Planning and Environmental Consultants

Environmental Impact Assessment Report

Briskalagh Renewable Energy Development, Co. Kilkenny

Chapter 7 - Birds

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7. BIRDS

7.1 Introduction

This chapter assesses the likely significant impacts of the Proposed Project on avian receptors.

Particular attention has been paid to bird species with national and international protection under the Irish Wildlife Acts 1976-2022 and the European Union (EU) Birds Directive (2009/147/EC). Where potential impacts on avian receptors are identified, mitigation is described, and the residual effects are assessed. The cumulative effects of the Proposed Project and other plans and projects have also been assessed in this chapter.

This chapter is supported by Technical Appendices 7-1 to 7-4, which contain data from the surveys undertaken including full details of the survey times, weather conditions, and other relevant information together with the bird records. Appendix 7-5 contains the Collision Risk Assessment (CRA) document which describes how the Collision Risk Modelling was undertaken for the Proposed Project. Appendix 7-6 contains the bird monitoring programme proposed for the Proposed Project. Confidential Appendix 7-7 contains sensitive records of protected species breeding sites. The Proposed Wind Farm site and survey radii are provided in Figures 7-1 to 7-8.

The chapter is structured as follows:

- The Introduction provides a description of the Proposed Project and the relevant legislation, guidance and policy context.
- The Assessment Approach and Methodology section is a comprehensive description of the ornithological surveys and impact assessment methodology used to inform a robust assessment of the potential impacts of the Proposed Project on birds.
- The Baseline Ornithological Conditions section describes the existing bird population at the Site.
- The Receptor Evaluation section identifies key ornithological receptors and determines their sensitivity.
- The Potential Impacts section details the impact assessment of the key ornithological receptors (including direct habitat loss, disturbance/displacement and collision risk). Impacts are described with regard to each phase of the Proposed Project: construction, operation and decommissioning.
- The Mitigation and Best Practice Measures section describes proposed mitigation and best practice measures to ameliorate the identified impacts.
- The Monitoring section outlines a schedule for monitoring birds during each phase of the Proposed Project if planning permission is granted: commencement and construction, operation and decommissioning.
- The Residual Effects section considers the implications of the proposed mitigation, best practice, enhancement measures and monitoring.
- Finally, the Cumulative Effects section fully assesses potential cumulative effects of the Proposed Project in combination with other projects.
- The Conclusion provides a summary statement on the overall significance of predicted effects on birds.

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

The other definitions used in this chapter are as follows:

- The "Zone of Influence" (ZOI) for individual ornithological receptors refers to the area within which potential effects are anticipated. ZOIs differ depending on the sensitivities of particular species and were assigned in accordance with best available guidance (SNH, 2016 and McGuinness *et al.*, 2015), adopting a precautionary approach.

- "Key Ornithological Receptor" (KOR) is defined as a species occurring within the ZOI of the Proposed Project upon which potential impacts are anticipated and assessed.

7.1.1 Description of the Proposed Project

A full description of the Proposed Project is provided in Chapter 4 of this EIAR. In brief, the applicant is seeking a 10-year planning permission for a renewable energy development comprising 7 no. wind turbines, and associated infrastructure at Briskalagh and adjacent townlands, near Kilmanagh in Co. Kilkenny, including an on-site 38kV substation and c.23km underground cabling route connecting to the national grid at Ballyragget 110kV substation, in the townland of Moatpark, Co. Kilkenny.

As detailed in Section 4.3.1.1.3 in Chapter 4, the Proposed Wind Farm turbines will have the following dimensions:

- Turbine Tip Height –185 metres;
- Hub Height – 103.5m;
- Rotor Diameter – 163m.

The above turbine dimensions will result in an overall ground-to-blade tip height of 185m and a lowest swept height of 22m. An operational life of 35 years from the date of full commissioning of the Proposed Wind Farm is sought.

7.1.2 Legislation, Guidance and Policy Context

This EIAR is prepared in accordance with the requirements of EU Environmental Impact Assessment Directive 2014/52/EU. The following key legislative provisions apply to habitats and fauna in Ireland:

- The Wildlife Act 1976. This Act was revised in October 2022 to present amendments since enactment.
- The Birds Directive (EU Directive 2009/147/EC on the conservation of wild birds)
- The European Communities (Birds and Natural Habitats) Regulations 2011, as amended (S.I. no. 477 of 2011). These regulations transpose the EU Birds Directive into Irish law. The regulations were amended in 2013 (290/2013 and 499/2013), 2015 (355/205) as well as Chapter 4 of the Planning, Heritage and Broadcasting (Amendment) Act 2021 (11/2021) and in 2021 (293/2021).
- The International Convention on Wetlands of International Importance (the Ramsar Convention), 1971. This convention protects 45 wetland sites of significant value for nature in Ireland.

In the absence of national wind farm ornithological survey guidance for Ireland, the following guidance documents published by NatureScot (formerly Scottish Natural Heritage [SNH]) have been followed to inform this assessment:

- SNH (2000). Wind farms and birds: calculating a theoretical collision risk assuming no avoidance action. Scottish Natural Heritage, Inverness, Scotland. Available at: https://www.nature.scot/sites/default/files/2017-09/Guidance%20Note%20-%20Windfarms%20and%20birds%20-%20Calculating%20a%20theoretical%20collision%20risk%20assuming%20no%20avoiding%20action.pdf
- SNH (2009). Monitoring the impact of onshore wind farms on birds. Scottish Natural Heritage, Inverness, Scotland. Available at: https://www.nature.scot/sites/default/files/2017-09/Guidance%20Note%20-%20Monitoring%20the%20impact%20of%20onshore%20windfarms%20on%20birds.pdf
- SNH (2016). Assessing connectivity with Special Protection Areas (SPAs). Scottish Natural Heritage, Inverness, Scotland. Available at: https://www.nature.scot/sites/default/files/2018-08/Assessing%20connectivity%20with%20special%20protection%20areas.pdf
- SNH (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms. Scottish Natural Heritage, Inverness, Scotland. Available at: https://www.nature.scot/sites/default/files/2018-06/Guidance%20Note%20-

%20Recommended%20bird%20survey%20methods%20to%20inform%20impact%20assessment%20of%20onshore%20windfarms.pdf

- SNH (2018a) Avoidance rates for the onshore SNH wind farm collision risk model. Scottish Natural Heritage, Inverness, Scotland. Available at: https://www.nature.scot/sites/default/files/2018-09/Wind%20farm%20impacts%20on%20birds%20-%20Use%20of%20Avoidance%20Rates%20in%20the%20SNH%20Wind%20Farm%20Collision%20Risk%20Model.pdf
- SNH (2018b). Assessing the cumulative impacts of onshore wind farms on birds. Scottish Natural Heritage, Inverness, Scotland. Available at: https://www.nature.scot/sites/default/files/2018-08/Guidance%20-%20Assessing%20the%20cumulative%20impacts%20of%20onshore%20wind%20farms%20on%20birds.pdf
- SNH (2018c). Assessing significance of impacts from onshore wind farms outwith designated areas. Scottish Natural Heritage, Inverness, Scotland. Available at: https://www.nature.scot/doc/guidance-assessing-significance-impacts-bird-populations-onshore-wind-farms-do-not-affect-protected

The following Irish guidance documents were also consulted:

- Percival, S.M. (2003). Birds and wind farms in Ireland: A review of potential issues and impact assessment. Ecology Consulting, Durham, UK. Available at: https://tethys.pnnl.gov/sites/default/files/publications/Percival_2003.pdf
- McGuinness, D., Muldoon, C., Tierney, N., Cummins, S., Murray, A., Egan, S. and Crowe, O. (2015). Bird Sensitivity Mapping for Wind Energy Developments and Associated Infrastructure in the Republic of Ireland. Birdwatch Ireland, Wicklow, Ireland. Available at: https://birdwatchireland.ie/app/uploads/2019/09/BWI-Bird-Wind-Energy-devt-Sensitivity-Mapping-Guidance_document.pdf
- Gilbert, G., Stanbury, A. and Lewis, A. (2021). Birds of Conservation Concern in Ireland 4: 2020-2026. *Irish Birds,* 43:1-22. Available at: https://birdwatchireland.ie/birds-of-conservation-concern-in-ireland/

Furthermore, this assessment has been prepared with respect to the various planning policies and strategy guidance documents listed below and as detailed in Section 1.2 in Chapter 1 of this EIAR:

- European Commission (2002). Assessment of plans and projects significantly affecting Natura 2000 sites. Publications Office of the European Union, Luxembourg.
- European Commission (2020). Guidance document on wind energy developments and EU nature legislation. Publications Office of the European Union, Luxembourg.
- Planning and Development Acts 2000 (as amended).
- NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes. National Roads Authority, Ireland.
- EPA (2022). Guidelines on the information to be contained in Environmental Impact Statement reports. Environmental Protection Agency, Johnstown Castle Estate, Wexford.
- DoHPLG (2018). Guidelines for planning authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. Department of Housing, Planning and Local Government, Government of Ireland, Dublin.

7.1.3 Statement of Authority and Competence

This ornithology chapter has been prepared by Donnacha Woods (B.Sc., M.Sc.), Project Ornithologist of MKO and reviewed by Padraig Cregg (B.Sc., M.Sc..), Principal Ornithologist. Both are suitably qualified ornithologists with experience in completing avifaunal assessments and competent experts for the purposes of the preparation of this EIAR. Donnacha Woods has over six years of experience in ornithological assessments for the purposes of EIA across a range of sectors. Padraig Cregg has over 11 years of experience working in both the UK and Ireland in designing, executing and project managing ecological/ornithological assessments, and had worked on over 60 wind farm projects across the UK and Ireland.

The scope of works and survey methodology was devised by Padraig Cregg and is fully compliant with recent NatureScot (formerly Scottish Natural Heritage) guidance. Field surveys were undertaken by Allan Mee, Conor Berney, Cian Cahalin, Donnacha Woods, Ian Hynes, John McMahon, Kathryn Sheridan, Ken Westman, Laura Hynes, Neil Bourke, Padraig Webb and Sean Pierce. Surveyors are suitably qualified competent experts in ornithological surveying.

7.2 Assessment Approach and Methodology

7.2.1 Desk Study

A comprehensive desk study was undertaken to search for any relevant information on species of conservation concern that may use the Proposed Wind Farm site. The assessment included a thorough review of the available ornithological data listed below and presented in Sections 7.3.1 to 7.3.5:

- Designated sites within the likely ZOI of the Site;
- Review of Bird Atlases: (Sharrock, 1976; Lack, 1986; Gibbons et al., 1993; Balmer et al., 2013);
- BirdWatch Ireland Bird sensitivity mapping tool;
- Online web-mappers[1] from the National Parks and Wildlife Service (NPWS), and Irish Wetland Bird Survey I-WeBS;
- Irish Wetland Bird Survey data;
- Review of Birds of Conservation Concern (BoCCI) in Ireland 2020 – 2026 (Gilbert et al., 2021); and
- Review of specially requested records from the National Parks and Wildlife Service Rare and Protected Species Database.

7.2.2 Consultation

Consultation was undertaken with the relevant statutory and non-statutory organisations as part of the EIAR scoping to inform the current assessment. Full details can be found in Chapter 2 of this EIAR.

Table 7-1 below provides a list of the organisations consulted with regard to ornithology during the scoping exercise and describes where any comments raised in the scoping responses received in relation to birds have been addressed in this Chapter.

Copies of all scoping responses are included in Appendix 2-1 of this EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this chapter; Chapter 2 describes where any comments raised in the scoping responses received have been addressed.

Table 7-1 Consultation responses

	Consultee	Response
01	An Taisce	No response received
02	BirdWatch Ireland	No response received
03	Department of Agriculture, Food and the Marine	Response received outlining tree felling requirements. No correspondence relating to birds received.
04	Department of the Environment, Climate and Communications	No response received
05	Development Applications Unit (NPWS/NMS)	Response received stating Department is not in a position to make specific comment on this particular referral at this time.
06	Inland Fisheries Ireland	No response received
07	Irish Red Grouse Association	No response received
08	Irish Raptor Study Group	No response received
09	Irish Wildlife Trust	Response received stating IWT does not have the staff capacity to respond to consultation.

[1] *Accessed on 4th June 2024*

	Consultee	Response
10	Waterways Ireland	Response received stating that the Proposed Project is not within ZOI of Waterways Ireland waterways so they will not be commenting.

7.2.3 Identification of Target Species and Key Ornithological Receptors

Following a comprehensive desk study, initial site visits and consultation, a list of "target species" likely to occur in the ZOI of the Proposed Project was compiled. Bird surveys conducted at the Proposed Wind Farm site were then specifically designed to survey these target species, in accordance with NatureScot (2017). The target species list was drawn from:

- Species listed on Annex I of the EU Birds Directive.
- Special Conservation Interests (SCI) of Special Protection Areas (SPA) within the zone of likely significant effects.
- Red listed Birds of Conservation Concern in Ireland (BoCCI).
- Raptors and species that are particularly sensitive to wind farm developments.

Following analysis of field survey data (described below), a precautionary screening approach was followed to identify KORs: the list of target species observed during surveys (see Appendix 7-1) was refined to KORs, excluding those for which pathways for a significant effect could not be identified (refer to Section 7.4.2).

7.2.4 Field Surveys

The survey work that was undertaken between April 2021 and May 2023 forms the core dataset for the assessment of impacts on ornithology.

These field surveys were undertaken in compliance with NatureScot guidance (SNH, 2017). The data provided in this report is robust and allows clear, precise and definitive conclusions to be made in relation to the avian receptors identified within the Proposed Wind Farm site and its surroundings.

Field survey methodologies were devised to survey for the bird species composition and assemblages that occur within the Proposed Wind Farm site and its surroundings. The study area surveyed for each type of survey is discussed in the methodology section below. The survey locations / areas are shown in Figures 7-1 to 7-8. The survey radii mentioned below are discussed in relation to the Proposed Wind Farm site.

The Proposed Grid Connection underground cabling route was surveyed as part of a multidisciplinary, ecological walkover (details in Chapter 6 of this EIAR).

7.2.4.1 Initial Site Assessment

Based on the results of the desk study, consultation and reconnaissance site visits undertaken in March 2021, the likely importance of the Proposed Wind Farm site for bird species was ascertained. Based on the collated information available from the above preliminary assessment and adopting a precautionary approach, a site-specific survey scope for the ornithological survey was developed.

7.2.4.2 Survey Methodologies

Field surveys were undertaken during the survey period April 2021 – May 2023, consisting of 2 breeding seasons (April – September) and 2 non-breeding seasons (October – March).

In the absence of specific national bird survey guidelines, the ornithological surveys were designed and undertaken in full accordance with the guidance document '*Recommended bird survey methods to*

inform impact assessment of onshore wind farms' (SNH, 2017). The various ornithological surveys undertaken at the Proposed Wind Farm site and hinterland are described in detail below.

7.2.4.2.1 Vantage Point Surveys

Vantage point (VP) surveys were undertaken in accordance with NatureScot (2017) to monitor flight activity within the Proposed Wind Farm site and within a 500m radius of the proposed wind turbine positions. Surveys were conducted from one fixed point vantage point (VP1) with comprehensive coverage of the Proposed Wind Farm site (Figure 7-1). This vantage point location was selected by undertaking a viewshed analysis (described below) and confirmed by a reconnaissance visit and initial field surveys to ensure that the Proposed Wind Farm turbine layout was adequately covered.

Viewshed Analysis

The viewshed analysis aims to identify the most suitable locations to site vantage points such that the airspace of the turbine rotor swept area is in view using the fewest possible number of vantage points. Viewsheds were calculated using visibility analysis over raster DEM (Version 1.8) in QGIS (Version 3.28) using a notional layer suspended at 22m, which is representative of the minimum swept height of the proposed turbine. While the relevance of being able to view as much of the site to ground level is acknowledged, the NatureScot guidance (2017) emphasises the importance of visibility of the 'collision risk volume' when the data is to be used to estimate the risk of collision with turbines by birds.

The vantage point location was tested for visibility coverage of the proposed turbines and to a 500m radius of the outermost turbines in line with NatureScot (2017). The viewshed analysis was undertaken by creating a viewshed point 1.75m in height (to represent the height of the observer) on a map using a 25m resolution digital terrain model (DTM). The relative height of any surrounding vegetation and its effects on visibility was recorded during a site visit and is also accounted for in the analysis. Using QGIS (Version 3.28), a viewshed of 360° was produced calculating an area 22m from ground level up to a 2km radius. The resulting viewshed image was then cropped to 180° to give the viewshed. A 500m buffer was applied to the outer most turbines of the Proposed Wind Farm. The visible viewshed at 22m is presented in Figure 7-2.

Data Recording and Digitisation

Survey methodology followed NatureScot (2017). The surveyor collected data on bird observations and flight activity from the scanning arc of 180° to a 2km radius at the fixed vantage point location for two 3-hour watches separated by a minimum 30-minute break (i.e. 6 hours total) per month. Surveys were conducted from April 2021 to March 2023 inclusive and were scheduled to provide a minimum of 36 hours per winter or breeding season and spread over the full daylight period, including dawn and dusk watches, to coincide with the highest periods of bird activity.

Survey effort for vantage point watches is presented in Appendix 7-2, Table 1. This includes full details of dates, times, survey locations, survey duration and weather conditions for each survey. Table 7-2 below shows a summary of the VP survey work undertaken.

Table 7-2 Vantage point survey effort.

Survey Season and Number of Vantage Points (VPs)	Effort per Vantage Point (VP)
Breeding Season 2021 (1 VP)	36 hours
Winter Season 2021/2022 (1 VP)	42 hours
Breeding Season 2022 (1 VP)	36 hours
Winter Season 2022/2023 (1 VP)	36 hours

Flight activity of target species was mapped and recorded as per defined flight bands which were chosen in relation to the dimensions of potential turbine models for the Proposed Wind Farm site. Bands were split into 0-15m, 15-25m, 25-200m and >200m. All flight activity within the height bands 15-25m and 25-200m is considered to be within the Potential Collision Height (PCH) as the turbine swept area of the proposed turbine dimension overlaps with these height bands. Please see Appendix 7-5 for further detail. In addition, the presence of any non-target species was recorded to inform the evaluation of supporting habitat.

Each flight observation was assigned a unique identifier when mapped in the field and subsequently digitised using GIS software.

7.2.4.2.2 Breeding Walkover Surveys

Breeding walkover surveys were undertaken to determine the presence of bird species of high conservation concern and identify areas of possible, probable or confirmed breeding for bird species observed within the Proposed Wind Farm site and 500m radius. The methodology was based on Brown and Shepherd (1993) and Calladine *et al.* (2009), combined with Common Bird Census methods (British Trust for Ornithology, 2021) for dense habitats. Transect routes were walked across different habitat complexes within the survey area where access was allowed. Using binoculars, the surveyor regularly scanned the surroundings of each transect for target species. All target species were mapped, and breeding status was assigned following British Trust for Ornithology (BTO) breeding status codes[2]. In addition, the presence of any non-target species was recorded to inform the evaluation of supporting habitat. The survey area for these surveys was the Proposed Wind Farm site and a 500m survey radius of the Proposed Wind Farm site.

Transect routes were devised to ensure the required coverage of different habitats was achieved within the survey area. Transects were selected to ensure all areas of suitable breeding/ foraging habitat were approached to within 100m, where access was allowed. Target species included waders, raptors, waterbirds, gulls and other birds of conservation concern. Along with target species, all additional non-target species observed were recorded to inform the evaluation of supporting habitat.

Breeding walkover surveys were carried out during daylight hours during the core breeding season months April to July (2021 and 2022), with the Proposed Wind Farm site being visited one day per month on each occasion. The timing of visits followed the recommendations of Calladine *et al.* (2009). Following all survey visits, the field maps were analysed to determine the number and location of breeding territories. All non-breeding individuals and species encountered were also recorded.

The survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions for each survey. Figure 7-3 shows the survey transects.

7.2.4.2.3 Breeding Raptor Surveys

Breeding raptor surveys were undertaken within the Proposed Wind Farm site and within a 2km radius to identify occupied territories and monitor their breeding success near or within the Proposed Wind Farm site. Raptors include all harrier, falcon, buzzard, eagle, hawk, owl, kite and osprey species. The survey methodology followed Hardey *et al.* (2013). Raptor surveys were undertaken in the form of short vantage point watches and walked transects. All raptor species observed were recorded and mapped and breeding status was assigned following BTO breeding status codes. Surveyors did not approach nest sites to avoid disturbance.

Each breeding raptor location was surveyed once per month during the core breeding season between April and July (2021 and 2022). Each round of surveys was undertaken over three days, this allowed sufficient time to survey the key areas of suitable habitat within the survey area.

Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions. Figure 7-4 shows the breeding raptor locations.

[2] https://www.bto.org/our-science/projects/birdatlas/methods/breeding-evidence

7.2.4.2.4 Breeding Woodcock Surveys

Breeding woodcock surveys were undertaken in accordance with Gilbert *et al.* (1998). Surveys were undertaken at the Proposed Wind Farm site in May and June (2021 and 2022). The survey area extended 500m beyond the Proposed Wind Farm site boundary and was focused on areas of suitable habitat. Surveys commenced one hour before sunset and continued for one hour after sunset or until it was too dark to see, as per Gilbert *et al.* (1998). Transects were slowly walked through areas of suitable woodland habitat onsite and to a 500m radius of the Proposed Wind Farm site. All observations of woodcock (as well as the areas covered) were mapped. The survey aimed to record the presence of roding (displaying) male woodcock and thereby establish the distribution and abundance of the species in the surveyed area. This survey method also allowed the observer to survey for owls, i.e. barn owls and long-eared owls.

Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions. Figure 7-5 shows the transect routes.

7.2.4.2.5 Breeding Kingfisher Surveys

Breeding kingfisher surveys were undertaken within the Proposed Wind Farm site and to a 500m radius. The survey aimed to identify breeding kingfisher territories within the survey area by locating kingfishers or signs of nesting along river courses. Survey methodology followed Cummins *et al.* (2010): the surveyor walked along the Tullaroan Stream within 500m of the Proposed Wind Farm site, where accessible, searching for kingfisher, nest holes or suitable nesting banks during daylight hours. All such observations were recorded and mapped. Surveys were carried out once per month during the core breeding season March, April and May. Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions. Figure 7-6 shows the survey area.

7.2.4.2.6 Winter Walkover Surveys

Winter walkover surveys were undertaken to record the presence of bird species within the Proposed Wind Farm site and within a 500m radius of the Proposed Wind Farm site, including areas away from vantage point locations. The methodology was adapted from the breeding walkover methodology outlined in Brown and Shepherd (1993) and Calladine *et al.* (2009), combined with Common Bird Census methods (British Trust for Ornithology, 2021). Transect routes were walked across different habitat complexes within the survey area where access was allowed. All target species were recorded and mapped. In addition, the presence of any non-target species was recorded to inform the evaluation of supporting habitat. Figure 7-7 shows the survey transects.

Winter walkover surveys were conducted in daylight hours over four visits between October and March (i.e. four visits in winter 2021/2022, four visits in winter 2022/2023). Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions for each survey.

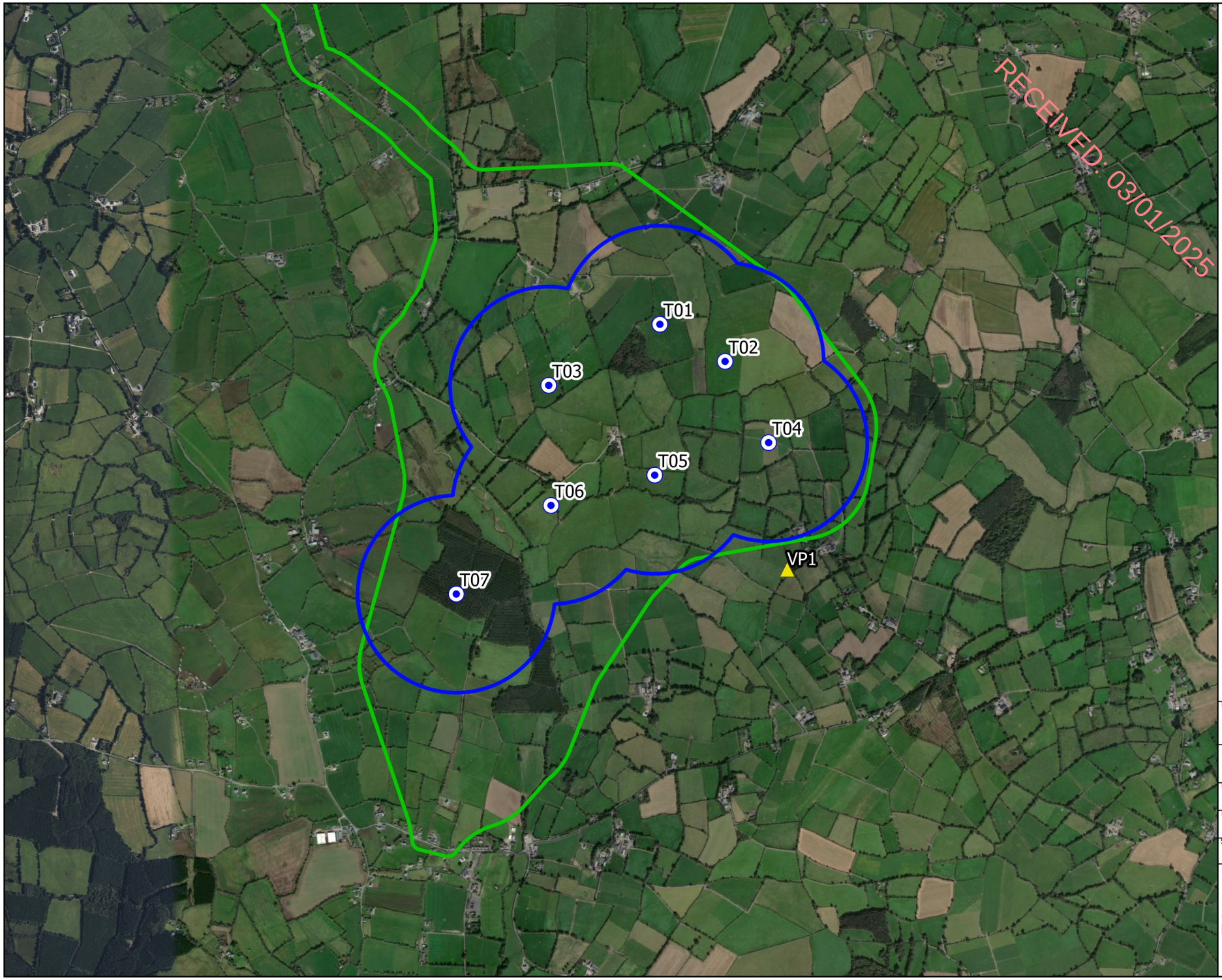
7.2.4.2.7 Waterbird Distribution and Abundance Surveys

Waterbirds include: swans, geese and ducks; cormorant, shag, divers and grebes; auks and seabirds; gulls, terns and skuas; herons, egrets and crane; rails and crakes; waders; and kingfisher. Significant wetlands and waterbodies within a minimum of 5km of the Proposed Wind Farm site were surveyed for waterbirds during the 2021/2022 and 2022/2023 winter and passage seasons (August to May inclusive) to provide information on their distribution and abundance in relation to the Proposed Wind Farm site. The area surveyed exceeds the 500m for foraging waterbirds and 1km for roosting waterbirds requirements of NatureScot (2017).

Survey methodology follows Gilbert *et al.* (1998) and the Irish Wetland Bird Survey (BirdWatch Ireland, 2021). Surveys were undertaken during daylight hours from suitable vantage points at wetlands and waterbodies. All target waterbird species were recorded and mapped. Survey effort, including details of survey duration and weather conditions, is presented in Appendix 7-2. Figure 7-8 shows the surveyed area.

7.2.4.2.8 Multidisciplinary Walkover Survey

The Proposed Grid Connection underground cabling route was surveyed on multiple dates set out in Section 6.4.3 of Chapter 6 of this EIAR, through a multidisciplinary, ecological walkover survey. The route was systematically walked, while the surveyor recorded a range of protected species, including birds. Further details on this survey are available in Chapter 6: Biodiversity of this EIAR.



Map Legend

- EIAR Site Boundary
- Turbine Locations
- 500m Radius of Turbines
- Vantage Point Locations

N

Drawing Title

Vantage Point Survey Location

Project Title

Briskalagh Renewable Energy Development

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
230502	Fig. 7-1
Scale	Date
1:25,000	28.06.2024

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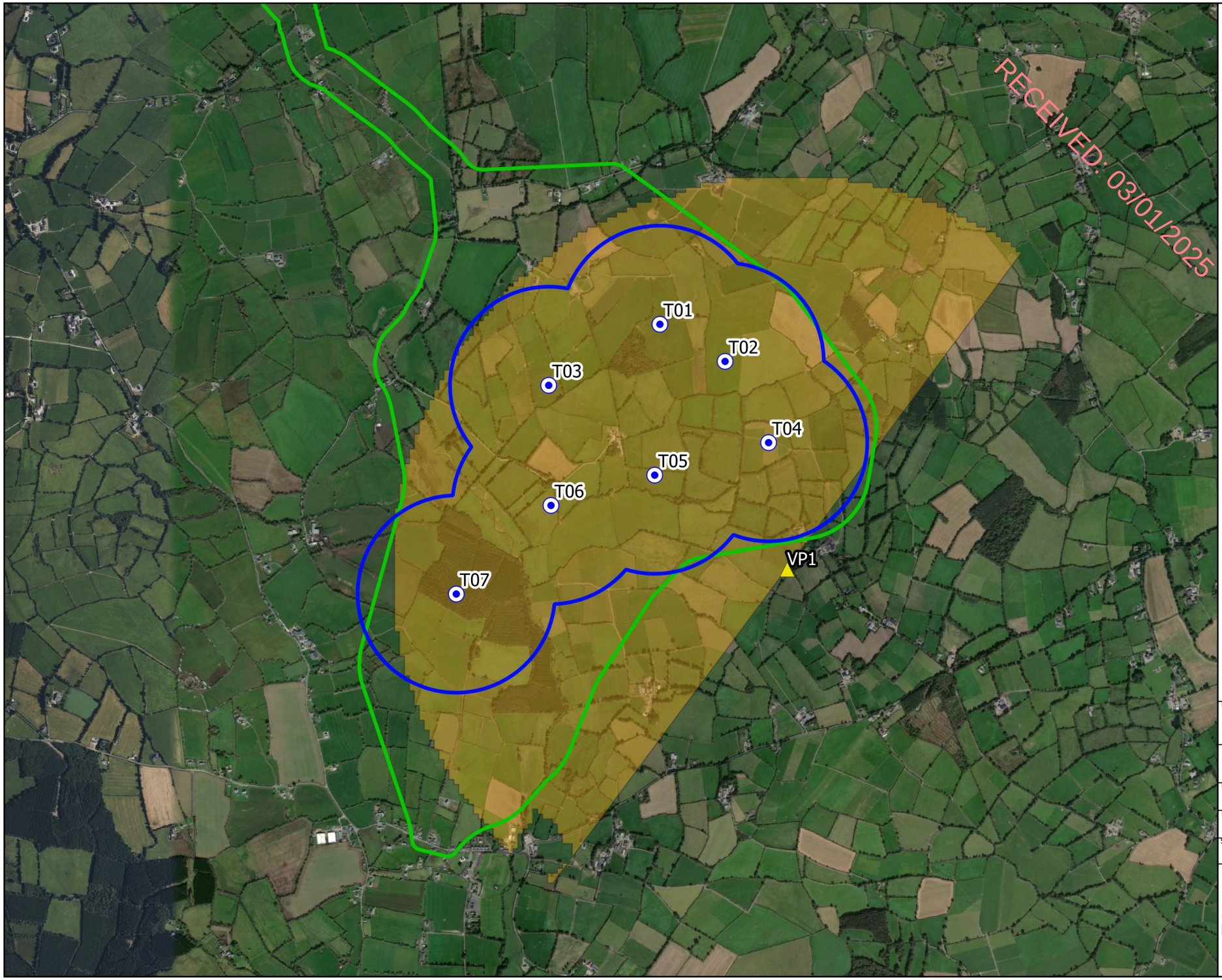

Map Legend

- EIAR Site Boundary
- Turbine Locations
- 500m Radius of Turbines
- Vantage Point Locations
- Viewshed

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Drawing Title

Viewshed Coverage at 22m

Project Title

Briskalagh Renewable Energy Development

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
230502	Fig. 7-2
Scale	Date
1:25,000	28.06.2024

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Map Legend

- EIAR Site Boundary
- Turbine Locations
- Survey Area
- Transects

N

Drawing Title
Breeding Walkover Survey Transects

Project Title
Briskalagh Renewable Energy Development

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
230502	Fig. 7-3
Scale	Date
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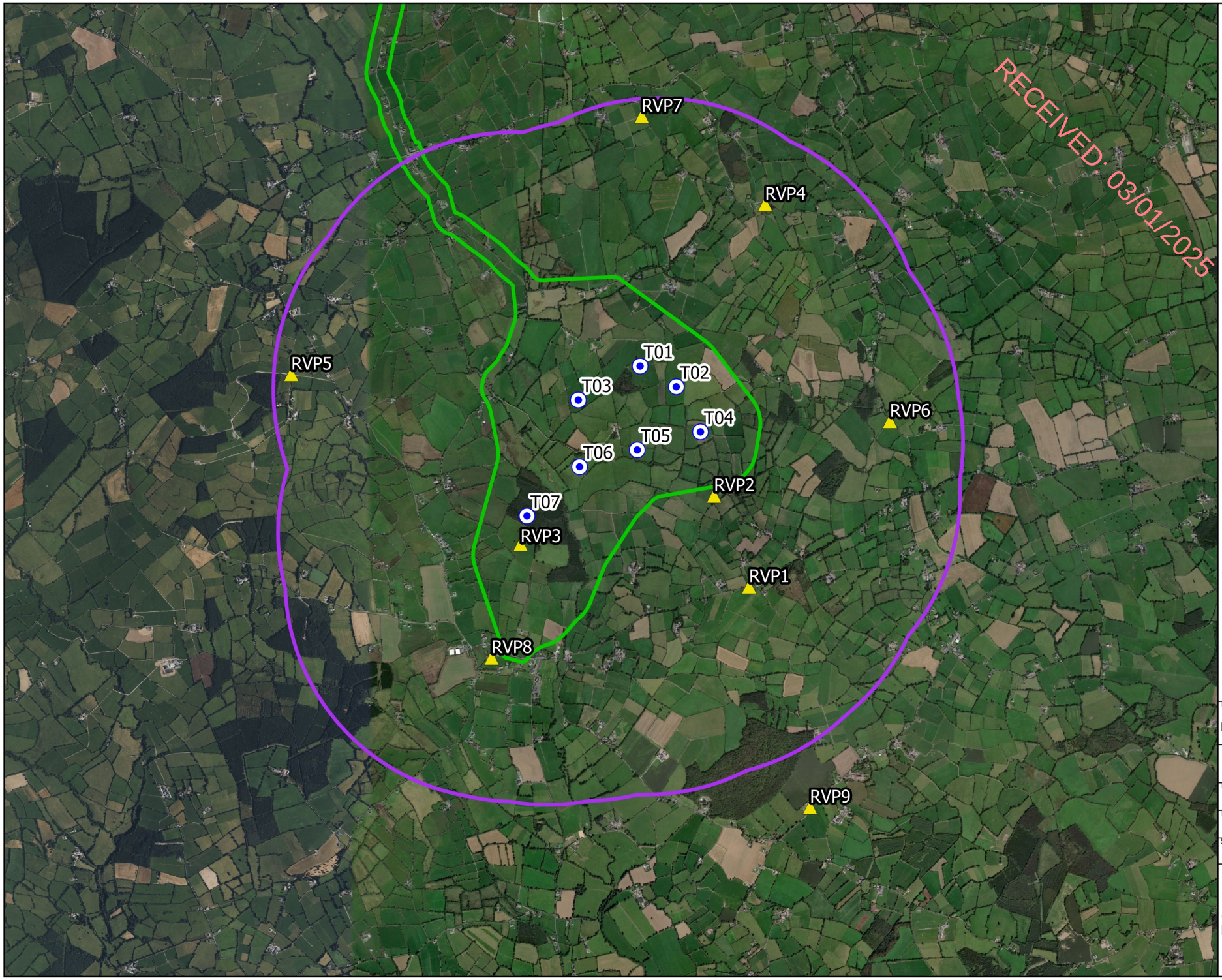

Map Legend

- EIAR Site Boundary
- Turbine Locations
- Survey Area
- RVP Locations

N

Drawing Title

Breeding Raptor Survey Locations

Project Title

Briskalagh Renewable Energy Development

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
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Map Legend

- EIAR Site Boundary
- Turbine Locations
- Survey Area
- Transects

N

Drawing Title
Breeding Woodcock Survey Transects

Project Title
Briskalagh Renewable Energy Development

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
230502	Fig. 7-5
Scale	Date
1:25,000	28.06.2024

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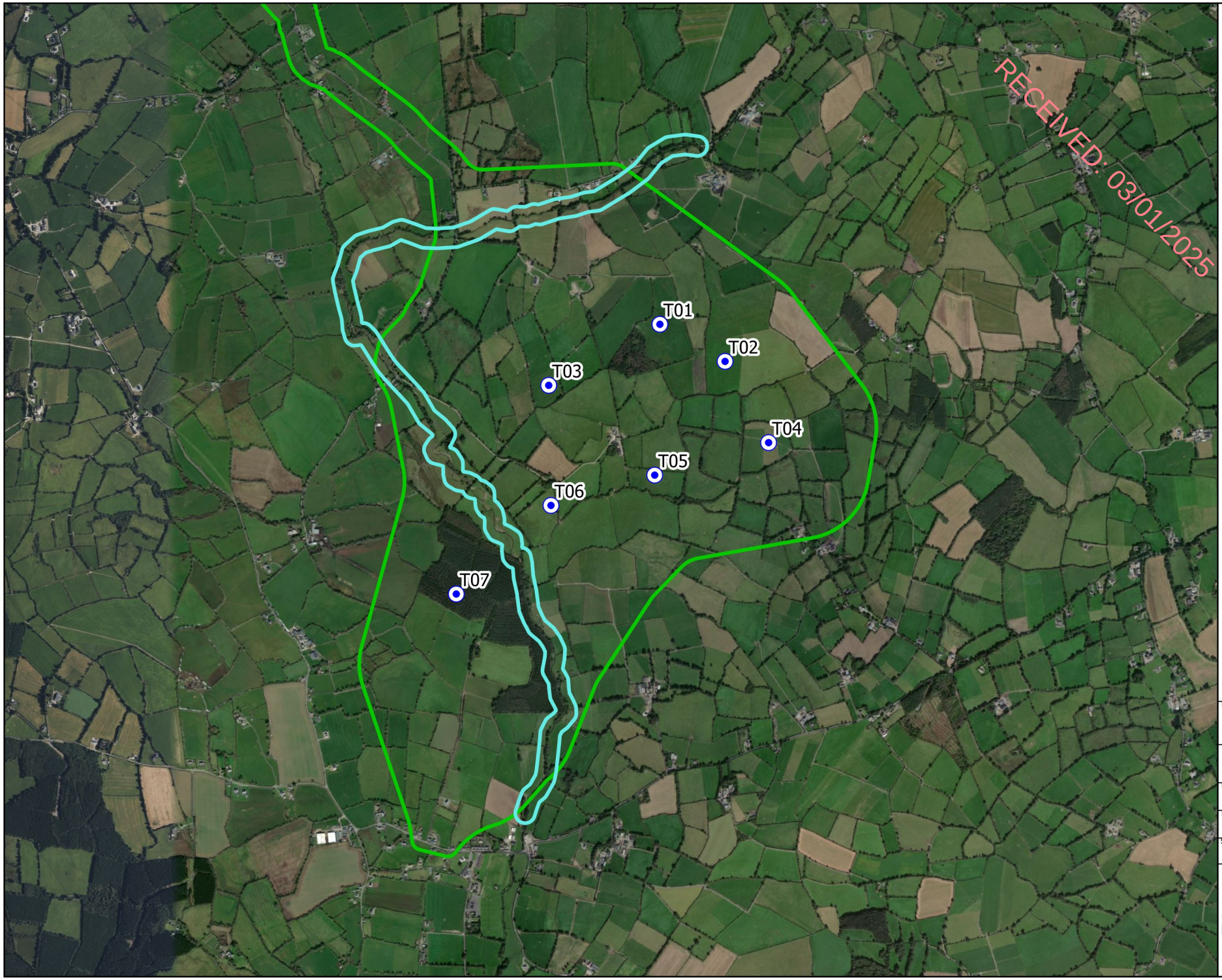

Map Legend

- EIAR Site Boundary
- Turbine Locations
- Survey Area

N

Drawing Title

Breeding Kingfisher Survey Area

Project Title

Briskalagh Renewable Energy Development

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
230502	Fig. 7-6
Scale	Date
1:25,000	28.06.2024

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Map Legend

- EIAR Site Boundary
- Turbine Locations
- Survey Area
- Transects

N

Drawing Title

Winter Walkover Survey Transects

Project Title

Briskalagh Renewable Energy Development

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
230502	Fig. 7-7
Scale	Date
1:25,000	28.06.2024

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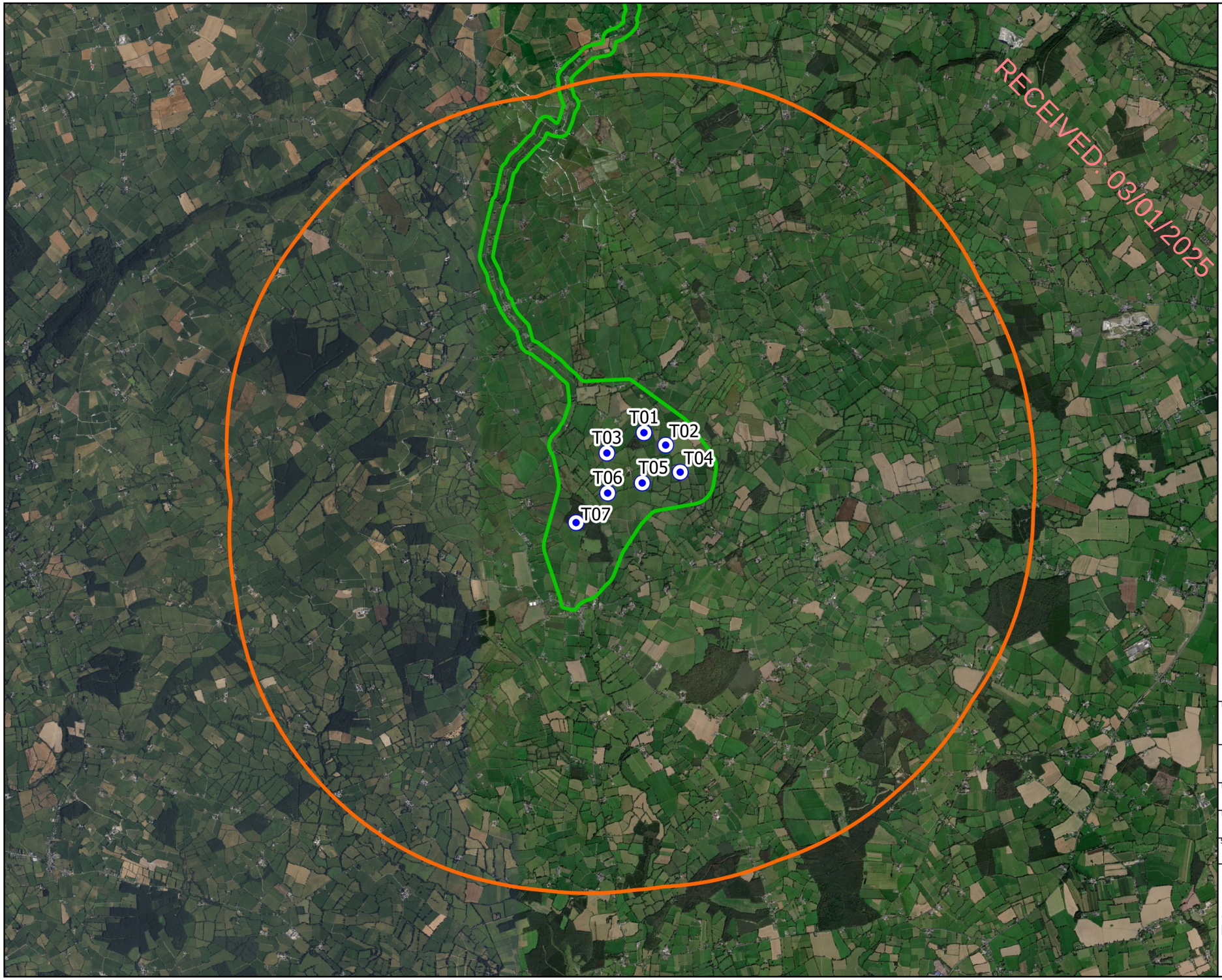

Map Legend

- EIAR Site Boundary
- Turbine Locations
- Survey Area

N

Drawing Title
Waterbird Distribution and Abundance Survey Area

Project Title
Briskalagh Renewable Energy Development

Drawn By	Checked By
D. Woods	P. Cregg
Project No.	Drawing No.
230502	Fig. 7-8
Scale	Date
1:75,000	28.06.2024

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7.2.5 Receptor Evaluation and Impact Assessment

7.2.5.1 Potential Impacts Associated with Proposed Project

Wind farms present three potential risks to birds (Drewitt and Langston 2006, 2008; *Band et al.,* 2007):

- **Direct (physical) habitat loss** due to construction of wind farm infrastructure.
- **Disturbance/displacement** (sometimes called indirect habitat loss) if birds avoid the wind farm and its surrounding area due to construction works or turbine operation. Displacement may also include barrier effects in which birds are deterred from using normal routes to feeding or roosting grounds.
- **Death through collision** or interaction with turbine blades and other infrastructure.

For each of these three risks, the detailed knowledge of bird distribution and flight activity within and surrounding the Proposed Wind Farm site has been used to predict the potential impacts of the Proposed Project on birds. Impacts associated with the Proposed Grid Connection are also assessed, including habitat loss and disturbance related to construction works. These impacts are also assessed cumulatively with other projects. The geographical framework and description of impacts are described below.

7.2.5.2 Geographical Framework

Guidance on Ecological Impact Assessment (CIEEM, 2019) recommends categories of ornithological value that relate to a geographical framework (e.g. international through to local). This chapter of the EIAR utilises the geographical framework described in 'Guidelines for Assessment of Ecological Impact of National Road Schemes' (NRA, 2009). The following geographic frame of reference should be used when determining the value of a bird population:

- International Importance
- National Importance
- County Importance
- Local Importance (Higher Value)
- Local Importance (Lower Value)

Locally Important (Lower Value) receptors are habitats and species that are widespread and of low ecological significance and important only in the local area. In contrast, Internationally Important sites are designated for conservation as part of the Natura 2000 Network (Special Area of Conservation or Special Protection Area) or provide the best examples of habitats or internationally important populations of protected flora and fauna.

7.2.5.3 Description of Impacts

The sensitivity, magnitude and significance of impacts on bird populations resulting from the Proposed Wind Farm was quantified according to two assessment criteria: Percival (2003) and the Environmental Protection Agency (EPA, 2022) EIA Guidelines. The two assessment criteria have been used to independently characterise impacts to inform a robust assessment of potential impacts. EPA impact assessment criteria has been used for consistency between the Biodiversity (Chapter 6) and Ornithology chapters of this EIAR, while Percival (2003) has also been followed given its specific focus on Irish birds.

Percival (2003) criteria

The Percival (2003) methodology quantifies the sensitivity of a given species to the development type, the magnitude of the effect and the significance of the potential impact. Table 7-3 (Sensitivity), Table 7-4 (Magnitude of effect) and Table 7-5 (Determination of significance) outline the assessment criteria for each stage.

Table 7-3 Evaluation of sensitivity for birds (from Percival, 2003)

Sensitivity	Determining Factor
Very High	Species that form the cited interest of SPAs and other statutorily protected nature conservation areas. Cited means mentioned in the citation text for the site as a species for which the site is designated.
High	Species that contribute to the integrity of a SPA but which are not cited as a species for which the site is designated. Ecologically sensitive species including the following: divers, common scoter, hen harrier, golden eagle, red necked phalarope, roseate tern and chough. Species present in nationally important numbers (>1% of the Irish population)
Medium	Species listed on Annex 1 of the EU Birds Directive. Species present in regionally important numbers (>1% county population). Other species on BirdWatch Ireland's Red List of Birds of Conservation Concern
Low	Any other species of conservation interest, including species on BirdWatch Ireland's Amber List of Birds of Conservation Concern, not covered above.

Table 7-4 Determination of magnitude of effects (from Percival, 2003)

Sensitivity	Description
Very High	Total loss or very major alteration to key elements/ features of the baseline conditions, such that the post development character/composition/attributes will be fundamentally changed and may be lost from the site altogether. Guide: < 20% of population / habitat remains
High	Major loss or major alteration to key elements/features of the baseline (pre-development) conditions such that post development character/composition/attributes will be fundamentally changed. Guide: 20-80% of population/ habitat lost
Medium	Loss or alteration to one or more key elements/features of the baseline conditions such that post development character/composition/attributes of baseline will be partially changed. Guide: 5-20% of population/ habitat lost
Low	Minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible but underlying character/composition/attributes of baseline condition will be similar to pre-development circumstances/patterns. Guide: 1-5% of population/ habitat lost
Negligible	Very slight change from baseline condition. Change barely distinguishable, approximating to the "no change" situation. Guide: < 1% population/ habitat lost

Table 7-5 Significance matrix combining magnitude and sensitivity to assess significance (from Percival, 2003)

Significance		Sensitivity			
		Very High	High	Medium	Low
Magnitude	Very High	Very High	Very High	High	Medium
	High	Very High	Very High	Medium	Low
	Medium	Very High	High	Low	Very Low

Significance		Sensitivity			
		Very High	High	Medium	Low
	Low	Medium	Low	Low	Very Low
	Negligible	Low	Very Low	Very Low	Very Low

EPA (2022) Criteria

EPA criteria use the following terms to describe the quality of the effect:

- **Positive** - a change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
- **Neutral** - no effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
- **Negative** - a change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).

The significance of the effect is quantified as:

- **Imperceptible** - an effect capable of measurement but without significant consequences.
- **Not Significant** – an effect which causes noticeable changes in the character of the environment but without significant consequences.
- **Slight** - an effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
- **Moderate** - an effect that alters the character of the environment that is consistent with existing and emerging baseline trends.
- **Significant** - an effect which, by its character, magnitude, duration or intensity significantly alters a sensitive aspect of the environment.
- **Very Significant**– an effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
- **Profound** - an effect which obliterates sensitive characteristics.

The duration of effects can be:

- **Momentary** – effects lasting from seconds to minutes.
- **Brief** – effects lasting less than a day.
- **Temporary** – effects lasting less than a year.
- **Short-term** – effects lasting 1 to 7 years.
- **Medium term** – effects lasting 7 to 15 years.
- **Long term** – effects lasting 15 to 60 years.
- **Permanent** – effects lasting over 60 years.
- **Reversible** – effects that can be undone (e.g. through remediation or restoration).

The frequency of effects (i.e. how often the effect will occur) can be:

- **Once, rarely, occasionally, frequently** or **constantly**
- **Hourly, daily, weekly, monthly** or **annually**

The probability of the effect may be:

- **Likely** – the effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
- **Unlikely** – the effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.

The effects may also be described in relation to their extent and context. Extent describes the population affected by an effect, while context relates the effect to the established baseline conditions. Further details are available in the Chapter 1, Section 1.7.2 of this EIAR.

7.2.5.4 Collision Risk Assessment

Collision risk is calculated using a mathematical model to predict the number of individual birds of a particular species that may be killed by collision with moving wind turbine rotor blades. The modelling method used in this collision risk calculation follows the Band Model (Band *et al.,* 2007), as recommended by NatureScot guidance. The Band Model (an open-source formula based in Excel) first determines the number of birds transits through the air space swept by the rotor blades of the wind turbines. Then it calculates the collision risk for the birds. The product of the transits multiplied by the collision risk provides a collision rate. An avoidance factor is applied to this to account for birds actively avoiding turbines, providing a final "real world" annual collision rate for each species. See Appendix 7-5 for full details on the collision risk modelling method.

7.2.6 Assessment Justification

7.2.6.1 Survey Data

A comprehensive suite of bird surveys was undertaken at the Proposed Wind Farm site between April 2021 – May 2023. Results derived from a continuous two years of surveying at the Proposed Wind Farm site and hinterland, undertaken in line with NatureScot guidance, are analysed to inform this assessment. As such, the surveys that were undertaken provide the information necessary to allow a complete, comprehensive and robust assessment of the potential impacts of the Proposed Project on avian receptors.

7.2.6.2 Mitigation

The Proposed Project has been designed to specifically avoid, reduce and minimise impacts on all avian receptors. Where potential impacts on KORs are predicted, mitigation has been prescribed to avoid, reduce and remove such impacts. Proposed best practice design and mitigation measures are specifically set out and are realistic in terms of cost and practicality. They have been subject to detailed design and will effectively address the effects on the identified KORs. As such, the potential impacts of the Proposed Project have been considered and assessed to ensure that all impacts on KORs are adequately addressed and no significant residual effects are likely to remain following the implementation of mitigation measures and best practices (refer to Section 7.6 for further details).

7.2.6.3 Limitations

The information provided in this EIAR chapter accurately and comprehensively describes the baseline environment and provides an informed prediction of the likely impacts of the Proposed Project. It also prescribes mitigation as necessary and describes the predicted residual effects. Furthermore, the desk study, surveys, analysis and reporting have been undertaken in accordance with the appropriate guidelines. Therefore, no significant limitations in the scope, scale or context of the assessment have been identified.

7.3 Baseline Ornithological Conditions

7.3.1 Designated Sites within the Likely ZOI of the Proposed Project

A screening assessment and Natura Impact Statement (NIS) were prepared to provide the competent authority with the information necessary to complete an Appropriate Assessment for the Proposed Project in compliance with Article 6(3) of the EU Habitats Directive (92/43/EEC). According to EPA (2022) "*A biodiversity section of an EIAR … should not repeat the detailed assessment of potential effects on European sites contained in documentation prepared as part of the Appropriate Assessment process, but it should refer to the findings of that separate assessment*". Therefore, this section provides a summary of the key findings regarding SPAs and nationally designated sites. For a detailed assessment of any potential impacts on SPAs, refer to the Appropriate Assessment (AA) and NIS associated with Chapter 6 of this EIAR.

Sites designated for nature conservation within the potential ZOI of the Proposed Project were identified using GIS software. The ZOI is derived utilising a precautionary approach. Initially, sites within a 15km offset from the Site are identified. Then designated sites located outside the 15km zone are accounted for and assessed for pathways for impacts. In this case, no potential for direct or indirect impacts for species listed as SCIs of SPAs more than 15km from the Site was identified. The next closest SPA is situated over 27km distant from the Site, and over 39km from the Proposed Wind Farm site – the Slieve Bloom Mountains SPA listed for breeding hen harrier. This distance is significantly beyond the foraging range of hen harrier (i.e. max range of 10km – SNH (2016)) and there were no observations of hen harrier at the Proposed Wind Farm site over the two years of surveying.

In addition (and in the absence of any specific European or Irish guidance), the guidance document '*Assessing Connectivity with Special Protection Areas*' (SNH, 2016) was consulted. This document provides guidance on identifying of connectivity between the Proposed Project and SPAs. It considers the distances some species may travel beyond the boundary of their SPAs and outlines dispersal and foraging ranges. Potential effects on wetlands and supporting habitats associated with SPAs and potential indirect pathways in the form of surface water pollution are considered in the Appropriate Assessment Screening Report and Natura Impact Statement and summarised below.

One SPA is located within 15km of the Site, the River Nore SPA. This SPA is listed and summarised in Table 7-6. No other nationally designated sites of ornithological significance occur within the potential ZOI. The closest Natural Heritage Areas (NHAs) to the Site are Coan Bogs NHA (approximately 12.3km distant) and Slievenamon Bog NHA (approximately 20.3km distant). Both of these sites are designated for peatland habitats and are not of ornithological significance[3].

[3] https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY002388.pdf
https://www.npws.ie/sites/default/files/protected-sites/synopsis/SY002382.pdf

Table 7-6 Designated sites in the Zone of Influence

Site Name	Distance from proposed works	Special Conservation Interests for which the site has been designated	Conservation Objectives	ZOI Determination and Identification of Pathways for Effect
Special Protection Area				
River Nore SPA	9.0km from the Proposed Wind Farm site Proposed Grid Connection underground cabling route crosses SPA *c.*1km north-west of Ballyragget Bridge.	› Kingfisher (*Alcedo atthis*) [A229]	This SPA has the First-Order Site-specific Conservation Objectives: To maintain or restore the favourable conservation condition of the bird species listed as Special Conservation Interests for this SPA NPWS (2022) Conservation objectives for River Nore SPA [004233]. First Order Site-specific Conservation Objectives Version 1.0. Department of Housing, Local Government and Heritage.	**Direct Effects (Disturbance)** The Proposed Wind Farm site is located approximately 9km (overland) from the SPA therefore direct effects on kingfisher (SCI population) associated with development of the site have been ruled out. Kingfisher were recorded along the Tullaroan Stream within the Proposed Wind Farm site during surveys. However, these birds are considered to be separate from the SPA population given the distance between the SPA and the Proposed Wind Farm site – i.e. over 9km overland and over 15km channel distance. Results from the 2010 national kingfisher survey estimated individual kingfisher territories on the River Nore as spanning from <1km up to a maximum of 5km of channel length (Cummins *et al.*, 2010). The Proposed Wind Farm site is over 15km channel distance from the SPA. The Proposed Grid Connection underground cabling works will be largely confined to the existing road network. The Proposed Grid Connection underground cabling route crosses the SPA approximately 1km north-west of Ballyragget. The crossing will be via Horizontal Directional Drilling (HDD) and has been designed to pass cabling

Site Name	Distance from proposed works	Special Conservation Interests for which the site has been designated	Conservation Objectives	ZOI Determination and Identification of Pathways for Effect
Special Protection Area				
				beneath the River Nore, thus avoiding works within the SPA boundary. The Proposed Grid Connection underground cabling works are broadly analogous in scale to existing activities in the general area (e.g. farm machinery, road works, vehicle movements). The proposed works are not significant in the context of the baseline conditions. As such, given the nature of the Proposed Grid Connection underground cabling works, the potential for direct impacts (disturbance) on populations of SCI species associated with the SPA as a result of the Proposed Project have been ruled out. **Indirect Effects (Deterioration in Water Quality)** Taking a precautionary approach a potential for indirect effect to the SPA (and associated SCI species) was identified via a direct surface water pathway between the SPA and the Proposed Project, both the Proposed Wind Farm site and Grid Connection underground cabling route are hydrologically linked to the SPA. Therefore, there is potential for deterioration of water quality during the construction and operational phases of the Proposed Project. Potential pathways for indirect effects on kingfisher were identified via a deterioration in water quality

Site Name	Distance from proposed works	Special Conservation Interests for which the site has been designated	Conservation Objectives	ZOI Determination and Identification of Pathways for Effect
Special Protection Area				
				potentially resulting in habitat degradation and reduced prey availability. A complete source-pathway-receptor chain was identified and in the absence of mitigation, there is potential for the Proposed Project to result in likely significant effects on this European Site. The SPA is considered to be within the Likely ZOI of the Proposed Project and further assessment is required.

7.3.2 Breeding and Wintering Bird Atlas Records

'*Bird Atlas 2007-11: The breeding and wintering birds of Britain and Ireland*' (Balmer *et al.*, 2013) is the most recent comprehensive work on wintering and breeding birds in Ireland. Previous bird atlases have been the primary source of information on the distribution and abundance of British and Irish birds prior to Bird Atlas 2007–11. The three previously published atlases were:

- The atlas of breeding birds in Britain and Ireland (Sharrock, 1976)
- The atlas of wintering birds in Britain and Ireland (Lack, 1986)
- The new atlas of breeding birds in Britain and Ireland: 1988-1991. (Gibbons *et al.,* 1993)

The Proposed Wind Farm site lies within hectads S35 and S45. Table 7-7 and Table 7-8 present a list of species of conservation interest recorded from the hectads encompassing the Proposed Wind Farm site, with regard to breeding and wintering respectively.

Table 7-7 Breeding Bird Atlas Data (Hectads S35 and S45).

Species Name	Breeding Atlas 1968-1972		Breeding Atlas 1988-1991		Breeding Atlas 2007-2011		Conservation Status
	S35	S45	S35	S45	S35	S45	
Barn Owl	conf	-	-	bred	-	-	RL
Corncrake	prob	prob	-	-	-	-	BD
Curlew	conf	prob	-	seen	-	-	RL
Grey Wagtail	conf	conf	bred	bred	-	poss	BD
Kestrel	conf	conf	seen	bred	prob	-	RL
Kingfisher	conf	-	-	bred	-	-	BD
Lapwing	-	-	-	bred	-	-	RL
Meadow Pipit	conf	conf	bred	bred	poss	conf	RL
Snipe	conf	prob	-	bred	-	-	RL
Stock Dove	conf	prob	bred	bred	-	poss	RL
Swift	conf	poss	seen	seen	conf	prob	RL
Woodcock	conf	conf	-	-	-	-	RL
Yellowhammer	conf	conf	bred	bred	-	confirmed	RL

Seen = recorded; Poss = possible breeding; Prob = probable breeding; Conf = confirmed breeding; - = not-recorded; Bred = Breeding Record. Conservation Status: BD = Annex I of the Birds Directive, RL = BoCCI Red Listed.

Table 7-8 Wintering Bird Atlas Data (Hectads S35 and S45).

Species Name	Wintering Atlas 1981-1984		Wintering Atlas 2007-2011		Conservation Status
	S35	S45	S35	S45	
Barn Owl	-	present		-	RL
Curlew	present	-	-	-	RL
Golden Plover	present	present	present	-	BD
Grey Wagtail	present	present	present	present	RL
Kestrel	present	present	present	present	RL
Lapwing	present	present	-	present	RL
Meadow Pipit	present	present	present	present	RL
Merlin	-	present		-	BD

Species Name	Wintering Atlas 1981-1984		Wintering Atlas 2007-2011		Conservation Status
	S35	S45	S35	S45	
Redwing	present	present	present	present	RL
Snipe	present	present	present	present	RL
Stock Dove	present	present	present	-	RL
Woodcock	-	present	-	-	RL
Yellowhammer	present	present	-	present	RL

Pres = present in hectad; - = not recorded. Conservation Status: BD = Annex I of the Birds Directive, RL = BoCCI Red Listed

7.3.3 Bird Sensitivity Mapping Tool

A Bird Sensitivity Mapping Tool for wind energy development was developed by BirdWatch Ireland to provide a measured spatial indication of where protected birds are likely to be sensitive to wind energy developments. The tool can be accessed via the National Biodiversity Data Centre Website (www.biodiversityireland.ie) and is accompanied by a guidance document (McGuiness *et al.*, 2015). The criteria for estimating a zone of sensitivity (i.e. 'low', 'medium', 'high' and 'highest') is based on a review of the behavioural, ecological and distributional data available for each species.

The Proposed Wind Farm site is not located within an area identified as sensitive to birds (i.e. there is no data available). The Proposed Wind Farm site is over 45km from the nearest area of high sensitivity, i.e., the Slieve Bloom Mountains.

7.3.4 Irish Wetland Bird Survey Records

The Irish Wetland Bird Survey (I-WeBS), coordinated by BirdWatch Ireland, monitors wintering waterbird populations at their wetland sites across Ireland. I-WeBS site locations are available at https://birdwatchireland.ie/our-work/.

The Proposed Wind Farm site is not covered by an I-WeBS site and the nearest site is located approximately 11km east of the Proposed Wind Farm site – i.e., Newpark Marsh. Data from I-WeBS sites within 25km of the Proposed Wind Farm site have been used to estimate populations at the 'county[4]' level for wintering waterbirds identified as KORs[5]. Datasets for the following sites were sourced from www.birdwatchireland.ie and reviewed:

- Newpark Marsh *no data available
- Bishop's Lough Tullaherin *no data available
- Avonmore Ponds, Ballyragget *no data available
- Durrow Curragh (River Erkina)

7.3.5 Rare and Protected Species Dataset

An information request was sent to NPWS requesting records from the Rare and Protected Species Database. The following records were obtained from the NPWS on the 27/05/2024:

[4] *A 25km radius of the Proposed Wind Farm site is considered to be representative of the county scale and is more representative of bird populations at 'county' scale in relation to the Proposed Wind Farm site than defined County boundaries.*
[5] *The limitations of using this data to estimate a county population is acknowledged, e.g. as all the counts in a given year were not undertaken on the same day typically there is the potential for under or over estimates, however this is the best available information.*

Kingfisher

One record of kingfisher was provided within the S45 hectad from the 2010 national survey. This record related to the River Nore, approximately 9.5km from the Proposed Wind Farm site.

Peregrine Falcon

The following peregrine nest locations or estimated centres of territory were recorded during 2017 National Peregrine Survey. The Proposed Wind Farm site is situated within hectads S35 and S45.

- Hectad S45: one occupied nest site (not known in 2002); two unoccupied nest sites (not known in 2002)

There was no peregrine breeding activity recorded during surveys at the Proposed Wind Farm site and surrounding area. The nearest suitable nesting habitat/features for peregrine within hectad S45 (as investigated via satellite imagery and during survey work), are situated over 3km from the Proposed Wind Farm site.

7.3.6 Field Survey Results

The target species recorded within the potential ZOI of the Proposed Wind Farm site during field surveys are listed in Table 7-9 below, along with a summary of breeding and roosting status. The following sections describe the records of each target species under the individual survey headings.

Table 7-9 Target species recorded in the Potential ZOI of the Proposed Wind Farm site.

Species	Overall breeding status	Overall wintering status
Kingfisher (Annex I)	**Possible Breeding. Kingfisher activity and suitable nesting habitat was recorded along Tullaroan Stream within the Proposed Wind Farm site.**	No regularly used roosts identified
Golden Plover (Annex I)	Non-breeding. There was no evidence of breeding at the Proposed Wind Farm site during surveys.	No regularly used roosts identified
Little Egret (Annex I)	Non-breeding. There was no evidence of breeding at the Proposed Wind Farm site during surveys.	No regularly used roosts identified
Peregrine Falcon (Annex I)	Non-breeding. There was no evidence of breeding at the Proposed Wind Farm site during surveys.	No regularly used roosts identified
Whooper Swan (Annex I)	Non-breeding. There was no evidence of breeding at the Proposed Wind Farm site during surveys.	No regularly used roosts identified
Kestrel (Red Listed)	**Confirmed Breeding. Up to three breeding territories identified between 850m and 2.6km of Proposed Wind Farm site.**	No regularly used roosts identified

Species		Overall breeding status	Overall wintering status
Snipe (Red Listed)		Non-breeding. There was no evidence of breeding at the site during surveys.	No regularly used roosts identified
Buzzard (Raptor)		**Confirmed Breeding. Up to four breeding territories identified, comprising up to two territories within the Proposed Wind Farm site, and up to two territories between 800m and 1.6km of the Proposed Wind Farm site.**	No regularly used roosts identified
Sparrowhawk (Raptor)		**Confirmed Breeding. Up to two breeding territories identified, comprising one territory within the Proposed Wind Farm site, and one territory between 1.9km and 2.3km of the Proposed Wind Farm site.**	No regularly used roosts identified
Passerines (Red Listed)	**Grey wagtail**	Confirmed Breeding along Tullaroan Stream within Proposed Wind Farm site.	Present within Proposed Wind Farm site during winter season.
	Meadow pipit	Probable Breeding within Proposed Wind Farm site.	Present within Proposed Wind Farm site during winter season.
	Redwing	Non-breeding. There was no evidence of breeding at the site during surveys.	Present within Proposed Wind Farm site during winter season. Max flock of 36 birds recorded.
	Yellow-hammer	Probable Breeding within Proposed Wind Farm site.	No observations during winter season.
	Swift	Non-breeding. There was no evidence of breeding at the site during surveys.	No observations during winter season.

The target species listed in Table 7-10 below were only recorded during waterbird distribution surveys and/or additional supplementary surveys greater than 4km from the Proposed Wind Farm site. These species were not observed within a minimum of 6km of the Proposed Wind Farm site and, therefore, there is no potential for impact from works at the Proposed Wind Farm site. A summary of observations is provided in Table 7-10 below.

Table 7-10 Target species recorded outside the Potential ZOI of the Proposed Wind Farm site.

Species	Observations
Curlew (Red Listed)	Closest record = 6.9km distant from Proposed Wind Farm site. There was one observation of curlew during waterbird distribution surveys, comprising a flock of six birds travelling in vicinity of King's River in February 2023 over 6km from the Proposed Wind Farm site.

A list of all bird species recorded during surveys is provided in Appendix 7-1. Appendix 7-3 presents results summary tables including:

- Summary of vantage point survey records
- Summary of breeding walkover survey records
- Summary of breeding raptor survey records

- Summary of breeding woodcock survey records
- Summary of winter walkover survey records
- Summary of waterbird distribution survey records
- Summary of non-target species recorded

Sensitive data relating to breeding sites are provided in Confidential Appendix 7-7.

Note: breeding territory polygons shown in respective maps in Confidential Appendix 7-7 are the estimated areas in which a suspected nest site is located, e.g. a confirmed territory where a bird was seen visiting a nest site will have a small targeted polygon whereas a probable territory where birds were seen displaying over suitable habitat will have a larger polygon for the estimated nest site location. Distances from the Proposed Wind Farm site and proposed turbines given in sections below are taken from the outer edge of these polygons and therefore represent minimum distances.

7.3.6.1 Kingfisher

Kingfisher was recorded during the winter and breeding seasons. Raw survey data and maps are provided in Appendix 7-4.

Breeding Walkover Surveys

Kingfisher were infrequently recorded during breeding walkover surveys, the species was observed on average once every 20 hours of breeding walkover survey. Kingfisher was recorded on five occasions during breeding walkover surveys; one observation in June 2022 and the remaining four observations from one day in July 2022. All observations were associated with the Tullaroan Stream and comprised single birds travelling up/downstream. One of the observations comprised a bird calling.

Breeding Kingfisher Surveys

Kingfisher were infrequently recorded during dedicated breeding kingfisher surveys, the species was observed on average once every 12 hours of breeding kingfisher survey. There were two observations of kingfisher during breeding kingfisher surveys, in April 2021 and May 2022, both of single birds travelling along the Tullaroan Stream.

Waterbird Distribution and Abundance Surveys

Kingfisher was recorded on three occasions during waterbird distribution surveys. One observation was from the Tullaroan Stream within the Proposed Wind Farm site, comprising a bird travelling upstream calling in August 2021. The remaining two observations were of single birds travelling, at Killaloe Bridge and along the King's River, these birds were over 4km and 11km distant from the Proposed Wind Farm site respectively.

Breeding Summary

No confirmed breeding territory was recorded within the Proposed Wind Farm site or within the surrounding area. Of the eight total observations of kingfisher along the Tullaroan stream, two involved birds calling and the remaining comprised birds travelling and perching. There were some suitable nesting banks observed along this watercourse within the Proposed Wind Farm site, where bank collapse has created vertical exposed soil banks. Numerous burrows were recorded, however these were confirmed to be sand martin nests. However, given the number of observations of kingfisher along the Tullaroan Stream, and the presence of suitable nesting banks and following a precautionary approach, it is considered that a possible breeding territory was present along this watercourse within the Proposed Wind Farm site in 2021 and 2022.

7.3.6.2 Golden Plover

Golden plover were observed in the winter season. Raw survey data and maps are provided in Appendix 7-4.

Vantage Point Surveys

Golden plover were infrequently recorded during vantage point surveys, the species was observed on average once every 31 hours of vantage point surveys during main winter and migratory period (i.e. September – April). There were three observations of golden plover during vantage point surveys, in the months of December and February. All observations comprised birds travelling with flock sizes ranging from 20-50 birds. Of the three observations, one was within/partially within the Proposed Wind Farm site and one was within/partially within 500m of the Proposed Wind Farm site.

Waterbird Distribution and Abundance Surveys

There were four observations of golden plover during the waterbird distribution surveys. All observations comprised birds travelling, with flock sizes ranging from five to 111 birds. Two observations comprised five and six birds in flight approximately 3.5km from the Proposed Wind Farm site in September 2021. The remaining two observations comprised a flock of 111 birds resting in a ploughed field near Callan in April 2023, and a flock of 16 birds in flight at Lisnalea in March 2022, approximately 5km and 10km from the Proposed Wind Farm site respectively.

7.3.6.3 Little Egret

Little egret were observed in the winter and breeding seasons. Raw survey data and maps are provided in Appendix 7-4.

Vantage Point Surveys

Little egret were infrequently recorded during vantage point surveys, the species was observed on average once every 25 hours of vantage point surveys, with an average count of 1 bird and a peak count of 2 individuals. Little egret was recorded on six occasions during vantage point surveys, in the months of May, September and December. The majority of observations comprised birds travelling. All six observations were within or partially within the Proposed Wind Farm site and were all in the general area of the Tullaroan Stream. There was a single observation of two birds foraging on the ground within the Proposed Wind Farm site.

Winter Walkover Surveys

There was one observation of little egret during winter walkover surveys, comprising a single bird foraging in field adjacent to Tullaroan Stream in December 2022, within the Proposed Wind Farm site.

Waterbird Distribution and Abundance Surveys

There were 17 observations of little egret during the waterbird distribution surveys, up to 10km from the Proposed Wind Farm site. These observations largely comprised between 1-2 birds foraging at points along the King's River near Callan. There were four observations of between 1-2 birds foraging at points along the Tullaroan Stream, two observations within the Proposed Wind Farm site and two within 500m of the Proposed Wind Farm site.

Incidental Records

There were an additional two incidental observations of little egret from breeding woodcock and breeding kingfisher surveys. These comprised an observation of a single bird travelling within the Proposed Wind

Farm site in May 2022, and two birds flushed from the Tullaroan Stream, briefly perching in a tree and then continuing flight in May 2021.

7.3.6.4 Peregrine Falcon

Peregrine were observed in the winter and breeding seasons. Raw survey data and maps are provided in Appendix 7-4.

Vantage Point Surveys

Peregrine were infrequently recorded during vantage point surveys, the species was observed on average once every 75 hours of vantage point surveys. Peregrine was recorded on two occasions during vantage point surveys, in the months of February and August, i.e. outside the core breeding season months. Both observations comprised single birds hunting, one observation within the Proposed Wind Farm site and the second over 500m from the Proposed Wind Farm site.

Breeding Walkover Surveys

There was one observation of peregrine during breeding walkover surveys, comprising a juvenile bird travelling in April 2022, within the Proposed Wind Farm site. As an early-season observation, this is likely a juvenile from the previous summer.

Breeding Raptor Surveys

There were two observations of peregrine during breeding raptor surveys. One observation comprised a single bird soaring and circling over forestry at Coolnapisha in May 2021. The second observation comprised a male in a descending glide to a church in June 2022. No signs of a nest were observed at this church and follow-up checks also recorded no nesting activity. Both observations were greater than 500m from the Proposed Wind Farm site.

7.3.6.5 Whooper Swan

Whooper swan were observed in the winter season. Raw survey data and maps are provided in Appendix 7-4.

Vantage Point Surveys

Whooper swan were infrequently recorded during vantage point surveys, the species was observed on average once every 93 hours of vantage point surveys during main winter and migratory period (i.e. September – April). There was one observation of whooper swan during vantage point surveys, comprising two birds travelling within the Proposed Wind Farm site in October 2022.

7.3.6.6 Kestrel

Kestrel was observed in the winter and breeding seasons. Raw survey data and maps are provided in Appendix 7-4. Sensitive data relating to breeding locations are presented in Confidential Appendix 7-7.

Vantage Point Surveys

Kestrel were infrequently recorded during vantage point surveys, the species was observed on average once every 8 hours of vantage point surveys. Kestrel were recorded on 19 occasions during vantage point surveys, within the months of February, May, June, July, August, September and November. All observations were of single birds, predominantly hunting or travelling. Of the 19 observations, 17 were within/partially within the Proposed Wind Farm site and two were within/partially within 500m of the Proposed Wind Farm site.

Breeding Walkover Surveys

There were two observations of kestrel during breeding walkover surveys, both from same day in July 2022 comprising an adult male travelling.

Breeding Raptor Surveys

There were 34 observations of kestrel during breeding raptor surveys. The majority of observations comprised single birds hunting/travelling. There were four observations of breeding behaviour:

In July 2021 two birds were observed circling together over woodland. A bird was observed entering this woodland shortly after, indicating a probable breeding territory at a location approximately 850m from the Proposed Wind Farm site and 1.4km from the nearest proposed turbine location, T4 (Ref: K-a - see Figure 7.7.2.2 in Confidential Appendix 7-7 for breeding territory locations).

In May 2022 an adult was recorded entering a woodland indicating a probable breeding territory at this location approximately 1.3km from the Proposed Wind Farm site (Ref: K-b).

In June 2022 a female was recorded carrying prey into woodland confirming breeding at this location approximately 950m from the Proposed Wind Farm site and 1.4km from the nearest proposed turbine location (Ref: K-c).

In July 2022 an adult was recorded carrying prey to a suspected nest site with begging calls heard, confirming breeding at this location approximately 2.6km from the Proposed Wind Farm site (Ref: K-d).

Winter Walkover Surveys

There were six observations of kestrel during winter walkover surveys, from the months of October, December, January and March. All observations comprised single adult birds hunting and travelling. Of the six observations, none were within/partially within the Proposed Wind Farm site and two were within/partially within 500m of the Proposed Wind Farm site.

Incidental Records

There were 20 incidental records of kestrel during waterbird distribution surveys, and breeding kingfisher surveys. The majority of observations were of single birds hunting and travelling. Of the 20 observations, 11 were within/partially within the Proposed Wind Farm site and seven were within/partially within 500m of the Proposed Wind Farm site.

Breeding Summary

- **2021 (One territory)** – One probable breeding territory (Ref: K-a) 850m from Proposed Wind Farm site (1.4km from nearest proposed turbine [T4]).
- **2022 (Three territories)** – Two confirmed and one probable breeding territories (Refs: K-b, K-c and K-d) 1.3km, 950m and 2.6km from the Proposed Wind Farm site respectively (1.9km [T1] 1.4km [T4] and 3.5km [T4] from nearest proposed turbines respectively).

7.3.6.7 Snipe

Snipe was recorded during the winter and passage[6] seasons. Raw survey data and maps are provided in Appendix 7-4

[6] *Passage season refers to the period when birds are on migration or moving between breeding and wintering areas, typically in the months of August, September, March and April.*

Vantage Point Surveys

Snipe were infrequently recorded during vantage point surveys, the species was observed on average once every 21 hours of vantage point surveys with an average flock of one bird and a max flock of two birds. Snipe was recorded on seven occasions during vantage point surveys, in the months of January, March, August and October, i.e. outside the core breeding season months. All observations comprised birds travelling, with four observations being within/partially within the Proposed Wind Farm site and three being within/partially within 500m of the Proposed Wind Farm site.

Breeding Walkover Surveys

There were three observations of snipe during breeding walkover surveys, all from a single day in April 2022. All observations comprised a single bird flushed and travelling within/partially within the Proposed Wind Farm site. No drumming or other breeding behaviour was recorded.

Winter Walkover Surveys

There were 12 observations of snipe during winter walkover surveys, from the months of January, February, March, October and December. All observations comprised birds flushed, with flocks ranging from an individual up to four birds. Of the 12 observations, 11 were within/partially within the Proposed Wind Farm site and one was within/partially within 500m of the Proposed Wind Farm site.

Waterbird Distribution and Abundance Surveys

There was one observation of snipe during the waterbird distribution surveys, comprising a single bird flushed over 4km from the Proposed Wind Farm site in October 2021.

Incidental Records

There were three incidental records of snipe during breeding kingfisher surveys, and on walk to supplementary vantage point survey, from months of April and November. All observations comprised single birds flushed, two within/partially within the Proposed Wind Farm site and one over 4km from the Proposed Wind Farm site.

7.3.6.8 Buzzard

Buzzard was observed in the winter and breeding seasons. Raw survey data and maps are provided in Appendix 7-4. Sensitive data relating to breeding locations are presented in Confidential Appendix 7-7.

Vantage Point Surveys

Buzzard was frequently recorded during vantage point surveys, the species was observed on average once every 2 hours of vantage point surveys ranging from an individual up to three birds. Buzzard was recorded on 64 occasions during vantage point surveys, across all months. The majority of observations comprised individual birds hunting or travelling.

There was one observation of a pair in display flight in March 2022 indicating a probable breeding territory at this location within the Proposed Wind Farm site (Ref: BZ-a - see Figure 7.7.3.3 in Confidential Appendix 7-7 for breeding territory locations). One buzzard from a pair was also seen mobbing a third buzzard in this area during a vantage point survey in April 2022.

Breeding Walkover Surveys

There were 40 observations of buzzard during breeding walkover surveys, during the months of April, May, June and July. The majority of observations were of individual birds travelling and hunting. There were several observations of breeding behaviour which are outlined below.

There were observations of a pair circling over woodland, in display flight, calling and entering woodland in June 2021 indicating a probable breeding territory at this location within the Proposed Wind Farm site (Ref: BZ-b).

A pair was observed in similar area to BZ-b within the Proposed Wind Farm site in April 2022 in display flight, indicting a probable breeding territory at this location for 2022 breeding season (Ref: BZ-c).

A pair was observed mating on a tree at the suspected breeding territory location within the Proposed Wind Farm site (Ref: BZ-a - see above) in April 2022, confirming breeding in this general location. Up to three birds were heard calling in this general area in July 2022, indicating possibly fledged young in the area from breeding pair.

Breeding Raptor Surveys

Buzzard was frequently recorded during breeding raptor surveys, the species was observed on average once every 60 minutes of breeding raptor surveys ranging from an individual up to four birds. There were 183 observations of buzzard during breeding raptor surveys. The majority of observations comprised single birds hunting/travelling. There were several observations of breeding behaviour which are outlined below.

There were a number of observations in April and May 2021 of individuals soaring over, entering and emerging from forestry in the general vicinity of breeding territory BZ-b (see above). A pair was then observed on the nest with two young in June 2021, confirming breeding at location BZ-b within the Proposed Wind Farm site.

There was an observation of a displaying bird over suitable breeding habitat in May 2021, indicating a probable breeding territory at this location approximately 1.3km from the Proposed Wind Farm site (Ref: BZ-d).

A pair was observed soaring together with one bird seen potentially carrying nesting material in April 2022 indicating a probable breeding territory at this location approximately 1.6km from Proposed Wind Farm site (Ref: BZ-e). There was also considerable activity recorded over this suitable nesting habitat in 2021 breeding season indicating probable breeding in both years.

A pair in display flight with one bird dropping down into trees in May 2022 at a location approximately 800m from Proposed Wind Farm site, indicating a probable breeding territory at this location (Ref: BZ-f).

Winter Walkover Surveys

There were 14 observations of buzzard during winter walkover surveys, from the months of October, December, January, February and March. All observations comprised single birds hunting, travelling or flushing within the Proposed Wind Farm site.

Incidental Records

There were 40 incidental records of buzzard during waterbird distribution surveys, breeding woodcock surveys and breeding kingfisher surveys. The majority of observations were of single birds hunting and travelling. Of the 40 observations, nine were within/partially within the Proposed Wind Farm site and one was within/partially within 500m of the Proposed Wind Farm site.

Breeding Summary

- **2021 (Three territories)** – Two probable breeding territories (Refs: BZ-d & BZ-e) approximately 1.3km and 1.6km from Proposed Wind Farm site respectively (1.7km [T2] and 2.7km [T7] from nearest proposed turbines respectively), and one confirmed breeding territory

(Ref: BZ-b) within the Proposed Wind Farm site (within 30m of nearest proposed turbine [T7]).

- **2022 (Six territories)** – Five probable breeding territories (Refs: BZ-c, BZ-e &BZ-f) one being within the Proposed Wind Farm site (BZ-c) (400m from nearest proposed turbine [T7]) and the remaining approximately 1.6km, and 800m from Proposed Wind Farm site respectively (2.7km [T7] and 1.4km [T4] from the nearest proposed turbines respectively), and one confirmed breeding territory (Ref: BZ-a) within the Proposed Wind Farm site (within 60m of nearest proposed turbine location [T1]).

7.3.6.9 Sparrowhawk

Sparrowhawk was observed in the winter and breeding seasons. Raw survey data and maps are provided in Appendix 7-4. Sensitive data relating to breeding locations are presented in Confidential Appendix 7-7.

Vantage Point Surveys

Sparrowhawk was infrequently recorded during vantage point surveys, the species was observed on average once every 16 hours of vantage point surveys. Sparrowhawk was recorded on nine occasions during vantage point surveys, across all months. All observations were of single birds hunting or travelling. Of the nine observations, eight were within/partially within the Proposed Wind Farm site and one was within/partially within 500m of the Proposed Wind Farm site.

Breeding Raptor Surveys

Sparrowhawk was infrequently recorded during breeding raptor surveys, the species was observed on average once every 14 hours of breeding raptor surveys. There were 12 observations of sparrowhawk during breeding raptor surveys. The majority of observations comprised single birds hunting/travelling. There were several observations of breeding behaviour which are outlined below.

A bird was observed in in display flight over woodland within the Proposed Wind Farm site in May 2021 indicating a probable breeding territory at this location (Ref: SH-a - see Figure 7.7.4.2 in Confidential Appendix 7-7 for breeding territory locations).

A bird was observed flying out of forestry with agitated calling in July 2021 approximately 1.9km from the Proposed Wind Farm site, indicating a probable breeding territory at this location (Ref: SH-b).

A bird was observed soaring and carrying prey in July 2022 confirming breeding in general area approximately 2.3km from the Proposed Wind Farm site (Ref: SH-c).

Winter Walkover Surveys

There were two observations of sparrowhawk during winter walkover surveys, both from same day in January 2023. Both observations comprised a female hunting within the Proposed Wind Farm site.

Incidental Records

There were eight incidental records of sparrowhawk during waterbird distribution surveys and breeding kingfisher surveys. All observations were of single birds hunting, travelling or soaring. Of the eight observations, two were within/partially within the Proposed Wind Farm site and none within/partially within 500m of the Proposed Wind Farm site.

Breeding Summary

- **2021 (Two territories)** – Two probable breeding territories, one within the Proposed Wind Farm site (Ref: SH-a) and one approximately 1.9km from the Proposed Wind Farm site (Ref: SH-b); 100m [T7] and 2.5km [T7] from nearest proposed turbines respectively.

- **2022 (One territory)** – One confirmed breeding territory approximately 2.3km from the Proposed Wind Farm site (Ref: SH-c)); 2.6km from nearest proposed turbine [T1].

7.3.6.10 Passerines (Red Listed)

The BOCCI red listed species grey wagtail, meadow pipit, redwing, swift and yellowhammer were recorded within 500m of the Proposed Wind Farm site during surveys.

Grey wagtail were observed on 27 occasions, the majority associated with the Tullaroan Stream including an observation of two adults and three fledgelings in June 2021. Meadow pipit was observed on 15 occasions, with up to seven birds recorded, including birds recorded in display flight. Redwing was observed on 14 occasions during the winter season, with a max flock of 36 birds recorded. Swift was observed on two occasions, with a max flock of eight birds recorded. Yellowhammer was observed on two occasions, both comprising single birds singing.

7.4 Receptor Evaluation

7.4.1 Determination of Population Importance

A determination of population importance for birds within the likely ZOI is provided below, following criteria described in Section 7.2.5. Estimates of national population sizes were obtained from the most recent species-specific national survey, or national surveys by Burke *et al.* (2018), Lewis *et al.* (2019a), Crowe *et al.* (2014) and Lewis *et al.* (2019b), or Ireland's Article 12 Reporting 2013-2018 (EU, 2022), depending on what literature was available. Estimates for mean county population sizes were obtained from species-specific surveys, a review of I-WeBS sites within 25km of the Proposed Wind Farm site[7], or derived from national estimates, according to what literature was available.

Following NRA (2009), a population of National Importance is a regularly occurring population that exceeds 1% of the national population. Similarly, a population of County Importance is a regularly occurring population that exceeds 1% of the county population. Locally Important (Higher Value) populations are resident or regularly occurring species of conservation concern of importance at the local level, while Locally Important (Lower Value) populations are resident or regularly occurring species of some local importance.

7.4.1.1 Kingfisher

As reported (2013-2018) under Article 12 of the Birds Directive (Directive 2009/147/EC), the estimated population of kingfisher is 368 - 1,031 pairs. Therefore, taking the median of this range estimate, as per NRA 2009, a regularly occurring population of six pairs of kingfisher is required for classification as Nationally Important. There are no published figures for the County Kilkenny population of kingfisher. Taking a precautionary approach and using the above as a guide; a regularly occurring population of a single bird is required for classification of County Importance.

Kingfisher was recorded on eight occasions within the Proposed Wind Farm site, all associated with the Tullaroan Stream. A possible breeding territory was present along this watercourse within the Proposed Wind Farm site in 2021 and 2022.

The population recorded at the Proposed Wind Farm site was therefore assigned **County Importance** on the basis of a resident/regularly occurring population assessed to be important on a county level.

7.4.1.2 Golden Plover

Wintering

The estimated national wintering population of golden plover in Ireland is 80,707 for the Republic of Ireland (ROI) (Burke et al. 2018). 1% of the ROI National wintering population of golden plover is 807 birds. As per NRA 2009, a regularly occurring population of 807 golden plover is required for classification as Nationally Important. The maximum number of birds recorded within 500m of the Proposed Wind Farm site during the winter seasons surveyed was 50 birds. A regularly occurring Nationally Important population was not therefore observed at the Proposed Wind Farm site.

To estimate the county population, a review of all I-WeBS sites within 25km of the Proposed Wind Farm site was conducted. It should be noted that the population estimate based on I-WeBS figures alone is likely to be an underestimate of the county population[8]. This is due to the foraging ecology of wintering golden plover that will utilise agricultural grasslands and other terrestrial habitats not typically surveyed during I-WeBS counts. I-WeBS is a survey of wetland habitats.

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[7] *Please note that these figures are estimates based on the best available information and should be interpreted with a degree of caution.*

[8] *I-WeBS data has been used for the estimate of county populations of wintering waterbirds in the absence of other available data. As per Burke et al (2018) in relation to the golden plover count, "these estimates must be treated as conservative on the basis that they are widely disturbed in a variety of wetland and non-wetland habitats that are under-sampled during I-WeBS."*

Below are the mean count values recorded for I-WeBS sites over the most recent 5-season period, i.e. for the period 2016/17 – 2020/21 (note that sites with a mean of zero birds were excluded from this list)):

- Little Brosna Callows (mean = 552)

Based on the above, the mean wintering population[9] from 25km radius of the Proposed Wind Farm site is 552 birds. However, as previously stated this likely remains an underestimate. Therefore, a regularly occurring population of 5 or more birds (>1% of the county population, as per NRA (2009)) is required to be classified as County Importance.

Golden plover were only recorded within 500m of the Proposed Wind Farm site on only two occasions over the two years of bird surveys. The Proposed Wind Farm site is of **No Ecological Importance** to this species, based on the following rationale. This is a numerous and widespread wintering species and notwithstanding this there was only two observations of this species within the Proposed Wind Farm site over the two winters of surveying, comprising birds travelling.

7.4.1.3 Little Egret

The estimated national wintering population of little egret in Ireland is 1,274 Burke *et al.* 2018). As reported (2013-2018) under Article 12 of the Birds Directive (Directive 2009/147/EC), the estimated population of breeding little egret in Ireland is between 323 – 645 pairs, which indicates a population broadly in-line with the wintering estimate. As such, as per NRA 2009, a regularly occurring population of 12 little egret, or six pairs, is required for classification as Nationally Important. The maximum flock recorded within 500m of the Proposed Wind Farm site was two birds. No breeding activity was recorded within the Proposed Wind Farm site. A regularly occurring Nationally Important population was not therefore observed at the Proposed Wind Farm site.

To estimate the county population, a review of all I-WeBS sites within 25km of the Proposed Wind Farm site was conducted. Below are the mean count values recorded for I-WeBS sites over the most recent 5-season period, i.e. for the period 2016/17 – 2020/21 (note that sites with a mean of zero birds were excluded from this list)):

- Little Brosna Callows (mean = 10)

Therefore, a regularly occurring population of one bird is required to be classified as County Importance. The population recorded at the Proposed Wind Farm site was therefore assigned **County Importance** on the basis of a resident/regularly occurring wintering population assessed to be important on a county level.

7.4.1.4 Peregrine

As reported (2013-2018) under Article 12 of the Birds Directive (Directive 2009/147/EC), the estimated population of peregrine is 425 pairs. Therefore, as per NRA 2009, a regularly occurring population of four pairs of peregrine is required for classification as Nationally Important.

There are no published figures for the County Kilkenny population of peregrine. The Bird Atlas (2007 – 2011) provides breeding and wintering distribution maps for birds in Ireland. Using these maps, and using the national population estimate for peregrine of 425 pairs, county populations can be inferred by examining distribution points for each county. The population of peregrine in Co. Kilkenny is therefore roughly estimated to be 8 birds. Taking a precautionary approach and using the above as a guide; a regularly occurring population of a single bird is required for classification of County Importance.

Peregrine was only observed on two occasions within 500m of the Proposed Wind Farm site over the two years of surveying, comprising single birds travelling/hunting.

[9] *Please note that these figures are estimates based on the best available information and should be interpreted with a degree of caution.*

The Proposed Wind Farm site is of **No Ecological Importance** to this species, given that there was only two observations of this species within the Proposed Wind Farm site over the two years of surveying.

7.4.1.5 Whooper Swan

There was only one observation of whooper swan within 500m of the Proposed Wind Farm over the two years of surveying, comprising two birds travelling in October 2022.

The Proposed Wind Farm site is of **No Ecological Importance** to this species, given that there was only one observation of this species within the Proposed Wind Farm site over the two years of surveying.

7.4.1.6 Kestrel

As reported (2013-2018) under Article 12 of the Birds Directive (Directive 2009/147/EC), the national breeding population estimate of kestrel in the ROI is 13,500 birds. Using these latest figures, 1% of the National population of kestrel is 135 birds. Therefore, as per NRA 2009, a regularly occurring population of 135 birds is required for classification as Nationally Important.

There are no published figures for the County Kilkenny population of kestrel. The Bird Atlas (2007 – 2011) provides breeding and wintering distribution maps for birds in Ireland. Using these maps, and using the national population estimate for peregrine of 13,500 birds, county populations can be inferred by examining distribution points for each county. The population of kestrel in Co. Kilkenny is therefore roughly estimated to be 270 birds. Therefore, a regularly occurring population of two birds is required for classification of County Importance.

There were no breeding territories identified within the Proposed Wind Farm site or within 500m of the Proposed Wind Farm site. There was a maximum of three breeding territories per year (2021–2022) identified in the surrounding area, the closest of which was 850m from the Proposed Wind Farm site. This indicates a resident population of six adult birds during the breeding season in the wider area. Kestrel were regularly recorded hunting within the Proposed Wind Farm site, and it can therefore be assumed birds from these territories utilise the Proposed Wind Farm site as hunting grounds. This population would be bolstered by fledglings at the end of the breeding season, which will remain present in the area until the start of the next breeding season, when birds become territorial again. Given that kestrel have brood sizes of four to five chicks, and a survival rate of 30% in their first year[10], it is likely that there would be a population of approximately six adults and five juvenile birds by the end of each winter season. The population recorded at the Proposed Wind Farm site was therefore assigned **County Importance** on the basis of a resident/regularly occurring wintering population assessed to be important on a county level.

7.4.1.7 Snipe

Wintering

There are no population estimates for wintering snipe in Ireland. As reported (2013-2018) under Article 12 of the Birds Directive (Directive 2009/147/EC), the national breeding population estimate of snipe in the Republic of Ireland is 4,275 breeding pairs. In the absence of wintering population estimates, using these latest figures, 1% of the National population of snipe is taken to be 43 pairs. Taking a highly precautionary approach, it has been assumed that the number of birds is double the number of pairs. Note: as wintering snipe population in Ireland is bolstered by migration of European birds, this represents a considerable underestimate of the wintering population. Therefore, as per NRA 2009, a regularly occurring population of 86 birds is required for classification as Nationally Important.

There are no published figures for the County Kilkenny populations of snipe. The Bird Atlas (2007 – 2011) provides breeding and wintering distribution maps for birds in Ireland. Using these maps, and using the national population estimate for snipe of 4,275 pairs, county populations can be inferred by

[10] https://app.bto.org/birdfacts/results/bob3040.html

examining distribution points for each county. The wintering population of snipe in Co. Kilkenny is therefore roughly estimated to be 171 birds. Therefore, a regularly occurring population of 1 bird is required for the classification of County Important.

There were 24 observations of snipe within 500m of the Proposed Wind Farm site during the winter months, with a max count of four birds. As such, given that there is a regularly occurring wintering population of >1 bird, the wintering population recorded within 500m of the Proposed Wind Farm site was assigned **County Importance**.

Breeding

The only observations of snipe during the breeding season within 500m of the Proposed Wind Farm site are from early April and late August, and likely represent birds on passage and are therefore taken to be part of the wintering population. There were no observations of snipe during the months of May – July and no observations of drumming or breeding behaviour. The Proposed Wind Farm site is of **No Ecological Importance** to this species during the breeding season, given that there were no observations of this species within the Proposed Wind Farm site during the main breeding season months.

7.4.1.8 Buzzard

Buzzard is not listed on Annex I of the Birds Directive. The species is Green listed in Ireland (BoCCI). The population recorded across the seasons was assigned **Local Importance (Higher Value)** on the basis of a resident/regularly occurring population assessed to be important at the local level.

7.4.1.9 Sparrowhawk

Sparrowhawk is not listed on Annex I of the Birds Directive. The species is Green listed in Ireland (BoCCI). The population recorded was assigned **Local Importance (Higher Value)** on the basis of a resident/regularly occurring population assessed to be important at the local level.

7.4.1.10 Passerines (Red Listed)

Grey wagtail, meadow pipit, redwing, swift and yellowhammer are Red listed on the BoCCI. Populations recorded at the Proposed Wind Farm site were deemed to be of no greater than **Local Importance (Lower Value)**.

7.4.2 Identification of Key Ornithological Receptors

Table 7-11 outlines the rationale for including or excluding each target species recorded during field surveys as a KOR. The conservation status, population importance evaluation following NRA (2009) and a detailed explanation for inclusion/exclusion as a KOR is provided. The sensitivity of species included as KORs are then evaluated in the following section.

Table 7-11 Receptor evaluation and selection criteria rational

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
Kingfisher	Annex I, EU Birds Directive; SCI of the River Nore SPA; BoCCI Amber List & Irish Wildlife Act.	<u>All Seasons</u> County Importance	Kingfisher were occasionally recorded along the Tullaroan Stream within the Proposed Wind Farm site. **An assessment of direct habitat loss is required.** Birds were recorded within the Proposed Wind Farm site. Taking a precautionary approach, **the potential for displacement exists.** This species was not recorded flying over the Proposed Wind Farm site within the potential collision risk zone. A collision risk assessment is not required.	**Yes**
Golden Plover	Annex I, EU Birds Directive; BoCCI Red List (Breeding & Wintering Populations) & Irish Wildlife Act	<u>Wintering</u> No population of ecological significance recorded	There were only two records of golden plover within 500m of the Proposed Wind Farm site during the two years of surveys, comprising birds travelling. The potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the Proposed Wind Farm site is of any ecological importance to this species. Please refer to Section 7.4.1 for further detailed discussion. **No pathways for significant effects were identified.**	**No**
Little Egret	Annex I, EU Birds Directive	<u>All Seasons</u> County Importance	Little egret were occasionally recorded along the Tullaroan Stream within the Proposed Wind Farm site. **An assessment of direct habitat loss is required.** Birds were recorded within the Proposed Wind Farm site. Taking a precautionary approach, **the potential for displacement exists.**	**Yes**

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
			This species was recorded flying over the Proposed Wind Farm site within the potential collision risk zone. **A collision risk assessment is required.**	
Peregrine	Annex I, EU Birds Directive & Irish Wildlife Act.	<u>All Seasons</u> No population of ecological significance recorded	There were only two records of peregrine within 500m of the Proposed Wind Farm site during the two years of surveys, comprising individual birds travelling. The potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the Proposed Wind Farm site is of any ecological importance to this species. Please refer to Section 7.4.1 for further detailed discussion. **No pathways for significant effects were identified.**	**No**
Whooper Swan	Annex I, EU Birds Directive	<u>All Seasons</u> No population of ecological significance recorded	There was only a single record of whooper within 500m of the Proposed Wind Farm site during the two years of surveys, comprising two birds travelling. The potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the Proposed Wind Farm site is of any ecological importance to this species. Please refer to Section 7.4.1 for further detailed discussion. **No pathways for significant effects were identified.**	**No**
Kestrel	BoCCI Red Listed (Breeding Populations) & Irish Wildlife Act.	<u>All Seasons</u> County Importance	There were no kestrel territories identified within the Proposed Wind Farm site. However, up to three territories were observed within 5km of the Proposed Wind Farm site and kestrel were regularly recorded hunting within the Proposed Wind Farm site. The potential for habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** This species was regularly recorded within the Proposed Wind Farm site. **An assessment of displacement effect is required.** This species was recorded flying over the Proposed Wind Farm site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
Snipe	BoCCI Red Listed (Breeding & Wintering Populations) & Irish Wildlife Act.	<u>Wintering</u> County Importance	Snipe was regularly recorded within the Proposed Wind Farm site during the winter season. **An assessment of direct habitat loss is required.** This species was regularly recorded within the Proposed Wind Farm site during the winter season. **An assessment of displacement effect is required.** This species was recorded flying over the Proposed Wind Farm site within the potential collision risk zone during the winter season. **A collision risk assessment is required.**	**Yes**
		<u>Breeding</u> No population of ecological significance recorded	There were no observations of snipe during the breeding season, with records from early April and late August considered to be part of wintering population and will be assessed as such. The potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the Proposed Wind Farm site is of any ecological importance to this species during the breeding season. Please refer to Section 7.4.1 for further detailed discussion. **No pathways for significant effects were identified.**	**No**
Buzzard	BoCCI Green List & Irish Wildlife Act.	<u>All Seasons</u> Local Importance (Higher Value)	There was one confirmed breeding territory identified within the Proposed Wind Farm site in both 2021 and 2022, with an additional probable territory identified within the Proposed Wind Farm site in 2022. Up to four additional territories were identified in the surrounding 5km of the Proposed Wind Farm site. Buzzard were regularly recorded hunting within the Proposed Wind Farm site. The potential for habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** This species was recorded breeding and regularly hunting within the Proposed Wind Farm site. **An assessment of displacement effect is required.** This species was regularly recorded in flight within the Proposed Wind Farm site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
Sparrowhawk	BoCCI Green List & Irish Wildlife Act.	<u>All Seasons</u> Local Importance (Higher Value)	There was one probable breeding territory identified within the Proposed Wind Farm site and up to two additional territories identified in the surrounding area. Sparrowhawk were regularly recorded hunting within the Proposed Wind Farm site. The potential for habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** This species was regularly recorded hunting within the Proposed Wind Farm site. **An assessment of displacement effect is required.** This species was recorded in flight within the Proposed Wind Farm site within the potential collision risk zone. **A collision risk assessment is required.**	**Yes**
Passerines (Red Listed)	BoCCI Red List & Irish Wildlife Act.	<u>All Seasons</u> Local Importance (Lower Value)	As per NatureScot guidance, it is considered that passerine bird species are not significantly impacted by wind farms due to their ecology and large populations. As such, the potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the development will significantly impact these species.	**No**

7.4.3 Key Ornithological Receptor Sensitivity Determination

Criteria developed by Percival (2003) for assessing bird sensitivity within the Proposed Wind Farm site is presented in Table 7-3 (Section 7.2.5). The sensitivity of the KORs, as per Percival (2003), are listed below, including the rationale for their respective sensitivity classification.

Medium Sensitivity KORs include:

- Kingfisher (Annex I; SCI of River Nore SPA[11])
- Little Egret (Annex I)
- Kestrel (BoCCI Red Listed)
- Snipe (BoCCI Red Listed)

The remaining KORs identified were classified as Low Sensitivity:

- Buzzard
- Sparrowhawk

7.5 Potential Effects

All elements of the Proposed Project have been considered in assessing impacts on KORs. This section is structured as follows:

- Assessment of 'Do nothing' Effect
- Assessment of impacts in relation to KORs during construction and operation of the Proposed Wind Farm
- Assessment of impacts in relation to KORs during decommissioning of the Proposed Wind Farm
- Assessment of impacts associated with the Proposed Grid Connection underground cabling route
- Assessment of impacts on designated areas

7.5.1 Do-Nothing Effect

If the Proposed Project for which this EIAR has been prepared was not to proceed, the Site would continue to be managed under the various current management practices. It is reasonable to assume that the character of the habitats and related bird community, including the KORs identified, will remain much as is described in the baseline ornithological conditions. The Proposed Wind Farm site is characterised by improved agricultural grassland utilised for livestock grazing and smaller areas of commercial forestry plantation. Improved agricultural grassland and commercial forestry are typically considered to be of low ecological value. Both habitat types are among the most abundant in Ireland, particularly so, in the case of improved agricultural grassland. Neither habitat are rare locally or uniquely occur within the Proposed Wind Farm site.

If the Proposed Project were not to proceed, the existing uses of small-scale agriculture would continue. The opportunity to harness the wind energy resource of County Kilkenny would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions. The opportunity to generate local employment and investment would also be lost.

[11] *Connectivity between the kingfisher recorded at the Proposed Wind Farm site and the River Nore SPA population has been ruled out based on the significant intervening distance between the two locations – i.e. over 9km overland or over 15km channel distance. As such, kingfisher is assigned Medium Sensitivity as per Percival (2003).*

If the Proposed Project were not to proceed, the opportunity to provide an area of hedgerow enhancement and creation and riparian planting along a section of the Tullaroan Stream, as associated benefits for birds, would be lost (please see Appendix 6-4, Biodiversity Management and Enhancement Plan, for details.

7.5.2 Effects on Key Ornithological Receptors during Construction and Operation

The following sections describe potential effects on KORs that may occur during the construction and operation of the Proposed Wind Farm. The magnitude and significance of these effects are then defined according to Percival (2003) and EPA (2022) criteria.

7.5.2.1 Kingfisher (All Seasons)

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	There were observations of kingfisher along the Tullroan Stream, in addition there were watercourse banks of suitable nesting habitat, within the Proposed Wind Farm site. While no breeding was identified, adopting a precautionary approach it is possible a breeding territory was present in 2021 and 2022 within the Proposed Wind Farm site. See Section 7.3.6.1 for further information. There will be minimal loss of suitable nesting or foraging habitat within the Proposed Wind Farm site. The only works in the direct vicinity of the Tullaroan Stream comprise a single clear-span watercourse crossing to facilitate the internal road (between T6 and T7). No instream works are necessary for this crossing. The foundation base will be excavated outside the stream along the stream bank. There is potential for some alterations to the bank profile at this location. The alteration to a minor section of bank at the specific foundation locations is insignificant given the extent of suitable nesting banks present along the length of the Tullaroan Stream. No significant effects are predicted.	The magnitude of the effect is assessed as *Low.* The cross tablature of a *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Long-term **Slight** Negative Effect
Disturbance	As outlined above, a possible kingfisher breeding territory was identified along the Tullaroan Stream within the Proposed Wind Farm site.	The magnitude of the effect is assessed as *High.* The cross tablature of a *Medium* sensitivity species and *High*	Short-term **Moderate** Negative Effect Please see Section 7.6.2.2 for a description of

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
	A disturbance buffer zone of between 50-100m is recommended for kingfisher (Goodship & Furness, 2022). The only proposed works within a 100m buffer zone of the Tullaroan Stream comprise the following: › Upgrade works to approx. 250m section of existing internal road in west of site; › Approx. 230m section of new road between T6 and T7 (including requirement for some tree felling); and › Clear-span watercourse crossing as part of this new road section. Adopting a precautionary approach, and in the absence of mitigation, these works have the potential to cause short-term disturbance to breeding kingfisher which may be present within 100m of the works areas.	Impact corresponds to a **Medium** effect significance.	mitigation to avoid/offset impacts.
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated, as no additional infrastructure is proposed.	**No Effect**	**No Effect**
Displacement and Barrier Effect	There is no published research on displacement/avoidance buffers for kingfisher around operational wind infrastructure. The closest proposed turbine to the Tullaroan Steam is over 250m distant (T6). The proposed substation is situated over 100m distant. The only permanent infrastructure within 100m of the Tullaroan Stream is a new internal road and associated clear-span watercourse crossing. This internal road will be used infrequently. There are existing public road crossings of the Tullaroan Stream in the vicinity of the Proposed Wind Farm site – i.e. to the west of the Proposed Wind Farm site along the L5023 and in Kilmanagh. Noise and visual stimuli generated by infrequent vehicle movements on the internal road will be minimal in comparison to the existing public road crossings. Significant impacts are not predicted.	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Long-term **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
Collision Risk	This species was not recorded flying at potential collision height during the vantage point survey work undertaken at the Proposed Wind Farm site. Collision related mortality is not likely to significantly impact this species. Furthermore, kingfisher predominantly travelling along watercourse corridors rather than across open terrestrial habitats when moving across the landscape. The closest proposed turbine to the Tullaroan Steam is over 250m distant (T6), and no turbine blades will overhang the stream.	**No Effect**	**No Effect**

7.5.2.2 Little Egret (All Seasons)

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	Little egret was recorded within the Proposed Wind Farm site on 11 occasions over the two years of surveying. Of the 11 observations, five comprised birds utilising habitats within the Proposed Wind Farm site. These observations were of 1-2 birds and were all associated with agricultural land adjacent to the Tullaroan Stream. The above utilised areas are outside the footprint of the Project and there will be no direct/physical habitat loss in these areas. The only proposed infrastructure within 100m of the Tullaroan Stream is a new internal road and associated clear-span watercourse crossing. This is predominantly in commercial forestry which is of little to no ecological value to little egret. A minor amount of agricultural grassland within 100m of the stream will be removed to facilitate this road. This habitat is abundant in the wider area and are not unique to the Proposed Wind Farm site. In addition, the land lost to the permanent development footprint is small, comprising a total of approximately 8.75ha (or 0.88%) of the overall Site . No significant effects are predicted.	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Long-term **Slight** Negative Effect
Disturbance	As outlined above, little egret was infrequently recorded utilising habitats within the Proposed Wind Farm site and in small numbers over the two years of surveying (i.e. total of five observations comprising 1-2 birds). There were an additional two records of birds utilising habitats within 500m of the Proposed Wind Farm site. These observations were similarly within agricultural grassland habitat. This habitat type is abundant in the wider area and are not unique to the Proposed Wind Farm site. Therefore, were disturbance to occur it would not result in the loss of a scarce resource for the local little egret population.	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Short-term **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
	Significant impacts are not predicted.		
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	There is no published research on displacement/avoidance buffers for little egret around operational wind infrastructure. However, as outlined further above, little egret was infrequently recorded within 500m of the Proposed Wind Farm site and in small numbers, over the two years of surveying. The habitats utilised comprised agricultural grassland. This habitat is abundant in the wider area and is not unique to the Proposed Wind Farm site. This limits the potential for ecologically significant impacts to result. Significant impacts are not predicted.	The magnitude of the effect is assessed as *Low* The cross tablature of a *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Long-term **Slight** Negative Effect
Collision Risk	This species was recorded flying the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken (full details provided in Appendix 7-6). The collision risk has been calculated at a rate of 0.007 collisions per year. No bird collisions have been predicted over the 35 year lifetime of the Proposed Wind Farm. The predicted collision risk is therefore negligible as per Percival (2003). Significant impacts are not predicted.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* impact corresponds to a **Very Low** effect significance.	Long-term **Not Significant** Negative Effect

7.5.2.3 Kestrel (All Seasons)

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	There were no kestrel breeding territories recorded within the Proposed Wind Farm site. There were up to three breeding territories identified across the two breeding seasons during surveys. These were situated between 950m – 2.6km from the Proposed Wind Farm site (where no infrastructure is proposed). There will be minimal loss of suitable breeding habitat within the Proposed Wind Farm site. The majority of the development footprint is located in open agricultural grassland with minimal removal of mature trees or wooded areas. Kestrel were regularly recorded foraging within the Proposed Wind Farm site. However, direct (physical) loss of foraging habitat relative to its availability onsite, will be minimal. The land lost to the Proposed Project development footprint is small, comprising a total of approximately 8.75ha (or 0.88%) of the overall Site. In addition, the results of breeding raptor surveys outside of the Proposed Wind Farm site recorded similar levels of kestrel activity across areas of similar habitat, i.e. agricultural grassland, woodland and commercial forestry, which are the abundant habitat types in the surrounding area. The Proposed Wind Farm site is therefore not a unique or scarce resource for kestrel and the potential for construction works to result in ecologically significant habitat loss for kestrel is therefore limited. Substantial areas of undisturbed suitable breeding and foraging habitat will remain both within the Proposed Wind Farm site and the wider surroundings post-construction. Significant impacts are not predicted.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Long-term **Slight** Negative Effect
Disturbance	As outlined above, there were up to three breeding territories identified, situated between 950m – 2.6km from the Proposed Wind Farm site.	The magnitude of the effect is assessed as *Low*.	Short-term **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
	A disturbance buffer zone of between 100-200m from construction works is recommended for kestrel during the breeding season, and <50m during non-breeding season (Goodship & Furness, 2022). The identified breeding territories are significantly beyond these distances from the Proposed Wind Farm site and any construction works. Kestrel were recorded foraging within the Proposed Wind Farm site. Disturbance associated with construction works has the potential to result in a measurable reduction in the local density of foraging kestrel (onsite). However, significant impacts are not predicted, at the county, national or international level, based on the following rationale. The Proposed Wind Farm site does not contain habitats that are unique or rare in the local area. The results of breeding raptor surveys outside of the Proposed Wind Farm site recorded similar levels of kestrel activity across areas of similar habitat, i.e. agricultural grassland, woodland and commercial forestry, which are the abundant habitat types in the surrounding area. Therefore, were disturbance to occur it would not result in the loss of a scarce resource for the local kestrel population. No significant impacts are predicted at the county, national or international level.	The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	Raptor studies have found low levels of turbine avoidance (Hötker et al. 2006; Madders & Whitfield 2006), with some species, such as kestrels, known to continue foraging activity close to turbines (Pearce Higgins et.al 2009). Moreover, significant effects are not anticipated, given that extensive areas of suitable foraging habitat exist and will remain in the wider area. Onsite habitats are not unique to the Proposed Wind Farm site. Significant displacement effects are not predicted.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Long-term **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
Collision Risk	This species was recorded flying the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken (full details provided in Appendix 7-6). The collision risk has been calculated at a rate of 0.391 collisions per year. Annual mortality of adult kestrel has been calculated 31% per annum (Village, 1990). If 0.391 collisions were to occur per year, it would mean that the losses at the Proposed Wind Farm would increase the annual mortality of the county population[12] (i.e. 270 birds (please see Section 7.4.1 for further details)) by 0.47%. The predicted collision risk is therefore negligible as per Percival (2003). Significant impacts are not predicted.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* impact corresponds to a **Very Low** effect significance.	Long-term **Not Significant** Negative Effect

[12] *The county population was considered a suitable reference population for assessment, based on the following rationale. This is a mobile and widespread species (as per the Bird Atlas 2009-11) that utilises widespread habitat types (agricultural grassland, commercial forestry), it is, therefore, unlikely to be a distinct local population and reasonable to conclude that there is some exchange of individuals in suitable habitat within a 25km radius. As outlined in Section 7.3, a 25km radius has been used as a proxy for a county.*

7.5.2.4 Snipe (Wintering)

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	Snipe was recorded within the Proposed Wind Farm site on 24 occasions over the two years of surveying. Of these, there were 20 observations of snipe utilising habitats within the Proposed Wind Farm site (all comprising birds flushed from ground). The majority of these observations were of single birds, with a max observation of four birds. The utilised habitats comprised agricultural grassland and wet grassland. These habitats are abundant in the wider area and are not unique to the Proposed Wind Farm site. In addition, the land lost to the permanent development footprint is small, comprising a total of approximately 8.75ha (or 0.88%) of the overall Site. No significant effects are predicted.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* impact corresponds to a **Very Low** effect significance.	Long-term **Not Significant** Negative Effect
Disturbance	As outlined above, snipe was recorded utilising habitats within the Proposed Wind Farm site on 20 occasions over the two years of surveying. There were an additional four records of birds utilising habitats within 500m of the Proposed Wind Farm site (between 1-2 birds). These observations were similarly within agricultural grassland habitat. Disturbance associated with construction works has the potential to result in a measurable reduction in the local density of snipe (i.e. onsite). However, these onsite habitats are abundant in the wider area and are not unique to the Proposed Wind Farm site. Therefore, were disturbance to occur it would not result in the loss of a scarce resource for the local snipe population. Significant impacts are not predicted, at the county, national or international level.	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Short-term **Slight** Negative Effect
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	**No Effect**	**No Effect**

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
Displacement and Barrier Effect	As outlined above, snipe was recorded utilising habitats within the Proposed Wind Farm site on 20 occasions over the two years of surveying, with an additional four records of birds utilising habitats within 500m of the Proposed Wind Farm site. Pearce-Higgins et. al (2009), found that breeding snipe showed significant avoidance of turbines extending to a distance of 400m, with breeding density reduced by up to 50% within this area (Pearce-Higgins et. al 2009). There is also evidence of avoidance of access tracks. The above study relates to breeding snipe. Breeding activity was not recorded for snipe within the Proposed Wind Farm site or within 500m of the Proposed Wind Farm site. Wintering non-breeding birds are assumed to be at less risk of disturbance effects, as they are not tied to a fixed location (i.e. nest site) and are therefore less restricted in their selection of habitats. The habitats within the Proposed Wind Farm site and a 500m radius comprise agricultural grassland commercial forestry. These are the abundant habitat types in the surrounding landscape and are not unique to the Proposed Wind Farm site. Significant displacement impacts is not predicted.	The magnitude of the effect is assessed as *Low*. The cross tablature of a *Medium* sensitivity species and *Low* Impact corresponds to a **Low** effect significance.	Long-term **Slight** Negative Effect
Collision Risk	This species was recorded flying the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken (full details provided in Appendix 7-6). The collision risk has been calculated at a rate of 0.019 collisions per year. No bird collisions have been predicted over the 35 year lifetime of the Proposed Wind Farm. The predicted collision risk is therefore negligible as per Percival (2003). Significant impacts are not predicted.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of a *Medium* sensitivity species and *Negligible* impact corresponds to a **Very Low** effect significance.	Long-term **Not Significant** Negative Effect

7.5.2.5 Buzzard (All Seasons)

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	There was one confirmed buzzard breeding territory identified within the Proposed Wind Farm site during the 2021 breeding season and one confirmed and one probable breeding territory during the 2022 breeding season. These breeding territories do not directly overlap with any proposed turbine location. The only proposed project elements overlapping the approx. nest locations, is a section of new road through forestry in vicinity of buzzard territory BZ-b. This species was frequently recorded within the Proposed Wind Farm site during the breeding and winter seasons. The construction of the Proposed Wind Farm will not result in the loss of a significant amount of foraging habitat given the development footprint is small, comprising a total of approximately 8.75ha (or 0.88%) of the overall Site. In addition, the majority of suitable nesting habitat (e.g. mature forestry, woodland and treelines) are outside the Proposed Project development footprint and there will be no significant reduction in these habitats. Significant impacts are not predicted.	The magnitude of the effect is assessed as *Medium*. The cross tablature of *Low* sensitivity species and *Medium* Impact corresponds to a **Very Low** effect significance.	Long-term **Not Significant** Negative Effect
Disturbance	There was one confirmed buzzard breeding territory identified within the Proposed Wind Farm site during the 2021 breeding season and one confirmed and one probable breeding territory during the 2022 breeding season. These breeding territories do not directly overlap with any proposed turbine location. The only proposed project elements within the estimated areas within which the nests are located, is a section of new road through forestry in vicinity of buzzard territory BZ-b. In the absence of mitigation, there is some potential for disturbance should works take place during the breeding season and should this breeding pair be present in the vicinity of the works. This species was frequently recorded within the Proposed Wind Farm site during the breeding and winter seasons. The disturbance associated with	The magnitude of the effect is assessed as *Medium*. The cross tablature of *Low* sensitivity species and *Medium* Impact corresponds to a **Very Low** effect significance.	Short-term **Not Significant** Negative Effect

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
	construction works has the potential to result in a measurable reduction in the breeding density of buzzard on-site and a reduction in the amount of available foraging habitat around the construction works areas. However, these lands (e.g., commercial forestry and agricultural grassland) are not considered unique to the Proposed Wind Farm site or rare in the wider surroundings. The results of breeding raptor surveys show a similar density of buzzard breeding territories in the locality outside of the Proposed Wind Farm site. Significant impacts are not predicted.		
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	This species was frequently recorded within the Proposed Wind Farm site during the breeding and winter seasons. Pearce-Higgins (2009) describes that buzzard has been found to show significant turbine avoidance extending to at least 500m. There was one confirmed breeding territory (2021) and one confirmed and one probable breeding territory (2022) identified within 500m of the Proposed Wind Farm turbine layout. However, extensive areas of suitable foraging and breeding habitat exist and will remain in the wider area (i.e. outside 500m from the Proposed Wind Farm turbine layout). The results of breeding raptor surveys in the wider area show a similar density of buzzard breeding territories. This demonstrates that the Proposed Wind Farm site does not contain habitats that could be classed as a scarce or unique resource. Additionally, buzzard were regularly recorded within 500m of the Proposed Wind Farm turbine layout. There could potentially be a measurable reduction in the frequency of commuting and foraging buzzard within 500m of the Proposed Wind Farm turbine layout. However, onsite habitats are not considered unique to the Proposed Wind Farm site and suitable habitat is abundant for this species greater than 500m from the Proposed Wind Farm turbine layout.	The magnitude of the effect is assessed as *Medium*. The cross tablature of *Low* sensitivity species and *Medium* Impact corresponds to a **Very Low** effect significance.	Long-term **Not Significant** Negative Effect

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
	Significant impacts are not predicted.		
Collision Risk	This species was recorded flying the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken (full details provided in Appendix 7-6). The collision risk has been calculated at a rate of 0.945 collisions per year. The favourable conservation status of this species (Green-listed BoCCI) limits the potential for ecologically significant effects to result. The loss of 1.08 birds per year from the local population of a Green-listed (BoCCI) species is considered to be of low significance. Significant impacts are not predicted.	The magnitude of the effect is assessed as *Low*. The cross tablature of *Low* sensitivity species and *Low* Impact corresponds to a **Very Low** effect significance.	Long-term **Not Significant** Negative Effect.

7.5.2.6 Sparrowhawk (All Seasons)

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
Construction Phase			
Direct Habitat Loss	This species was recorded within the Proposed Wind Farm site during the breeding and winter seasons. The construction of the Proposed Wind Farm will not result in the loss of a significant amount of foraging habitat given the Proposed Project development footprint is small comprising a total of approximately 8.75ha (or 0.88%) of the overall Site. There was one probable breeding territory identified within the Proposed Wind Farm site in 2021. This probable territory does not overlap with any Proposed Wind Farm turbine locations. There is potential for the loss of nesting habitat within the Proposed Wind Farm site. However, these lands (e.g. commercial forestry and agricultural grassland) are not considered unique to the Proposed Wind Farm site or rare in the wider surroundings. Significant impacts are not predicted.	The magnitude of the effect is assessed as *Low.* The cross tablature of *Low* sensitivity species and *Low* Impact corresponds to a **Very Low** effect significance.	Long-term **Not Significant** Negative Effect
Disturbance	Breeding sparrowhawk were recorded within the Proposed Wind Farm site. Construction activity adjacent to the probable nest site within the Proposed Wind Farm site could potentially cause disturbance of breeding and foraging sparrowhawk. The disturbance associated with construction works has the potential to result in a measurable reduction in the breeding density of sparrowhawk and a reduction in the amount of available foraging habitat within the Proposed Wind Farm site. However, these lands (e.g., commercial forestry and agricultural grassland) are not considered unique to the Proposed Wind Farm site or rare in the wider surroundings. Breeding sparrowhawk territories were recorded in similar habitats distant form the Proposed Wind Farm site during breeding raptor surveys. Significant impacts are not predicted.	The magnitude of the effect is assessed as *Medium.* The cross tablature of *Low* sensitivity species and *Medium* Impact corresponds to a **Very Low** effect significance.	Short-term **Not Significant** Negative Effect
Operational Phase			

Potential effects during the construction and operational phases of the Proposed Wind Farm		Significance (Percival, 2003)	Significance (EPA, 2022)
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	**No Effect**	**No Effect**
Displacement and Barrier Effect	As previously discussed, the Proposed Wind Farm site hosts breeding and foraging sparrowhawk. Displacement from turbines is not reported for sparrowhawk, however, it is assumed for the purposes of the assessment that sparrowhawk show avoidance to a distance of 500m from Proposed Wind Farm turbine locations as with other raptors (Pearce-Higgins et al., 2009). There was one probable breeding territory identified within the Proposed Wind Farm site in 2021. The disturbance associated with operational turbines has the potential to result in a measurable reduction in the breeding density of sparrowhawk and a reduction in the amount of available foraging habitat within the Proposed Wind Farm site. Notwithstanding this, extensive areas of suitable foraging habitat exist and will remain in the wider area (i.e. outside 500m from the Proposed Wind Farm turbine layout). Moreover, onsite habitats are not considered unique to the Proposed Wind Farm site with significant areas of similar habitats available in the surrounding area. Significant impacts are not predicted.	The magnitude of the effect is assessed as *Medium*. The cross tablature of *Low* sensitivity species and *Medium* Impact corresponds to a **Very Low** effect significance.	Long-term **Not Significant** Negative Effect
Collision Risk	This species was recorded flying the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken (full details provided in Appendix 7-6). The collision risk has been calculated at a rate of 0.009 collisions per year. The favourable conservation status of this species (Green-listed BoCCI) limits the potential for ecologically significant effects to result. The loss of 0.01 birds per year from the local population of a Green-listed (BoCCI) species is considered of low significance. Significant impacts are not predicted.	The magnitude of the effect is assessed as *Negligible*. The cross tablature of *Low* sensitivity species and *Negligible* Impact corresponds to a **Very Low** effect significance.	Long-term **Not Significant** Negative Effect

7.5.3 Effects on Key Ornithological Receptors during Decommissioning

Potential effects on KORs that may occur during the decommissioning of the Proposed Wind Farm are described below. The magnitude and significance of these effects are then defined according to Percival (2003) and EPA (2022).

Potential impacts during the decommissioning phase of the Proposed Wind Farm		Significance (Percival 2003)	Significance (EPA 2022)
Direct Habitat Loss	Direct or indirect effects are not anticipated.	**No Effect**	**No Effect**
Disturbance	As above for the construction phase for each species in Section 7.5.2.	As above for the construction phase for each species in Section 7.5.2.	As above for the construction phase for each species in Section 7.5.2.

7.5.4 Effects on Designated Areas

Where the potential for any adverse effect on any European Site has been identified, the pathway by which any such effect may occur has been robustly blocked through the use of avoidance, appropriate design and mitigation measures as set out within the Natura Impact Statement and its appendices. The measures ensure that the construction and operation of the Proposed Project does not adversely affect the integrity of European sites.

Therefore, it can be objectively concluded that the Proposed Project, individually or in combination with other plans or projects, will not adversely affect the integrity of any European Site.

7.5.5 Effect Associated with the Proposed Grid Connection and Turbine Delivery Route

It is proposed to connect the onsite 38 kV substation to the existing 110 kV Ballyragget substation in Moatpark, Co Kilkenny via 38 kV underground electrical cabling. The Proposed Grid Connection underground cabling route illustrated in Figure 4-3, is approximately 23km in length and located primarily within the public road corridor, with a short section (approximately 260m) located within a road within the Proposed Wind Farm site and another short section (approximately 660m) passing through a number of agricultural fields and a private access track, near Ballyragget substation. Full details are provided in Chapter 4, Section 4.2.3.4, of this EIAR and Appendix 4-1.

There are no significant turbine delivery route (TDR) accommodation works required to facilitate the delivery of turbine components to the Site.

The majority of habitats along both the Proposed Grid Connection underground cabling route and TDR are of no to low ecological value (i.e. existing roads/tracks, agricultural land) and do not have the potential to support species of conservation interest in the area. On a precautionary basis, it is assumed that some temporary disturbance may occur during construction works. However, given the extent of suitable habitat in the wider area; significant displacement effects are not predicted.

The Proposed Grid Connection underground cabling works will be largely confined to the existing road network and involve minor works over a short period. The Proposed Grid Connection underground cabling route crosses the River Nore SPA approximately 1km north-west of Ballyragget. The crossing will be via Horizontal Directional Drilling (HDD) and has been designed to pass cabling beneath the River Nore, thus avoiding works within the SPA boundary and direct impacts to the SPA. The Proposed Grid Connection underground cabling works are broadly analogous in scale to existing activities in the general area (e.g. farm machinery, road works, vehicle movements). The proposed works are not significant in the context of the baseline conditions.

The TDR does not have the potential to result in any significant habitat loss or displacement of any KOR species. No significant effects are predicted.

As per Percival (2003) the magnitude of the effect on KORs is assessed as **Negligible**. The cross tablature of a **Medium** sensitivity species (e.g. kingfisher, little egret, kestrel and snipe - the highest sensitivity species identified as a KOR at the Site) and **Negligible** impact corresponds to a **Very Low Effect Significance**. The significance of the potential impact is classed as a **Short-term Not Significant Negative** effect following EPA criteria (2022). As no further works are proposed following construction, no significant effects are predicted during the operational phase.

7.6 Mitigation and Best Practice Measures

This section describes the measures that are in place to mitigate negative effects associated with the Proposed Project on avian receptors. Effects on avian receptors have been addressed in two ways:

- Design of the Proposed Project

- Management of the various phases of the Proposed Project (i.e. construction, operation and decommissioning)

7.6.1 Mitigation by Design

The layout of the Proposed Project has been designed following the basic principles outlined below to avoid the potential for significant effects on avian receptors:

- The overall development footprint, including hard standing areas, have been designed to the minimum size necessary to accommodate the Proposed Project.
- The Proposed Grid Connection underground cabling route has been selected to utilise built infrastructure for the majority of its length (i.e. cables to be laid within public roads). Cabling will be laid underground to avoid effects on roadside hedgerows and disturbance to nesting birds.

7.6.2 Mitigation During Construction, Operation and Decommissioning

The following section describes the mitigation and best practice measures to be implemented during each phase of the Proposed Project.

7.6.2.1 Construction Phase

7.6.2.1.1 *General Measures*

A Construction and Environmental Management Plan (CEMP) has been prepared and will be in place prior to the commencement of the construction phase. The CEMP is included as Appendix 4-2 of this EIAR and details pertinent to birds are summarised below. Note that these measures are proposed as industry best practices rather than to mitigate any identified significant effect and will be updated as required to address any conditions of a permission or findings of any pre-construction survey results.

- Works will commence outside the bird nesting season (1st of March to 31st of August inclusive) where possible. Any requirement for construction works to commence during or run into the breeding season following commencement will be informed by pre-construction bird surveys.
- The removal of woody vegetation will be undertaken in full compliance with Section 40 of the Wildlife Act 1976 – 2022.
- A Biodiversity Management and Enhancement Plan (BMEP) has been prepared for the Proposed Project and is Appendix 6-4 to this EIAR.
- During the construction phase, noise limits, noise control measures, hours of operation (i.e. dusk and dawn is high faunal activity time) and selection of plant items will be considered in relation to disturbance of birds. All plant and equipment for use will comply with the European Communities (Noise Emission By Equipment For Use Outdoors) Regulations, 2001, as amended (SI 632/2001). Plant machinery will also be turned off when not in use. Please see Chapter 12: Noise and Vibration for more detail associated with noise during the construction phase.
- Silt fences will be installed as an additional water protection measure around existing watercourses.
- An Environmental Clerk of Works and Project Ecologist will be appointed. Duties will include:
    - Organise the undertaking of a pre-construction walkover bird survey to ensure that significant effects on birds will be avoided.
    - Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Proposed Wind Farm site.
    - Oversee management of ornithological issues during the construction period and advise on ornithological issues as they arise.
    - Provide guidance to contractors to ensure legal compliance with respect to protected species onsite.

- Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress as necessary.

- If winter roosting or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and no works shall be undertaken within a species-specific disturbance buffer in line with industry best practice (e.g. Goodship and Furness, 2022). No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.

7.6.2.2 Measures Pertaining to Kingfisher

As outlined in Section 7.5.2.1, there is the potential for short term moderate negative effect (EPA, 2022) on breeding kingfisher as a result of disturbance during the works within 100m of the Tullaroan Stream during the construction phase. Specific mitigation measures are therefore required, the implementation of these measures is described below.

- Any works within 100m of the Tullaroan Stream during the period March – June will be preceded by a pre-commencement survey to investigate whether any potential active kingfisher nests are present within 100m of the proposed works;
- Should an active kingfisher breeding burrow be recorded, then these works will be restricted to outside the main breeding season for kingfisher, i.e. March – June.

7.6.2.3 Operational Phase

No significant operational phase impacts requiring mitigation were identified.

7.6.2.4 Decommissioning Phase

During the decommissioning phase, disturbance limitation measures will be as per the construction phase described in Section 7.6.2.1 and 7.6.2.2.

7.7 Sharing Ecological Data

As a measure to support conservation research and policy, it is proposed to submit the pre-planning survey data and information to the National Biodiversity Data Centre (NBDC) and to BirdWatch Ireland to contribute to the upcoming bird atlas (2027) on relevant ecological records, for example, information on the location of breeding territories and nest sites of bird species of conservation concern. The submission of the data will follow relevant standards and will be provided in the preferred NBDC excel template. This measure will be fulfilled within the first year of the construction phase in the event of a successful application.

7.8 Monitoring

The following monitoring measures are proposed as industry best practice rather than in response to any identified impacts associated with the Proposed Project.

7.8.1 Pre-Construction

Pre-construction surveys will be undertaken prior to the initiation of works at the Proposed Wind Farm. The survey will include a thorough walkover survey to a 500m radius of the Proposed Project footprint and all works areas, where access allows. If winter roosting or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and earmarked for monitoring at the beginning of the first winter or breeding season of the construction phase. If it is found to be active during the construction phase, no works shall be undertaken within a disturbance buffer in line with industry best practice (e.g. Forestry Commission Scotland, 2006; Ruddock and Whitfield, 2007; Goodship and Furness, 2022). No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.

7.8.2 Post-Construction

A detailed post-construction Bird Monitoring Programme has been prepared for the operational phase of the Proposed Project (please refer to Appendix 7-6 for further details). The programme of works will monitor parameters associated with collision, displacement/barrier effects and habituation during the lifetime of the Proposed Project. Surveys will be scheduled to coincide with Years 1, 2, 3, 5, 10 and 15 of the lifetime of the Proposed Wind Farm. Monitoring measures are broadly based on guidelines issued by NatureScot (2009, 2017). The following individual components are proposed:

- Vantage point surveys to monitor flight activity in the vicinity of Proposed Wind Farm turbines;
- Breeding walkover surveys to monitor breeding bird activity at the Proposed Wind Farm site;
- Collision monitoring, including carcass searches with trained dogs to monitor bird fatalities due to collision. These will include searcher efficiency and scavenger removal trails as a best practice measure.

7.8.3 Decommissioning

Decommissioning monitoring surveys will be undertaken prior to works associated with decommissioning at the wind farm. The survey will include a thorough walkover survey to a 500m radius of the Proposed Project footprint and all works areas, where access allows. If winter roosting or breeding activity of birds of high conservation concern is identified, the roost or nest site will be located and earmarked for monitoring at the beginning of the first winter or breeding season of the decommissioning phase. If it is found to be active during the decommissioning phase, no works shall be undertaken within a disturbance buffer (Forestry Commission Scotland, 2006; Ruddock and Whitfield, 2007; Goodship and Furness, 2022) in line with industry best practice. No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.

7.9 Residual Effects

The following species were identified as KORs and were subject to detailed impact assessment:

- Kingfisher (all seasons)
- Little egret (all seasons)
- Kestrel (all seasons)
- Snipe (wintering)
- Buzzard (all seasons)
- Sparrowhawk (all seasons)

Following the measures described in Section 7.6, no effect significance greater than ***Low,*** as per Percival (2003) criteria, was identified for any KOR. No effect significance greater than ***Slight,*** as per EPA (2022) criteria, was identified for any KOR. Taking into consideration the effect significance levels identified and the proposed best practice and mitigation, significant residual effects on the KORs with regard to direct habitat loss, disturbance/displacement or collision mortality are not anticipated.

The site is characterised by improved agricultural grassland utilised for livestock grazing and smaller areas of commercial forestry plantation. Improved agricultural grassland and commercial forestry are typically considered to be of low ecological value. Both habitat types are among the most abundant in Ireland, particularly so, in the case of improved agricultural grassland. Neither habitat are rare locally or uniquely occur within the Proposed Wind Farm site. As outlined in Section 7.2.5.1, wind farms have the potential to impact birds. The Proposed Wind Farm will likely give rise to a measurable reduction in the distribution and abundance of birds locally within the Proposed Wind Farm site. However, no significant effects are predicted at the county, national or international level.

7.10 Cumulative Effects

As per NatureScot guidance "Assessing the Cumulative Impacts of onshore Wind Energy Developments" (SNH, 2012), cumulative effects arising from two or more developments may be:

- **Additive** (a multiple independent additive model)
- **Antagonistic** (the sum of impacts are less that in a multiple independent additive model)
- **Synergistic** (the cumulative impact is greater than the sum of the multiple individual effects)

This section first identifies other plans and projects in the vicinity of the Proposed Wind Farm site and then assesses the potential for additive, antagonistic or synergistic impacts to occur.

7.10.1 Other Plans and Projects

Assessment material was compiled for relevant developments within the vicinity of the Site. The material was gathered through a search of relevant online Planning Registers, reviews of relevant EIS/EIAR documents, planning application details and planning drawings. It served to identify past and future plans and projects, their activities and their environmental impacts. These are then considered for in-combination or cumulative effects with the Proposed Project. All plans and projects reviewed are outlined below.

7.10.1.1 Plans Considered in the Cumulative Impact Assessment

The following plans were considered in the cumulative impact assessment:

- Carlow County Development Plan 2022-2028
- Kilkenny City and County Development Plan 2021
- Laois County Development Plan 2021-2027
- Tipperary County Development Plan 2022-202/
- National Biodiversity Action Plan 2023-2030

7.10.1.2 Projects Considered in the Cumulative Impact Assessment

NatureScot guidance (SNH, 2012; 2018) was consulted while undertaking the cumulative assessment. SNH (2012; 2018) emphasises that its priority is to 'maintain the conservation status of the species population at the national level.' However, it is acknowledged that consideration should also be allowed for impacts at the regional level 'where regional impacts have national implications (for example where a specific region holds the majority of the national population)'. Following the guidance of SNH (2012), the cumulative impact assessment has been carried out at the scale of the importance rating of the receptor. Please note that a 25km radius of the proposed turbine locations was considered a reasonable approximation of the size of a county and a 5km radius of the Proposed Wind Farm site was considered a reasonable approximation for the local level, in-line with industry best practice.

To conduct the cumulative impact assessment, local authority and An Bord Pleanála online planning registers, relevant EIAR (or EIS) documents, planning application details and planning drawings in the vicinity of the Proposed Wind Farm site and all associated works were reviewed to identify past and future projects, their activities and their environmental impacts. The findings of this review are outlined in the following sections.

7.10.1.2.1 *Forestry and Agricultural Practices*

The wider surroundings of the Site primarily consist of land managed for agriculture in the form of livestock grazing and commercial conifer plantations, both of low ecological value. The forestry works (felling/planting) associated with the forestry in the wider surroundings of the Site will be subject to relevant licencing and guidance from the Forestry Service.

These land-uses have been taken into account in this cumulative assessment.

7.10.1.2.2 *Other Developments*

The review of the local authority and An Bord Pleanála planning registers identified relevant general development planning applications in the vicinity of the Site. Most of these relate to the provision and/or alteration of one-off rural housing and agriculture-related structures, as described in Chapter 2 of the

EIAR. Owing to the scale and nature of these developments, significant cumulative impacts are not anticipated.

7.10.1.2.3 Other Wind Farm Developments

Existing, permitted and proposed wind farm projects within 25km of the proposed turbine locations are provided in Table 7-12, including details of their planning status. For further detail see Table 2-5 in Chapter 2 of this EIAR.

Table 7-12 Existing and permitted wind farms within 25km of the Proposed Wind Farm site.

Wind Farm	Planning Status	Number of Turbines	Approximate Distance to nearest Turbine(km)	County
Foyle Wind Farm	Existing & Permitted	4 & 1	*c.*2.5km	Co. Kilkenny
Ballybay Wind Farm	Existing	6 & 1	*c.*5.8km	Co. Kilkenny
An Cnoc Wind Farm	Existing	5	*c.*7.1km	Co. Tipperary
Gurteen Lower Wind Turbine	Existing	1	c.*11.7km*	Co. Tipperary
Ballincurry Wind Turbine II	Existing	1	*c.*14km	Co. Tipperary
Ballincurry Wind Turbine I	Existing	1	*c.*14km	Co. Tipperary
Lisdowney Wind Farm	Existing	4	*c.*15.5km	Co. Kilkenny
Lisheen Wind Farm I	Existing	18	*c.*20.7km	Co. Tipperary
Lisheen Wind Farm II	Existing	12	*c.*19km	Co. Tipperary
Lisheen Wind Farm III	Existing	8	*c.*21km	Co. Kilkenny and Laois
Buckrana Wind Farm	Existing	14	*c.*22km	Co. Kilkenny, Tipperary and Laois
Kyleballyoughter Wind Farm	Permitted	2	*c.*3.3km	Co. Kilkenny
Farranrory Wind Farm	Permitted	9	*c.*6km	Co. Tipperary
Knockroe Wind Farm	Permitted	7	*c.*17.4km	Co. Tipperary
White Hill Wind Farm	Permitted	7	*c.*23.2km	Co. Carlow and Kilkenny
Killoshulan Wind Farm	*Proposed*	*13**	*c.12.4km*	*Co. Kilkenny*
Fassa Wind Farm	*Proposed*	*13-20**	*c.24km*	*Co. Kilkenny*
Freneystown Wind Farm	*Proposed*	*8**	*c.18km*	*Co. Kilkenny*

Wind Farm	Planning Status	Number of Turbines	Approximate Distance to nearest Turbine(km)	County
Littleton Wind Farm	*Proposed*	*14**	*c.15km*	*Co. Tipperary*
Ballynalacken Wind Farm	*Proposed*	*12**	*c.20.5km*	*Co. Kilkenny*

** = Proposed number included in Pre-Application for Strategic Infrastructure Project (SID).*

Foyle Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the existing and permitted Foyle Wind Farm was considered. The EIS for existing Foyle Wind Farm was not available on the planning file[13], however the EIS for the permitted turbine was available and was reviewed[14]. There is very limited information on birds available in the EIS for the permitted turbine, however no KOR species of the Proposed Wind Farm were listed as being recorded during surveys. The existing and permitted Foyle Wind Farm is situated within agricultural grassland and commercial forestry. As such, there is potential for KOR species of the Proposed Wind Farm to occur at the existing and permitted Foyle Wind Farm, i.e. kestrel, snipe, buzzard and sparrowhawk.

Existing Ballybay Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the existing Ballybay Wind Farm was considered. The EIS for existing Ballybay Wind Farm was not available on planning file[15]. The existing Ballybay Wind Farm is situated within agricultural grassland with minor watercourses present. As such, there is potential for KOR species of the Proposed Wind Farm to occur at the existing Ballybay Wind Farm, i.e. kingfisher, little egret, kestrel, snipe, buzzard and sparrowhawk.

Existing An Cnoc Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the existing An Cnoc Wind Farm was considered. The EIS[16] for existing An Cnoc Wind Farm was consulted. There is very limited information on birds available in the EIS, with only a mention of commonly occurring passerines present at the site. The existing An Cnoc Wind Farm is situated within agricultural grassland with some watercourses present. As such, there is potential for KOR species of the Proposed Wind Farm to occur at the existing An Cnoc Wind Farm, i.e. kingfisher, little egret, kestrel, snipe, buzzard and sparrowhawk.

Gurteen Lower Wind Turbine

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the existing Gurteen Lower Wind Turbine was considered. The planning file for the existing Gurteen Lower Wind Turbine was consulted[17], however no information specific to birds was available. The existing Gurteen Lower Wind Turbine is situated within agricultural grassland. As such, there is potential for KOR species of the Proposed Wind Farm to occur at the existing Gurteen Lower Wind Turbine, i.e. kestrel, snipe, buzzard and sparrowhawk.

[13] https://planning.kilkennycoco.ie/AppFileRefDetails/12378/0
[14] https://planning.kilkennycoco.ie/AppFileRefDetails/1617/0
[15] https://planning.kilkennycoco.ie/AppFileRefDetails/12533/0
[16] https://www.eplanning.ie/TipperaryCC/AppFileRefDetails/09781/0
[17] https://www.eplanning.ie/TipperaryCC/AppFileRefDetails/09801/0

Ballincurry Wind Turbine II

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the existing Ballincurry Wind Turbine II was considered. The planning file for the existing Ballincurry Wind Turbine II was consulted[18], however no information specific to birds was available. The existing Ballincurry Wind Turbine II is situated within agricultural grassland and commercial forestry. As such, there is potential for KOR species of the Proposed Wind Farm to occur at the existing Ballincurry Wind Turbine II, i.e. kestrel, snipe, buzzard and sparrowhawk.

Ballincurry Wind Turbine I

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the existing Ballincurry Wind Turbine I was considered. The planning file for the existing Ballincurry Wind Turbine I was consulted[19]. The 'Flora and Fauna Survey Report' included in the planning file was consulted, however the uploaded file is incomplete and missing the results sections. The existing Ballincurry Wind Turbine I is situated within agricultural grassland and commercial forestry. As such, there is potential for KOR species of the Proposed Wind Farm to occur at the existing Ballincurry Wind Turbine I, i.e. kestrel, snipe, buzzard and sparrowhawk.

Existing Lisdowney Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the existing Lisdowney Wind Farm was considered. The EIS[20] for the existing Lisdowney Wind Farm was consulted. The existing Lisdowney Wind Farm assessed the following species which are shared as key ornithological receptors with the Proposed Wind Farm: kestrel, snipe, buzzard and sparrowhawk. A collision risk model was not conducted as part of the EIS for the existing Lisdowney Wind Farm. The EIS concluded no significant effects on these species due to collisions or disturbance.

Existing Lisheen Wind Farm I

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the existing Lisheen Wind Farm I was considered. The EIS[21] for the existing Lisheen Wind Farm I was consulted. There is limited information on birds available in the EIS. The following species which are key ornithological receptors with the Proposed Wind Farm were recorded at Lisheen Wind Farm I: kestrel and snipe. A collision risk model was not conducted as part of the EIS for the existing Lisheen Wind Farm I. The EIS concluded no potential for significant negative effects on birds.

Existing Lisheen Wind Farm II

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the existing Lisheen Wind Farm II was considered. The EIS and Avian Assessment Appendix[22] for the existing Lisheen Wind Farm II was consulted. There is limited information on birds available in the EIS. The following species which are key ornithological receptors of the Proposed Wind Farm were recorded at Lisheen Wind Farm II: kestrel, snipe and sparrowhawk. Thes EIS assessed collision risk and displacement for the operational phase of the existing Lisheen Wind Farm II development. A collision risk model was not conducted as part of the EIS for the existing Lisheen Wind Farm II. The EIS concluded no potential for significant negative effects on birds.

[18] https://www.eplanning.ie/TipperaryCC/AppFileRefDetails/15600561/0
[19] https://www.eplanning.ie/TipperaryCC/AppFileRefDetails/13231/0
[20] https://www.eplanning.ie/KilkennyCC/AppFileRefDetails/12172/0
[21] https://www.eplanning.ie/TipperaryCC/AppFileRefDetails/06510773/0
[22] https://www.eplanning.ie/TipperaryCC/AppFileRefDetails/09510100/0

Existing Lisheen Wind Farm III

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the existing Lisheen Wind Farm III was considered. The original EIS[23] and updated Environmental Considerations Report included in latest amendment application[24] for the existing Lisheen Wind Farm III was consulted. The only species which are key ornithological receptors of the Proposed Wind Farm and were recorded at Lisheen Wind Farm III was snipe and sparrowhawk, however these were not considered key ornithological receptors of Lisheen Wind Farm III. A collision risk model was not conducted as part of the EIS or Environmental Considerations Report for the existing Lisheen Wind Farm III. The EIS and Environmental Considerations Reports concluded no potential for significant negative effects on birds.

Existing Buckrana Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the existing Buckrana Wind Farm was considered. The EIS for the existing Buckrana Wind Farm was not available on planning file[25]. The existing Buckrana Wind Farm is situated within cutover bog, scrub, agricultural grassland and commercial forestry. As such, there is potential for KOR species of the Proposed Wind Farm to occur at the existing Foyle Wind Farm, i.e. kingfisher, little egret, kestrel, snipe, buzzard and sparrowhawk.

Permitted Kyleballyoughter Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the permitted Kyleballyoughter Wind Farm was considered. The EIAR[26] for the permitted Kyleballyoughter Wind Farm was consulted. There is limited information on birds available in the EIAR. The EIAR for the permitted Kyleballyoughter Wind Farm assessed collision risk and displacement for the operational phase of the Proposed Wind Farm, and both were assessed to be not significant. However, a collision risk model for kestrel and buzzard was not conducted as part of the EIAR. The cumulative assessment in the EIAR for the permitted Kyleballyoughter Wind Farm, taking into account wind farms within 10km, concluded that *"cumulative impacts are not predicted to be significant*".

Permitted Farranrory Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the permitted Farranrory Wind Farm was considered. The EIAR[27] for the permitted Farranrory Wind Farm was consulted. The permitted Farranrory Wind Farm shared the following key ornithological receptors with the Proposed Wind Farm: kestrel and buzzard. The EIAR for the permitted Farranrory Wind Farm assessed collision risk and displacement for the operational phase of the Proposed Wind Farm, and both were assessed to be of low significance for kestrel and buzzard. However, a collision risk model for kestrel and buzzard was not conducted as part of the EIAR for the permitted Farranrory Wind Farm. The cumulative assessment in the EIAR for the permitted Farranrory Wind Farm, taking into account wind farms within 20km, concluded there will be no potential for negative cumulative impacts.

Permitted Knockroe Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the permitted Knockroe Wind Farm was considered. The EIAR[28] for the

[23] https://planning.kilkennycoco.ie/AppFileRefDetails/14202/0
[24] https://planning.kilkennycoco.ie/AppFileRefDetails/20459/0
[25] https://planning.kilkennycoco.ie/AppFileRefDetails/10145/0
[26] https://planning.kilkennycoco.ie/AppFileRefDetails/16666/0
[27] https://www.eplanning.ie/TipperaryCC/AppFileRefDetails/20972/0 & https://www.eplanning.ie/TipperaryCC/AppFileRefDetails/2360803/0
[28] https://www.eplanning.ie/TipperaryCC/AppFileRefDetails/211502/0

permitted Knockroe Wind Farm was consulted. Key ornithological receptors were not highlighted within the EIAR, however the following species were assessed as part of that EIAR which are key ornithological receptors of the Proposed Wind Farm: kingfisher, kestrel, buzzard and sparrowhawk. The EIAR for the permitted Knockroe Wind Farm assessed collision risk and displacement for the operational phase of this development. The collision risk was assessed to be of low significance for buzzard and sparrowhawk and medium significance for kestrel. However, a collision risk model was not conducted as part of the EIAR for the permitted Knockroe Wind Farm. Disturbance/displacement was assessed to be of low significance for all species. The cumulative assessment in the EIAR for the permitted Knockroe Wind Farm, taking into account wind farms within 15km, concluded there will not be any in-combination effect on birds.

Permitted White Hill Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the permitted White Hill Wind Farm was considered. The EIAR[29] for White Hill Wind Farm was consulted. The EIAR for the permitted White Hill Wind Farm assessed the following species which are shared as key ornithological receptors with the Proposed Wind Farm: kestrel, snipe, buzzard and sparrowhawk. The EIAR for the permitted White Hill Wind Farm assessed collision risk and displacement for the operational phase of this development. The collision risk was assessed to be not significant for all species. Disturbance/displacement and barrier effect were assessed to be not significant for all species.

The cumulative assessment in the EIAR for the permitted White Hill Wind Farm assessed the in-combination collision risk and the in-combination barrier effect of the Proposed Wind Farm when wind farms within 15km were taken into consideration and concluded no likelihood for cumulative collision risk or cumulative barrier effect on birds.

Proposed Killoshulan Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the proposed Killoshulan Wind Farm was considered. As the project has not yet been submitted for planning, no information regarding potential effects on birds was available. The proposed Killoshulan Wind Farm is situated within agricultural grassland with some commercial forestry and watercourses. As such, there is potential for KOR species of the Proposed Wind Farm to occur at proposed Killoshulan Wind Farm, i.e. kingfisher, little egret, kestrel, snipe, buzzard and sparrowhawk.

Proposed Fassa Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the proposed Fassa Wind Farm was considered. As the project has not yet been submitted for planning, no information regarding potential effects on birds was available. The proposed Fassa Wind Farm is situated within agricultural grassland with some commercial forestry and watercourses. As such, there is potential for KOR species of the Proposed Wind Farm to occur at proposed Fassa Wind Farm, i.e. kingfisher, little egret, kestrel, snipe, buzzard and sparrowhawk.

Proposed Freneystown Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the proposed Freneystown Wind Farm was considered. As the project has not yet been submitted for planning, no information regarding potential effects on birds was available. The proposed Freneystown Wind Farm is situated within agricultural grassland with some commercial forestry and watercourses. As such, there is potential for KOR species of the Proposed Wind Farm to occur at proposed Freneytown Wind Farm, i.e. kingfisher, little egret, kestrel, snipe, buzzard and sparrowhawk.

[29] https://www.eplanning.ie/LaoisCC/AppFileRefDetails/04935/0

Proposed Littleton Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the proposed Littleton Wind Farm was considered. As the project has not yet been submitted for planning, no information regarding potential effects on birds was available. The proposed Littleton Wind Farm is situated within cutover bog. As such, there is potential for KOR species of the Proposed Wind Farm to occur at proposed Freneytown Wind Farm, i.e. kingfisher, little egret, kestrel, snipe, buzzard and sparrowhawk.

Proposed Ballynalacken Wind Farm

The potential for the Proposed Wind Farm to result in significant cumulative or in-combination effects when assessed alongside the proposed Ballynalacken Wind Farm was considered. As the project has not yet been submitted for planning, no information regarding potential effects on birds was available. The proposed Ballynalacken Wind Farm is situated within commercial forestry and agricultural grassland. As such, there is potential for KOR species of the Proposed Wind Farm to occur at proposed Ballynalacken Wind Farm, i.e. kingfisher, little egret, kestrel, snipe, buzzard and sparrowhawk

7.10.2 Assessment of Cumulative Effects

There were seven KORs identified at the Proposed Wind Farm: kingfisher, little egret, kestrel, snipe, buzzard and sparrowhawk. A key consideration in the assessment of the potential for cumulative impacts to result in significant effects on KORs is proximity and whether the projects under consideration all contain suitable habitats for the species in question. For the purposes of this cumulative assessment, the local scale is considered to be a 5km radius of the Proposed Wind Farm site and the county scale is considered to be a 25km radius of the Proposed Wind Farm site. There is only one wind farm within 5km of the Proposed Wind Farm (existing and permitted Foyle Wind Farm).

Following SNH (2012) guidance, the cumulative impact assessment has been carried out at the scale of the importance rating of the receptor: National Importance (none); County Importance (kingfisher, little egret, kestrel and snipe); and Local Importance Higher Value (buzzard and sparrowhawk). The assessment of cumulative effects on KORs is provided below. In particular, cumulative habitat loss and displacement and collision risk associated with the Proposed Wind Farm operational turbines is assessed.

7.10.2.1 Kingfisher

The potential for developments at a county scale (25km) to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Wind Farm were considered.

The Proposed Wind Farm is sited predominantly in agricultural grassland with some areas of commercial forestry, habitat types that are of limited ecological value to kingfisher apart from the stream that crosses the Proposed Wind Farm site. The existing Ballybay Wind Farm, existing An Cnoc Wind Farm, existing Gurteen Lower Wind Turbine, existing Lisdowney Wind Farm and permitted Knockroe Wind Farm are situated within agricultural grassland habitat, the existing Foyle Wind Farm, existing Ballincurry Wind Turbines I & II, permitted Kyleballyoughter Wind Farm, permitted Farranrory Wind Farm, permitted White Hill Wind Farm, proposed Killoshulan Wind Farm, proposed Fassa Wind Farm, proposed Freneystown Wind Farm and proposed Ballynalacken Wind Farm are situated within a mix of agricultural grassland and commercial forestry, the existing Lisheen Wind Farms I, II & III, existing Buckrana Wind Farm and proposed Littleton Wind Farm are situated within a mix of cutover bog, commercial forestry and agricultural grassland. Some of these wind farms contain watercourses which provide suitable foraging, commuting and nesting habitat for kingfisher. However, relevant watercourses have been retained/will be retained as part of these wind farm projects and as such there is limited potential for cumulative habitat loss. The watercourses present within the above wind farms represents a minor proportion of all watercourses within 25km of the Proposed Wind Farm site. Significant cumulative impacts are not anticipated.

Collision risk models were not undertaken as part of submitted EIS/EIARs for the existing / permitted wind farm projects within 25km of the Proposed Wind Farm site. Collision risk was assessed as being not

significant for all species in the submitted EIAR/EIS documents for all relevant wind farms above. Kingfisher were not recorded at potential collision height at the Proposed Wind Farm site. Significant cumulative impacts are not anticipated.

No significant effects were reported for any of the wind farms located within a 25km radius of the Proposed Wind Farm site. Taking into consideration the above reported effects and the predicted effects with the Proposed Wind Farm, no residual additive, antagonistic or synergistic effects have been identified concerning habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted to occur at the county, national, or international scale.

7.10.2.2 Little Egret

The potential for developments at a county scale (25km) to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Wind Farm were considered.

The Proposed Wind Farm is sited predominantly in agricultural grassland with some areas of commercial forestry. The existing Ballybay Wind Farm, existing An Cnoc Wind Farm, existing Gurteen Lower Wind Turbine, existing Lisdowney Wind Farm and permitted Knockroe Wind Farm are situated within agricultural grassland habitat, the existing Foyle Wind Farm, existing Ballincurry Wind Turbines I & II, permitted Kyleballyoughter Wind Farm, permitted Farranrory Wind Farm, permitted White Hill Wind Farm, proposed Killoshulan Wind Farm, proposed Fassa Wind Farm, proposed Freneystown Wind Farm and proposed Ballynalacken Wind Farm are situated within a mix of agricultural grassland and commercial forestry, the existing Lisheen Wind Farms I, II & III, existing Buckrana Wind Farm and proposed Littleton Wind Farm are situated within a mix of cutover bog, commercial forestry and agricultural grassland. Agricultural grassland can provide suitable foraging habitat for little egret. Some of these wind farms contain watercourses which also provide suitable foraging habitat for little egret. However, these habitats (i.e. predominantly agricultural grassland and commercial forestry, with some sites comprising cutover bog and related habitats) are not a rare resource locally or unique to the Proposed Wind Farm site or above wind farms. Relevant watercourses have been retained/will be retained as part of these wind farm projects and as such there is limited potential for cumulative habitat loss. The watercourses present within the above wind farms represents a minor proportion of all watercourses within 25km of the Proposed Wind Farm site. Extensive areas of suitable foraging habitat will remain post construction and suitable habitat is abundant in the surrounding area. Significant cumulative impacts are not anticipated.

Collision risk models were not undertaken as part of submitted EIS/EIARs for the existing / permitted wind farm projects within 25km of the Proposed Wind Farm site. Collision risk was assessed as being not significant for all species in the submitted EIAR/EIS documents for all wind farms within 25km (see above). Furthermore, collision risk for little egret from the Proposed Wind Farm is negligible (0.007 birds per year). Notwithstanding this, the result of operational phase bird monitoring will be reported to the Planning Authority following each monitoring year and will include recommendations that may inform additional mitigation or adaptation if required.

No significant effects were reported for any of the wind farms located within a 25km radius of the Proposed Wind Farm site. Taking into consideration the above reported effects and the predicted effects with the Proposed Wind Farm, no residual additive, antagonistic or synergistic effects have been identified concerning habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted to occur at the county, national, or international scale.

7.10.2.3 Kestrel

The potential for developments at a county scale (25km) to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Wind Farm were considered.

The Proposed Wind Farm is sited predominantly in agricultural grassland with some areas of commercial forestry, habitat types that are predominantly utilized for hunting and/or nesting. The existing Ballybay Wind Farm, existing An Cnoc Wind Farm, existing Gurteen Lower Wind Turbine, existing Lisdowney

Wind Farm and permitted Knockroe Wind Farm are situated within agricultural grassland habitat, the existing Foyle Wind Farm, existing Ballincurry Wind Turbines I & II, permitted Kyleballyoughter Wind Farm, permitted Farranrory Wind Farm, permitted White Hill Wind Farm, proposed Killoshulan Wind Farm, proposed Fassa Wind Farm, proposed Freneystown Wind Farm and proposed Ballynalacken Wind Farm are situated within a mix of agricultural grassland and commercial forestry, the existing Lisheen Wind Farms I, II & III, existing Buckrana Wind Farm and proposed Littleton Wind Farm are situated within a mix of cutover bog, commercial forestry and agricultural grassland. These habitats are suitable for foraging and breeding kestrel. However, these habitats (i.e. predominantly agricultural grassland and commercial forestry, with some sites comprising cutover bog and related habitats) are not a rare resource locally or unique to the Proposed Wind Farm site or above wind farms. Extensive areas of suitable foraging and nesting habitat will remain post construction and suitable habitat is abundant in the surrounding area. Significant cumulative impacts are not anticipated.

Collision risk models were not undertaken as part of submitted EIS/EIARs for the existing / permitted wind farm projects within 25km of the Proposed Wind Farm site. Collision risk was assessed as being not significant for all wind farms within 25km (see above). Furthermore, collision risk for kestrel from the Proposed Wind Farm is negligible (0.391 birds per year). Notwithstanding this, the result of operational phase bird monitoring will be reported to the Planning Authority following each monitoring year and will include recommendations that may inform additional mitigation or adaptation if required.

No significant effects were reported for any of the wind farms located within a 25km radius of the Proposed Wind Farm site. Taking into consideration the above reported effects and the predicted effects with the Proposed Wind Farm, no residual additive, antagonistic or synergistic effects have been identified concerning habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted to occur at the county, national, or international scale.

7.10.2.4 Snipe

The potential for developments at a county scale (25km) to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Wind Farm were considered.

The Proposed Wind Farm is sited predominantly in agricultural grassland with some areas of commercial forestry. The existing Ballybay Wind Farm, existing An Cnoc Wind Farm, existing Gurteen Lower Wind Turbine, existing Lisdowney Wind Farm and permitted Knockroe Wind Farm are situated within agricultural grassland habitat, the existing Foyle Wind Farm, existing Ballincurry Wind Turbines I & II, permitted Kyleballyoughter Wind Farm, permitted Farranrory Wind Farm, permitted White Hill Wind Farm, proposed Killoshulan Wind Farm, proposed Fassa Wind Farm, proposed Freneystown Wind Farm and proposed Ballynalacken Wind Farm are situated within a mix of agricultural grassland and commercial forestry, the existing Lisheen Wind Farms I, II & III, existing Buckrana Wind Farm and proposed Littleton Wind Farm are situated within a mix of cutover bog, commercial forestry and agricultural grassland. Commercial forestry is of limited value to snipe. The agricultural grassland habitat is suitable for foraging and roosting snipe and cutover bog and associated wetland habitats are suitable for breeding snipe. However, these habitats (i.e. predominantly agricultural grassland and commercial forestry, with some sites comprising cutover bog and related habitats) are not a rare resource locally or unique to the Proposed Wind Farm site or above wind farms. Extensive areas of suitable habitat will remain post construction and similar suitable habitat is abundant in the surrounding area. Significant cumulative impacts are not anticipated.

Collision risk models were not undertaken as part of submitted EIS/EIARs for the existing / permitted wind farm projects within 25km of the Proposed Wind Farm site. Collision risk was assessed as being not significant for all wind farms within 25km (see above). Furthermore, collision risk for snipe from the Proposed Wind Farm is negligible (0.019 birds per year). Notwithstanding this, the result of operational phase bird monitoring will be reported to the Planning Authority following each monitoring year and will include recommendations that may inform additional mitigation or adaptation if required.

No significant effects were reported for any of the wind farms located within a 25km radius of the Proposed Wind Farm site. Taking into consideration the above reported effects and the predicted effects with the Proposed Wind Farm, no residual additive, antagonistic or synergistic effects have been identified concerning habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted to occur at the county (or national or international) scale.

7.10.2.5 Buzzard

The potential for local developments (<5km) to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Wind Farm was considered.

The Proposed Wind Farm is sited predominantly in agricultural grassland with some areas of commercial forestry, habitat types that are predominantly utilized for hunting and/or nesting. The disturbance associated with operational turbines will not significantly impact the breeding population of buzzard at the local scale. Similar displacement impacts are predicted on other local wind farms (within 5km). However, these habitat types are not a rare habitat locally. Therefore, significant cumulative impacts are not predicted.

Collision risk models were not undertaken as part of submitted EIS/EIARs for the existing / permitted wind farm projects within 25km of the Proposed Wind Farm site. Collision risk was assessed as being not significant for all wind farms within 25km (see above). Furthermore, collision risk for buzzard from the Proposed Wind Farm is low (0.945 birds per year). Notwithstanding this, the result of operational phase bird monitoring will be reported to the Planning Authority following each monitoring year and will include recommendations that may inform additional mitigation or adaptation if required.

In summary, no significant impacts on this species were identified for any of the local wind farms (within 5km). Taking into consideration the above reported effects and the predicted effects with the Proposed Wind Farm, no residual additive, antagonistic or synergistic effects have been identified concerning habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted to occur at the local (or county, national or international) scale.

7.10.2.6 Sparrowhawk

The potential for local developments (<5km) to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Wind Farm was considered.

The Proposed Wind Farm is sited predominantly in agricultural grassland with some areas of commercial forestry, habitat types that are predominantly utilized for hunting and/or nesting. The disturbance associated with operational turbines will not significantly impact the breeding population of buzzard at the local scale. Similar displacement impacts are predicted on other local wind farms (within 5km). However, these habitat types are not a rare habitat locally. Therefore, significant cumulative impacts are not predicted.

Collision risk models were not undertaken as part of submitted EIS/EIARs for the existing / permitted wind farm projects within 25km of the Proposed Wind Farm site. Collision risk was assessed as being not significant for all wind farms within 25km (see above). Furthermore, collision risk for sparrowhawk from the Proposed Wind Farm is low (0.009 birds per year). Notwithstanding this, the result of operational phase bird monitoring will be reported to the Planning Authority following each monitoring year and will include recommendations that may inform additional mitigation or adaptation if required.

In summary, no significant impacts on this species were identified for any of the local wind farms (within 5km). Taking into consideration the above reported effects and the predicted effects with the Proposed Wind Farm, no residual additive, antagonistic or synergistic effects have been identified concerning habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted to occur at the local (or county, national or international) scale.

7.11 Conclusion

Following consideration of the residual effects (post-mitigation), it is concluded that the Proposed Project will not result in any significant effects on any of the identified KORs. No significant effects on receptors of International, National or County Importance were identified. Provided that the Proposed Project is constructed, operated and decommissioned in accordance with the design and best practice mitigation measures that are described within this application, significant individual or cumulative effects on the identified KORs are not anticipated.