUITABILITY ASSESSMENT



Guidelines for assessing the potential suitability of a site for bats, based on the presence of habitat features within the landscape (Collins, 2023).

| Suitability | Roosting Habitats | Potential Flight-Paths and Foraging Habitats |
|---|---|---|
| None | No habitat features on site likely to be used by any roosting bats at any time of the year. (i.e. a complete absence of crevices/ suitable shelter at all ground/ underground levels). | No habitat features on site likely to be used by any commuting or foraging bats at any time of the year (i.e. no habitats that provide continuous lines of shade/protection for flight-lines or generate/shelter insect populations available to foraging bats) |
| Negligible[a] | Negligible habitat features on site likely to be used by roosting bats; however, a small element of uncertainty remains as bats can use small and apparently unsuitable features on occasion. | No obvious habitat features on site likely to be used as flight-paths or by foraging bats; however, a small element of uncertainty remains in order to account for non-standard bat behaviour. |
| Low | A structure with one or more potential roost sites that could be used by individual bats opportunistically at any time of the year. However, these potential roost sites do not provide enough space, shelter, protection, appropriate conditions[b] and/or suitable surrounding habitat to be used on a regular basis or by larger numbers of bats, i.e. unlikely to be suitable for maternity and not a classic cool/stable hibernation site but could be used by individual hibernating bats [c]. | Habitat that could be used by small numbers of bats as flight-paths such as a gappy hedgerow or unvegetated stream, but isolated, i.e. not very well connected to the surrounding landscape by other habitat. Suitable, but isolated habitat that could be used by small numbers of foraging bats such as a lone tree (not in a parkland situation) or a patch of scrub. |
| Moderate | A structure with one or more potential roost sites that could be used by bats due to their size, shelter, protection, conditions[b] and surrounding habitat but unlikely to support a roost of high conservation status (with respect to roost type only, such as maternity and hibernation - the categorisation described in this table is made irrespective of species conservation status, which is established after presence is confirmed). | Continuous habitat connected to the wider landscape that could be used by bats for flight-paths such as lines of trees and scrub or linked back gardens. Habitat that is connected to the wider landscape that could be used by bats for foraging such as trees, scrub, grassland or water |
| High | A structure with one or potential roost sites that are obviously suitable for use by larger numbers of bats on a more regular basis and potentially for longer periods of time due to their size, shelter, protection, conditions[b], and surrounding habitat. These structures have the potential to support high conservation status which is established after presence is confirmed. | Continuous, high-quality habitat that is well connected to the wider landscape that is likely to be used regularly by bats for flight paths such as river valleys, streams, hedgerows, lines of trees and woodland edge. High-quality habitat that is well connected to the wider landscape that is likely to be used regularly by foraging bats such as broadleaved woodland, tree-lined watercourses and grazed parkland. Site is close to and connected to known roosts. |

[a]Negligible is defined as 'so small or unimportant as to be not worth considering, insignificant'. This category may

be used where there are places that a bat could roost or forage (due to one attribute) but it is unlikely that they actually would (due to another attribute).

[b] For example, in terms of temperature, humidity, height above ground level, light levels or levels of disturbance.

[c] Evidence from the Netherlands shows mass swarming events of common pipistrelle bats in the autumn followed by mass hibernation in a diverse range of building types in urban environments (Korsten et al., 2016 and Jansen et al., 2022). Common pipistrelle swarming has been observed in the UK (Bell, 2022 and Tomlinson, 2020) and winter hibernation of numbers of this species has been detected at Seaton Delaval Hall in Northumberland (National Trust, 2018). This phenomenon requires some research in the UK, but ecologists should be aware of the potential for larger numbers of this species to be present during the autumn and winter in prominent buildings in the landscape, urban or otherwise.



BCT Protocol for categorising the suitability of trees for bats (Collins, 2023)

| Assessment | Description |
|---|---|
| NONE | Either no PRFs in the tree or highly unlikely to be any. |
| FAR | Further assessment required to establish if PRFs are present in the tree. |
| PRF | A tree with at least one PRF present. |

BCT Guidance for categorising suitability of PRFs for bats (Collins, 2023).

| Assessment | Description |
|---|---|
| PRF-I | PRF is only suitable for individual bats or very small numbers of bats either due to size or lack of suitable surrounding habitats. |
| PRF-M | PRF is suitable for multiple bats and may therefore be used by a maternity colony. |

# APPENDIX 2

## *SITE RISK ASSESSMENT*

Table 3a: *Stage 1 - Initial site risk assessment*



| **Site Risk Level (1-5)*** | **Project Size** | | | |
|---|---|---|---|---|
| | | **Small** | **Medium** | **Large** |
| **Habitat Risk** | **Low** | 1 | 2 | 3 |
| | **Moderate** | 2 | 3 | 4 |
| | **High** | 3 | 4 | 5 |

Key: Green (1-2) - low/lowest site risk; Amber (3) - medium site risk; Red (4-5) - high/highest site risk.

* Some sites could conceivably be assessed as being of no (0) risk to bats. This assessment is only likely to be valid in more extreme environments, such as above the known altitudinal range of bats, or outside the known geographical distribution of any resident British species.

| **Habitat Risk** | **Description** |
|---|---|
| Low | Small number of potential roost features, of low quality.<br>Low quality foraging habitat that could be used by small numbers of foraging bats.<br>Isolated site not connected to the wider landscape by prominent linear features. |
| Moderate | Buildings, trees or other structures with moderate-high potential as roost sites on or near the site.<br>Habitat could be used extensively by foraging bats.<br>Site is connected to the wider landscape by linear features such as scrub, tree lines and streams. |
| High | Numerous suitable buildings, trees (particularly mature ancient woodland) or other structures with moderate-high potential as roost sites on or near the site, and/or confirmed roosts present close to or on the site.<br>Extensive and diverse habitat mosaic of high quality for foraging bats.<br>Site is connected to the wider landscape by a network of strong linear features such as rivers, blocks of woodland and mature hedgerows.<br>At/near edge of range and/or on an important flyway.<br>Close to key roost and/or swarming site. |

| **Project Size** | **Description** |
|---|---|
| Small | Small scale development (≤10 turbines). No other wind energy developments within 10km.<br>Comprising turbines <50m in height. |
| Medium | Larger developments (between 10 and 40 turbines). May have some other wind developments within 5km.<br>Comprising turbines 50-100m in height. |
| Large | Largest developments (>40 turbines) with other wind energy developments within 5km.<br>Comprising turbines >100m in height. |

# APPENDIX 3

## *OVERALL SITE RISK ASSESSMENT*

# OVERALL RISK ASSESSMENT



Table 3b: Stage 2 – Overall Risk Assessment

| **Site Risk Level (from Table 3a)** | **Ecobat activity category** | | | | | |
|---|---|---|---|---|---|---|
| **Site Risk Level** | Nil (0) | Low (1) | Low-Moderate (2) | Moderate (3) | Moderate-High (4) | High (5) |
| Lowest (1) | 0 | 1 | 2 | 3 | 4 | 5 |
| Low (2) | 0 | 2 | 4 | 6 | 8 | 10 |
| Medium (3) | 0 | 3 | 6 | 9 | 12 | 15 |
| High (4) | 0 | 4 | 8 | 12 | 16 | 20 |
| Highest (5) | 0 | 5 | 10 | 15 | 20 | 25 |

**Overall assessment**

| Low Overall Risk (0-4) | Medium Overall Risk (5-12) | High Overall Risk (15-25) |
|---|---|---|

The scores in the table are a product of multiplying site risk level and the Ecobat activity category (or equivalent). The activity categories equate to those given in Table 1 for high collision risk species. Nil (0) means no bat activity was recorded across the whole site, but caution is needed here, because although the values given in this column are "0", at sites where pre-construction surveys found no bat activity, there remains the possibility that new turbines could attract some bat species, thereby altering the level of risk that applies in reality.

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 recommended that both the highest Ecobat activity category and the most frequent activity category (i.e. the median) are assessed separately in Table 3b and presented in the overall risk assessment. A judgement can then be made on which is the most relevant. It should be noted that presenting mean activity levels can be highly misleading where the data are highly skewed, as is frequently the case with bat activity at wind turbines (Lintott & Mathews, 2018).

# APPENDIX 4

## *PROPOSED GRID CONNECTION CROSSING INFRASTRUCTURE*

# PROPOSED GRID CONNECTION CROSSING INFRASTRUCTURE

The Proposed Grid Connection underground cabling route will traverse 10 no. watercourse crossings, a motorway underpass and a rail bridge. The crossing structures were assessed for bat roost potential on the 10th October 2024 and the 13th February 2025. No evidence of bat roosts was found at any of the structures. The findings are described further below. Three watercourse crossings will require horizontal directional drilling, and all other works will be confined to the road structure. Watercourses referenced in Chapter 4 as 'WC 1', 'WC 3', 'WC 4', 'WC 7' consist primarily of field drains and lack suitable structures for any potential bat roosting, therefore they are not presented in detail in the table below. These crossings will be completed using flat formation over or under, as described in Chapter 4, Section 4.8.2. The locations of all proposed watercourse crossings are illustrated in Figure 4-34 of Chapter 4 in this EIAR.

*Proposed Grid Connection – Watercourse, Motorway & Rail Crossings*

| Water crossing reference | Location IG Ref | Bat Roost Suitability Assessment | | Extent of Works |
|---|---|---|---|---|
| WC 2 | M 58453 30725 | Clarinbridge River, Ballynanulty Existing structure: Masonry bridge. Recently repointed with 2 retained crevices. ***Moderate*** bat roost potential. |  | Horizontal Directional Drilling (HDD) |

| | | | | |
|---|---|---|---|---|
| WC 5 | M 56451<br>30903 | Existing structure: two pipes and masonry wall. Well pointed. **No** bat suitability |  | Flatbed Formation Over |
| WC 6 | M 56196<br>30880 | Toorkeel Stream. Existing structure: plastic pipe and masonry wall. ***Low*** bat roost suitability, no evidence of bat roost upon inspection of wall |  | Horizontal Directional Drilling (HDD) |

| | | | | |
|---|---|---|---|---|
| WC 8 | M 55655<br>30697 | Stone wall<br>**No** bat roost potential |  | Flatbed Formation Over |
| WC 9 | M 53101<br>30655 | Clarinbridge river/Shoodaun River.<br>Structure: double arch masonry bridge.<br>No crevices – **no** bat roost potential |  | Horizontal Directional Drilling (HDD) |

| | | | | |
|---|---|---|---|---|
| WC 10 | M 52245 30437 | Highly vegetated drain with masonry culvert. ***Negligible*** bat roost potential |  | Flatbed Formation Over |
| Motorway Underpass | | Concrete bridge under the M17 motorway classified as Buildings and artificial surfaces (BL3). ***Low*** bat roost potential due to surrounding habitat connectivity and small gaps behind concrete panels that could be used opportunistically by individual bats. |  | Remain within the curtilage of the public road network |

| | | | | |
|---|---|---|---|---|
| Rail Bridge | M 59479<br>30267 | Rail bridge well pointed with small crevices in some areas that could be used opportunistically by individual bats. ***Low*** bat roost potential. |  | Remain within the curtilage of the public road network |