Environmental Impact Assessment Report

Proposed Clonberne Wind Farm Development, Co. Galway

Chapter 7 – Ornithology

DOCUMENT DETAILS

Client:	**Clonberne Windfarm Limited**
Project Title:	**Proposed Clonberne Wind Farm Development, Co. Galway**
Project Number:	**180740**
Document Title:	**Environmental Impact Assessment Report**
Document File Name:	**Ch 7. Ornithology F - 2024.06.20 - 180740**
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Rev	Status	Date	Author(s)	Approved By
01	Final	20/06/2024	PM	PC, OC

7. ORNITHOLOGY

7.1 Introduction

This chapter assesses the likely significant effects that the Proposed Project may have on avian receptors. Particular attention has been paid to species of ornithological importance. These include species with national and international protection under the Wildlife Acts 1979-2012 and the EU Birds Directive 2009/147/EC among other relevant legislation. Where potential effects are identified, mitigation is described and residual impacts on avian receptors are assessed.

This chapter is supported by Technical Appendices 7-1 to 7-5, 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 themselves. Appendix 7-6 contains the collision risk assessment document which illustrates how the collision risk modelling was undertaken for the Wind Farm Site. Appendix 7-7 contains the Bird Monitoring Programme. The Wind Farm Site boundary and areas surveyed are provided in Figures 7-1 to 7-9.

The chapter is structured as follows:

- The Introduction provides a description of the Proposed Project and the relevant legislation, guidance and policy context regarding ornithology.
- This is followed by a comprehensive description of the ornithological surveys and impact assessment methodologies that were followed to inform the robust assessment of likely significant effects on avian receptors.
- A description of the baseline ornithological conditions and receptor evaluation is then provided. This is followed by an assessment of effects, which as per NatureScot, formerly Scottish Natural Heritage (SNH), Guidance (2017), includes direct habitat loss, displacement and death from collision. Effects are described with regard to each phase of the Proposed Project: construction, operational and decommissioning. Potential cumulative effects in combination with other projects are fully assessed.
- Proposed mitigation and best practice measures to ameliorate the identified effects are described and discussed. This is followed by an assessment of residual effects taking into consideration the effect of the proposed mitigation and best practice measures.
- The conclusion provides a summary statement on the overall significance of predicted effects on ornithology.

The following list defines the meaning of the technical terms used in this chapter:

- “Key Ornithological Receptor” (KOR) is defined as a species occurring within the zone of influence of the development upon which likely significant effects are anticipated and assessed.
- “Zones of Influence” (ZOI) for individual ornithological receptors refers to the zone within which potential effects are anticipated. ZOIs were assigned following best available guidance (NatureScot, 2016 and McGuinness *et al.,* 2015).
- The “Site” is defined as the proposed development area and all associated infrastructure.
- “Wind Farm Site” is defined as the proposed development area and all associated infrastructure, with the exception of the grid connection route and turbine delivery route accommodation works.
- “Grid Connection Route” is defined as the cable route from the Wind Farm Site to the national grid.
- “Turbine Delivery Route” is defined as the works related to turbine delivery. There are three turbine delivery route accommodation areas and are temporary in nature.

- "Proposed Project" is defined as all elements of the development within the EIAR site boundary (in green), including the grid connection route, turbine delivery route and all other associated infrastructure.

7.1.1 Description of the Proposed Project

The full development description is provided in Chapter 4 of this EIAR. The Proposed Project comprises 11 no. turbines with a blade tip height of 180m, a substation, 1 no. borrow pits and all ancillary infrastructure.

The Proposed Project will have an operational life of 35 years from the date of commissioning of the wind farm.

7.1.2 Legislation, Guidance and Policy Context

This EIAR is prepared in accordance with the requirements of the 2011 EIA Directive as amended by EIA Directive 2014/52/EU.

The following are the key legislative provisions applicable to habitats and fauna in Ireland:

- Irish Wildlife Acts 1976 to 2012 as amended.
- 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 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 specific national ornithological survey guidance for Ireland, the following guidance documents published by NatureScot (formerly Scottish Natural Heritage [SNH]) have informed this assessment:

- NatureScot (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
- NatureScot (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
- NatureScot (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
- NatureScot (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
- NatureScot (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

- NatureScot (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
- NatureScot (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
- Goodship, N.M. and Furness, R.W. (2022). NatureScot Research report 1283 – Disturbance Distances Review: An updated literature review of disturbance distances of selected bird species. Available at: https://www.nature.scot/doc/naturescot-research-report-1283-disturbance-distances-review-updated-literature-review-disturbance

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:

- 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 – 2021 (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.
- CIEEM (2017) Guideline for Ecological Report Writing.
- Galway County Council (2022). Galway County Development Plan 2022-2028.

7.1.3 Statement of Authority and Competence

This ornithology chapter has been prepared by Patrick Manley (B.Sc.), Senior Ornithologist of MKO and reviewed by Principal Ornithologist, Padraig Cregg (BSc., MSc.), who has over 9 years' experience in surveying and ecological assessment. Both of whom are suitably qualified, competent, professional

ecologists with extensive experience in completing avifaunal assessments for wind farm developments and are competent experts for the purposes of the preparation of this EIAR.

Field surveys were undertaken by Chris Peppiatt, Declan Manley, John Curtin, John Hehir, Julie O'Sullivan, Louis de Vries, Marcus Hogan, Patrick Manley, Peter Capsey, Seán Meehan and Shay Fennelly. All of the above surveyors are competent experts in the field of 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 which may potentially make use of the study area. The assessment included a thorough review of the available ornithological data including:

- Review of online web-mappers: National Parks and Wildlife Service (NPWS), National Biodiversity Data Centre (NBDC), Irish Wetland Bird Survey I-WeBS.
- Review of Bird Atlases: (Sharrock, 1976; Lack, 1986; Gibbons *et al.*, 1993; Balmer *et al.*, 2013).
- Review of Birds of Conservation Concern (BoCCI) in Ireland 2020-2026 (Gilbert *et al.*, 2021).
- Review of specially requested records from the NPWS Rare and Protected Species Database.
- Review of impact assessments associated with nearby developments including wind farms.

7.2.2 Consultation

7.2.2.1 Scoping and Consultation

The 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 Section 2.6 of Chapter 2.

Table 7-1 provides a list of the organisations consulted with regard to Ornithology during the scoping process and notes where scoping responses were received. Copies of all scoping responses are included in Appendix 2-2 of this EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this chapter. Table 2-12 in Chapter 2 of this EIAR describes where the comments raised in the scoping responses received have been addressed in this assessment.

Table 7-1 Consultation Responses

	Consultee	Response Status	Issues Raised	Addressed
01	BirdWatch Ireland	Response received 24th January 2024	Issues were raised in relation to Glenamaddy Turlough, Requesting I-WeBS data and other species	An NPWS request for data on the species outlined was requested and outlined in Section 7.3.5. Section 7.3.4 outlines the I-WeBS data used for this chapter
02	National Parks and Wildlife Service	Response received 4th January 2022	See Section 7.3.5 of this chapter	See Section 7.3.5 of this chapter

	Consultee	Response Status	Issues Raised	Addressed
03	Department of Agriculture, Food and the Marine	Response received 23rd January 2024	No issues raised in relation to birds	-
04	Department of Housing, Local Government, and Heritage	Response received 9th February 2024	Issues in relation to survey scope and evaluation criteria were raised	Methodologies for surveys are outlined in Section 7.2.4 and for the evaluation criteria is outlined in Section 7.2.5 of this chapter
05	Irish Peatland Conservation Council	No response received to date	-	-

7.2.3 Identification of Target Species and Key Ornithological Receptors

This section of the report describes the criteria used for the selection of target species. The methodology for assessment followed a precautionary screening approach with regard to the identification of Key Ornithological Receptors. Following a comprehensive desk study, initial site visits and consultation, a list of "target species" likely to occur in the zone of influence of the Site was derived. The observation/survey work carried out on the Site was specifically designed to survey these identified target species in accordance with NatureScot guidance (2017). The target species list was drawn from:

- 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.
- Species particularly sensitive to impacts from this type of development (i.e., raptors).

Following analysis of the collated bird survey data, it was possible to refine the list of target species to identify "Key Ornithological Receptors" and exclude species which were not recorded during the extensive surveys and those for which pathways for significant effects could not be identified.

7.2.4 Field Surveys

Field surveys were undertaken from October 2017 to March 2020 and from October 2022 to September 2023, these surveys form the core dataset for the assessment of effects on ornithological receptors. 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 Wind Farm Site and its surroundings.

Field survey methodologies were devised to survey for the bird species composition and assemblages that occur within the Wind Farm Site and its surroundings. The area surveyed for each type of survey is discussed in the methodology section below. The survey radii mentioned below are discussed in relation to the Wind Farm Site.

7.2.4.1 Initial Site Assessment

Based on the results of the desk study, consultation and reconnaissance site visit, the likely importance of the study area for bird species was ascertained. Based on the collated information available from the above preliminary assessment and adopting a precautionary approach, a site-specific scope for the ornithological survey was developed.

7.2.4.2 Survey Methodologies

The survey work undertaken from October 2017 to March 2020 and from October 2022 to September 2023 forms the core dataset for the assessment of effects on ornithology.

In the absence of specific national bird survey guidelines, the ornithological surveys were designed and undertaken in full accordance with '*Recommended bird survey methods to inform impact assessment of onshore wind farms*' (SNH, 2017). The various survey types undertaken are described below.

7.2.4.2.1 *Vantage Point Surveys*

Vantage point surveys were undertaken in accordance with NatureScot (SNH, 2017) to monitor flight activity within the Wind Farm Site and to a 500m radius of the proposed turbines to inform the collision risk model and to identify any regular flight paths across the Wind Farm Site. Surveys were conducted from two fixed point vantage points with comprehensive coverage of the Wind Farm Site. Survey methodology followed NatureScot guidance (SNH, 2017). The surveyor collected data on bird observations and flight activity from a scanning arc of 180° to a 2km radius at the fixed vantage point locations for two 3-hour watches separated by a minimum 30-minute break (i.e., 6 hours total) per month. Surveys were conducted from October 2017 to March 2020 and from October 2022 to September 2023 inclusive and were scheduled to provide a minimum of 36 hours for each winter and breeding season and spread over the full daylight period, including dawn and dusk watches, to coincide with the highest periods of bird activity. 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 Site. Bands were split into 0-10m, 10-25m, 25-175m and >175m between October 2017 and March 2020 and into 0-15m, 15-25m, 25-200m and >200m between October 2022 and September 2023. All flight activity within the height bands 10-25m, 25-175m and >175m or 15-25m and 25-200m are considered to be within the potential collision height (PCH) as they overlap with the area that would be occupied by the blades of the proposed turbine. In addition, the presence of any non-target species was recorded to inform the evaluation of supporting habitat. The survey effort is presented in Appendix 7-2, Table 1, including full details of dates, times and weather conditions. Figure 7-1 shows the locations of all vantage points relative to the Wind Farm Site.

Viewshed Analysis

Viewshed analysis was carried out to confirm the adequacy of the chosen fixed vantage point locations (i.e., VPs 1 & 2) in providing views of flight activity above the Wind Farm Site. Viewsheds were calculated using Resoft Wind Farm ZTV (Zone of Theoretical Visibility) software in combination with QGIS (version 3.22) using a notional layer suspended at 18m, which is representative of the minimum height considered for the potential collision risk area based on the dimensions of the turbine model. While the benefit of being able to view as much of the Site to ground level is acknowledged, the NatureScot guidance (2017) emphasizes 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 viewshed analysis involved testing each vantage point location for its visibility coverage of the proposed turbine locations and their 500m radius. The aim is to achieve sufficient coverage from the fewest number of vantage points. Firstly, in QGIS a viewshed point was created at the vantage point location at a height of 1.5m (to represent the height of the observer). The software contains (10m) contours terrain data but does not include the height of forestry and other structures that could obscure the observer's views of the Site, so this information is manually added to the analysis. Using the ZTV software, a viewshed of 360 degrees was produced calculating an area 18m from the ground to a 2km radius of the vantage point location. The resulting viewshed image was then cropped to 180 degrees to give the viewshed from each vantage point location in line with NatureScot guidance (2017). A 500m buffer was applied to the outermost turbines of the proposed wind farm development in line with NatureScot (2017). The viewshed analysis aims to ensure we have coverage of the visible airspace of the turbine rotor swept area, using the fewest vantage points possible. The view sheds at 18m are presented

in Figure 7-2. The majority of the Wind Farm Site is visible, there is a small gap in the viewshed, please see Section 7.2.6.2 for further discussion.

Data Recording and Digitisation

Data on bird observations and flight activity was collected from a scanning arc of 180° and a 2km radius by an observer at each fixed location for six hours per month. Due to weather constraints, some surveys ended early but were continued at a later date in the month to ensure that six hours of surveys were conducted per month in accordance with NatureScot guidance (2017). Surveys were scheduled to provide a spread over the full daylight period including dawn and dusk watches to coincide with the highest periods of bird activity. Target species observed were as per listed in Table 1 of Appendix 7-1.

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 vantage point survey work undertaken.

Table 7-2 Vantage Point Survey Effort

Survey Season	Months	Minimum Effort per VP
2017/2018 Non-Breeding Season (2 VPs)	Sep – Mar	36 hours/VP
2018 Breeding Season (2 VPs)	Apr – Sep	36 hours/VP
2018/2019 Non-Breeding Season (2 VPs)	Oct – Mar	36 hours/VP
2019 Breeding Season (2 VPs)	Apr – Sep	36 hours/VP
2019/2020 Non-Breeding Season (2 VPs)	Oct – Mar	36 hours/VP
2022/2023 Non-Breeding Season (2 VPs)	Oct – Mar	36 hours/VP
2023 Breeding Season (2 VPs)	Apr – Sep	36 hours/VP

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 (O'Brien & Smith Survey)*

Breeding walkover surveys were undertaken to determine the presence of bird species of high conservation concern and identify probable or confirmed breeding territories for bird species observed within the survey area. The survey methodology followed an adapted O'Brien & Smith method for lowland sites as outlined in Gilbert *et al.* (1998). The survey area for these surveys was the Wind Farm Site and a 500m survey radius of the Wind Farm Site.

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

Walkover surveys were carried out during daylight hours, starting at sunrise, during the core breeding season months of April, May and June (2018, 2019 and 2023) and July (2019 and 2023), with the Wind Farm Site being visited three days per month on each occasion. 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.

Survey effort is presented in Appendix 7-2, Table 2. This includes full details of dates, times, survey locations, survey duration and weather conditions for each survey. Figure 7-3 shows the survey area.

7.2.4.2.3 Breeding Raptor Surveys

Breeding raptor surveys (i.e., birds of prey and owls) were undertaken within the Wind Farm Site and its immediate surrounds. The survey methodology was as outlined in Hardey *et al.* (2013). These surveys aimed to identify territorial occupancy and confirm breeding success within the survey area. Raptor surveys were undertaken to a 2km survey radius from the Wind Farm Site (as per NatureScot, 2017) during the 2018 breeding season, in the form of short VP watches and walked transects. Merlin were observed breeding within the wind farm site in 2018. Given that merlin have a core foraging range of 5km, surveys were extended to a 5km survey radius during the 2019 breeding season. In 2023, surveys were undertaken from short VP watches to a 2km survey radius of the Wind Farm Site, given that no merlin breeding activity was observed within 5km of the Wind Farm Site in 2019 and there were very few merlin observations on site since 2018. These surveys were undertaken monthly during the core breeding season period (May to July in 2018, 2019 and 2023). Each visit required a minimum survey effort of two days to survey the entirety of the survey area.

Survey effort details are provided in Appendix 7-2, Table 3. Figure 7-4 shows the areas surveyed.

7.2.4.2.4 Winter Walkover Surveys

Winter transect surveys were conducted to determine the presence of bird species of high conservation concern within areas of potentially suitable habitat in the survey area. The study area for these surveys was the Wind Farm Site and a 500m survey radius of the Wind Farm Site.

Transect routes were devised to ensure coverage of different habitat complexes between vantage point locations within the survey area, during winter months. The methodology was broadly based on methods described in Bibby *et al.* (2000). Target species were raptors, waterbirds, gulls and ground birds of conservation interest. Along with target species, all additional species observed were recorded to inform the evaluation of supporting habitat.

Survey effort, including details of survey duration and weather conditions, is presented in Appendix 7-2, Table 4. Figure 7-5 shows the survey area.

7.2.4.2.5 Hen Harrier Roost Surveys

Suitable habitat for roosting hen harrier within 2km of the Wind Farm Site (as per NatureScot, 2017) were surveyed for the presence of hen harrier during all four winter seasons. Survey work was undertaken in accordance with the methodology devised by Gilbert *et al.* (1998) and the 'Irish Hen Harrier Winter Roost Survey' (unpublished document coordinated by members of NPWS). Surveys were carried out throughout the entirety of all four winter seasons surveyed (October 2017 – March 2018, October 2018 – March 2019, October 2019 – March 2020 and October 2022 – March 2023). Full details of survey effort are provided in Appendix 7-2, Table 5. Figure 7-6 shows the locations of hen harrier roost surveys.

7.2.4.2.6 Waterbird Distribution and Abundance Surveys

Significant wetland sites within 5km of the Wind Farm Site were surveyed for waterbird populations during the 2017/2018, 2018/2019, 2019/2020 and 2022/2023 winter seasons and in August/September 2023. The survey area extended approximately 5km from the Wind Farm Site which exceeds the recommended 500m survey radius for foraging waterbirds and one-kilometre survey radius recommendation for roosting waterbirds surveys stipulated by NatureScot (2017). These surveys aimed to provide contextual information on the distribution and abundance of waterfowl species within the wider surroundings of the Wind Farm Site. The methodology was in line with survey methodology guidelines issued by NatureScot (2017) and BirdWatch Ireland (2015). Counts were undertaken during daylight hours (dawn or before dusk) from suitable vantage points at the wetland sites.

Survey effort for all waterbird distribution and abundance surveys is presented in Appendix 7-2, Table 6. Figure 7-7 shows the wetland site survey locations.

7.2.4.2.7 Connectivity Vantage Point Surveys

The Wind Farm Site lies close to Kilmurray Turlough, which is approximately one kilometre to the west. Vantage point surveys were undertaken overlooking the turlough to identify any potential commuting corridors to/from this wetland site. The connectivity vantage point was surveyed from October 2017 to March 2020 and from October 2022 to March 2023.

Data on bird observations and flight activity was collected from a scanning arc of 180° and a two-kilometre radius by an observer at the fixed location for three hours. twice per month for the months of August to May in each year surveyed. Surveys aimed to cover the highest periods of bird activity (i.e., dawn and dusk). Surveys began an hour before sunrise or finished an hour after sunset.

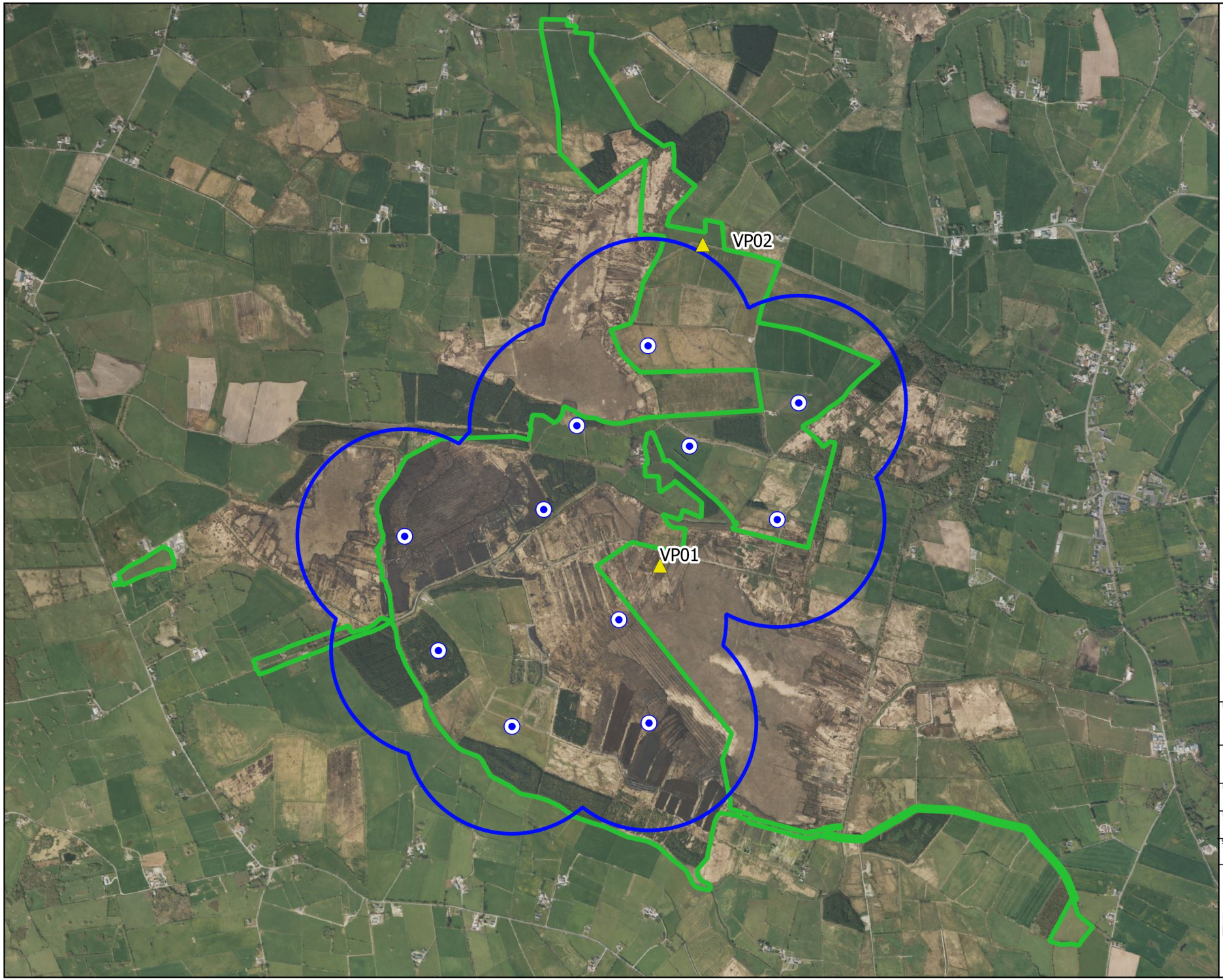
Survey effort, including details of survey duration and weather condition, is presented in Appendix 7-2, Table 7. Figure 7-8 shows the surveyed area.

7.2.4.2.8 Red Grouse Surveys

Breeding red grouse surveys were undertaken within the Wind Farm Site and within a 500m radius. The survey aimed to identify breeding red grouse territories within the Wind Farm Site by using an auditory lure of a recording of a 'rival' red grouse male to elicit a response from the territory holder within the Site. Survey methodology followed Cummins *et al.* (2010a): the surveyor walked transects 150m apart through suitable bog and heath habitat, where access allowed, stopping every 100m to broadcast lure calls for 30 seconds and listening for responses. Call-back and flying by the territory holder in response to the lure were recorded and mapped. The survey was conducted in March 2018, February 2019 and February 2023 and all surveys were conducted under National Parks and Wildlife Service license (licence numbers 012/2018, 010/2019 and 20/2023). Survey details are provided in Appendix 7-2, Table 8. Figure 7-9 shows the areas surveyed.

7.2.4.2.9 Multidisciplinary Walkover Surveys

The grid connection route was surveyed on the 25th of August 2021, 26th of June 2023 and the 11th of November 2023 and the turbine delivery route was surveyed on the 11th of November 2023. Both areas were surveyed through a multidisciplinary walkover survey. The grid connection route and the turbine delivery route were systematically walked, while the surveyor recorded a range of protected species, including birds. Further details on this survey are available in the Biodiversity Chapter (Chapter 6 of this EIAR).



Map Legend

- EIAR Site Boundary
- 500m Buffer of the Proposed Turbine Layout
- Proposed Turbine Layout
- Vantage Point Locations

N

Drawing Title
Vantage Point Survey Locations

Project Title
Clonberne Wind Farm

Drawn By	Checked By
P. Manley	P. Cregg
Project No.	Drawing No.
180740	Fig. 7.1
Scale	Date
1:23,000	22/02/2024

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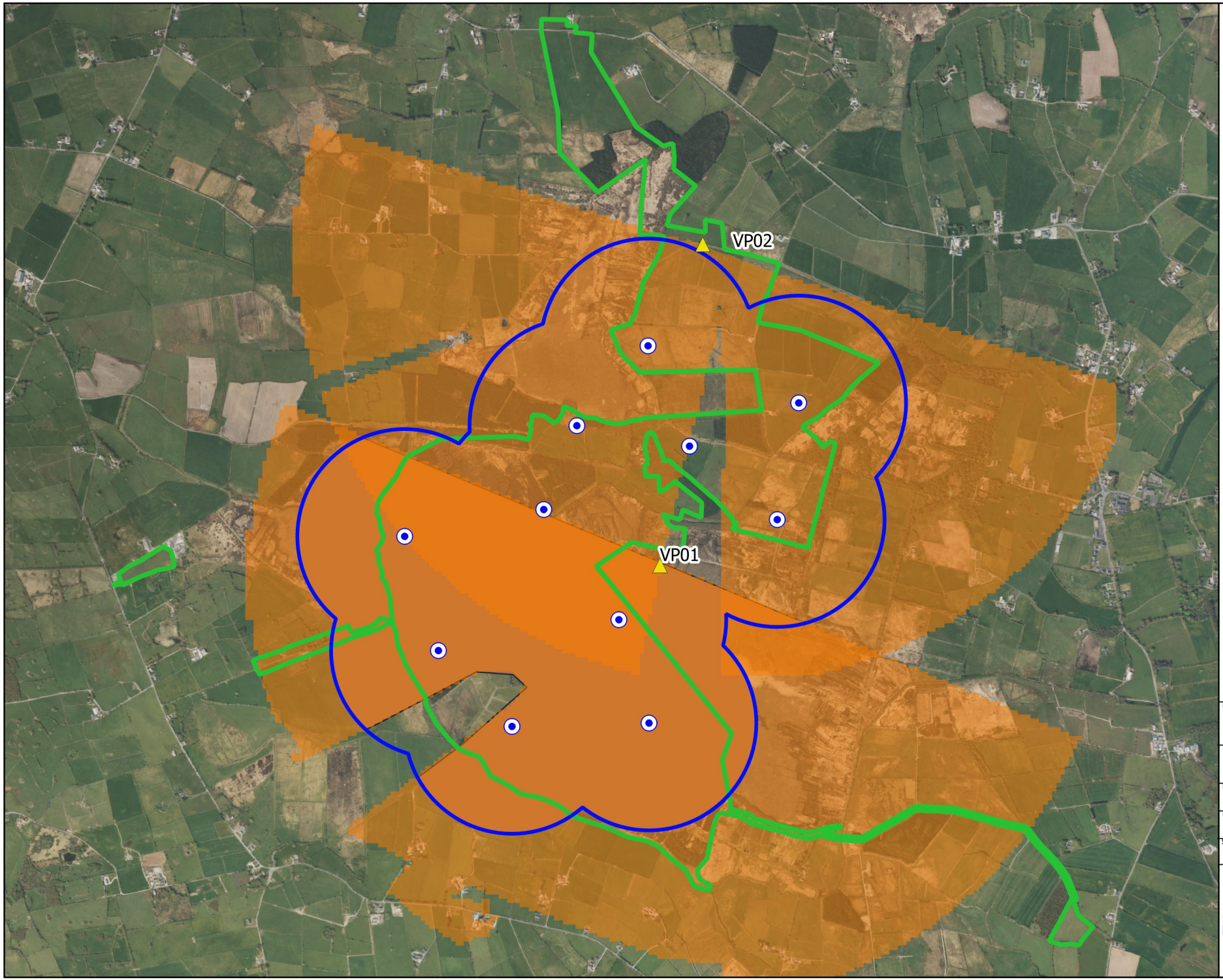

Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- 500m Buffer of the Proposed Turbine Layout
- Vantage Point Location
- Visible Area

N

Drawing Title

Viewshed Analysis

Project Title

Clonberne Wind Farm

Drawn By	Checked By
P. Manley	P. Cregg
Project No.	Drawing No.
180740	Fig. 7.2
Scale	Date
1:23,000	22/02/2024

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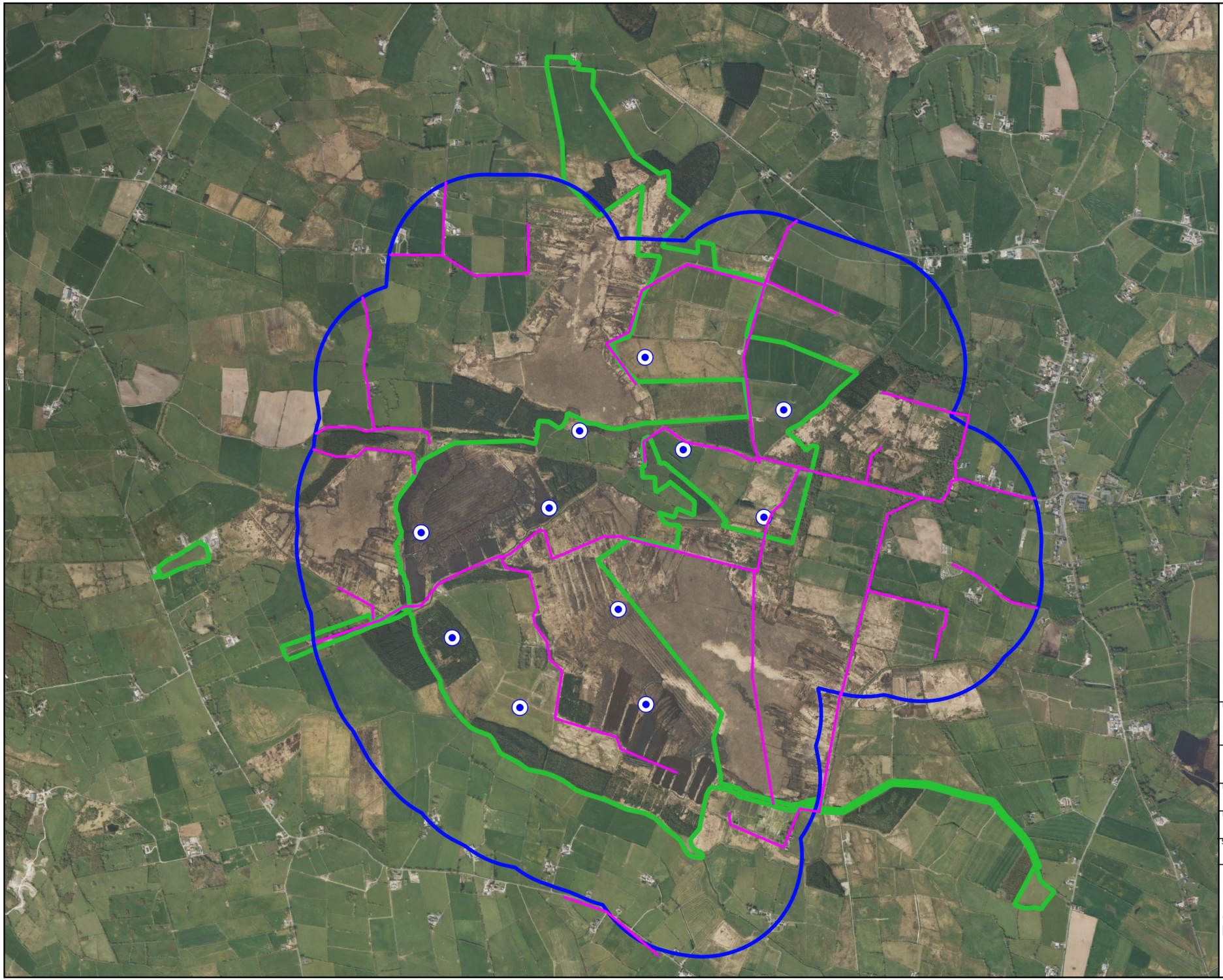

Map Legend

- EIAR Site Boundary
- Walkover Survey Area
- Proposed Turbine Layout
- Breeding Walkover Transects

N

Drawing Title
Breeding Walkover Transects

Project Title
Clonberne Wind Farm

Drawn By	Checked By
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Project No.	Drawing No.
180740	Fig. 7.3
Scale	Date
1:25,000	22/02/2024

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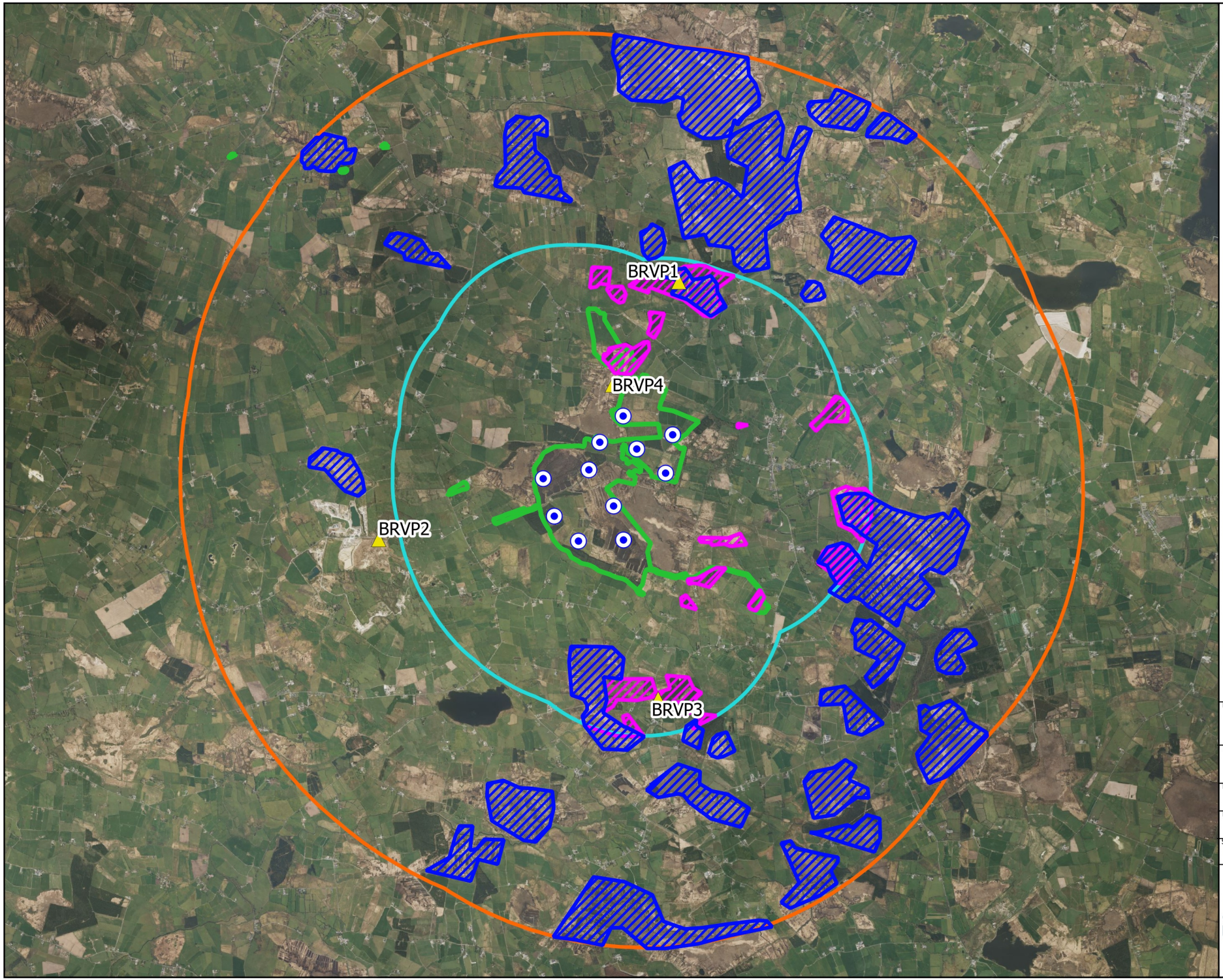

Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- 2km Survey Area
- 5km Survey Area
- Raptor Survey Area 2018
- Raptor Survey Area 2019
- Raptor Survey Location 2023

N

Drawing Title

Breeding Raptor Survey Areas

Project Title

Clonberne Wind Farm

Drawn By	Checked By
P. Manley	P. Cregg
Project No.	Drawing No.
180740	Fig. 7.4
Scale	Date
1:70,000	22/02/2024

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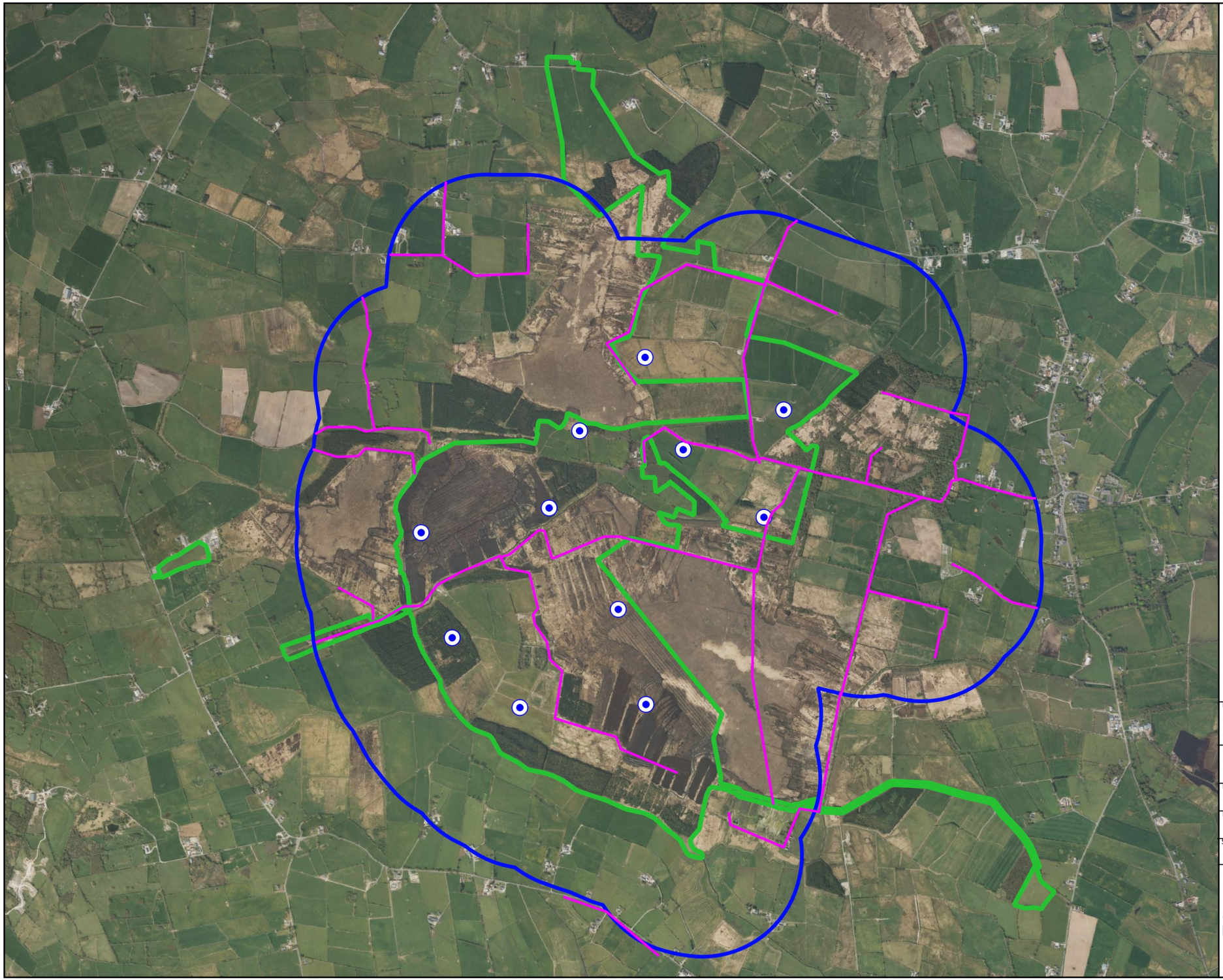

Map Legend

- EIAR Site Boundary
- Walkover Survey Area
- Proposed Turbine Layout
- Winter Walkover Transects

N

Drawing Title
Winter Walkover Transects

Project Title
Clonberne Wind Farm

Drawn By	Checked By
P. Manley	P. Cregg
Project No.	Drawing No.
180740	Fig. 7.5
Scale	Date
1:25,000	22/02/2024

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Map Legend

- EIAR Site Boundary
- 2km Survey Area
- Proposed Turbine Layout
- Hen Harrier Roost Vantage Point Location

N

Drawing Title
Hen Harrier Roost Survey Areas

Project Title
Clonberne Wind Farm

Drawn By	Checked By
P. Manley	P. Cregg
Project No.	Drawing No.
180740	Fig. 7.6
Scale	Date
1:37,500	22/02/2024

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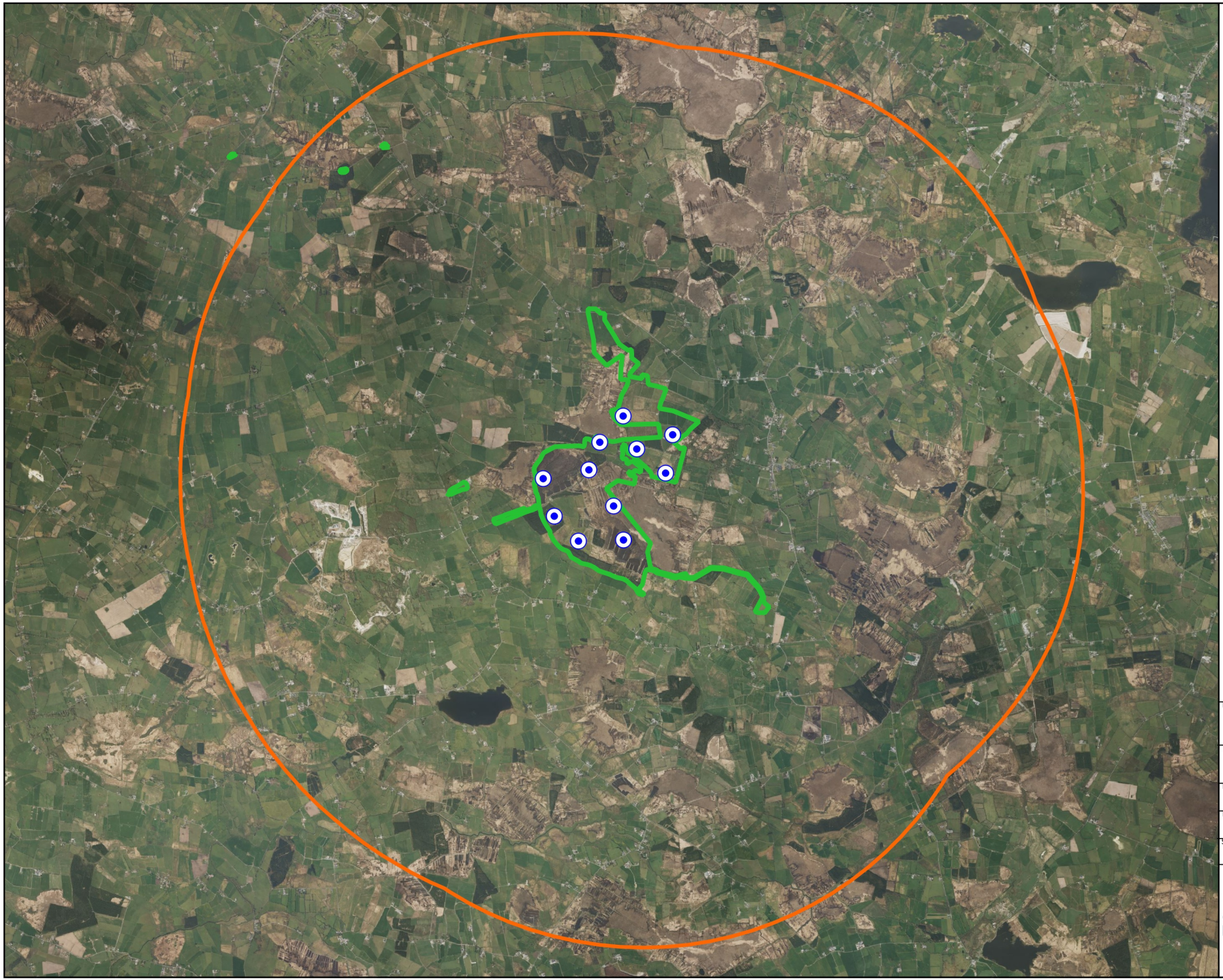

Map Legend

- EIAR Site Boundary
- 5km Survey Radius
- Proposed Turbine Layout

N

Drawing Title
Wildfowl Distribution Survey Area

Project Title
Clonberne Wind Farm

Drawn By	Checked By
P. Manley	P. Cregg
Project No.	Drawing No.
180740	Fig. 7.7
Scale	Date
1:70,000	22/02/2024

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Map Legend

- EIAR Site Boundary
- Proposed Turbine Layout
- Connectivity Vantage Point Location

N

Drawing Title
Connectivity Vantage Point Survey Location

Project Title
Clonberne Wind Farm

Drawn By	Checked By
P. Manley	P. Cregg
Project No.	Drawing No.
180740	Fig. 7.8
Scale	Date
1:23,000	22/02/2024

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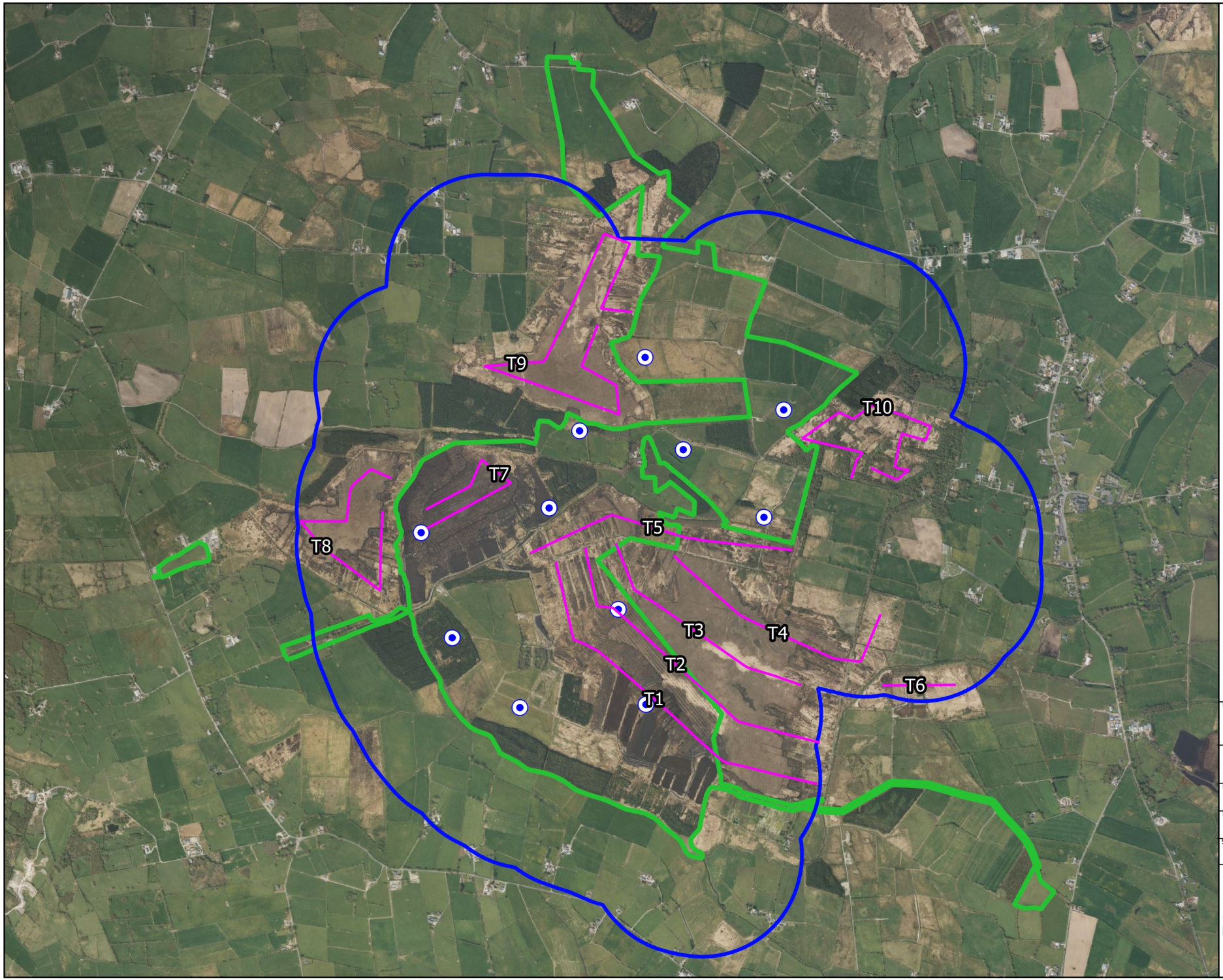

Map Legend

- EIAR Site Boundary
- Survey Area
- Proposed Turbine Layout
- Red Grouse Survey Transects

N

Drawing Title
Red Grouse Survey Transects

Project Title
Clonberne Wind Farm

Drawn By	Checked By
P. Manley	P. Cregg
Project No.	Drawing No.
180740	Fig. 7.9
Scale	Date
1:25,000	22/02/2024

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7.2.5 Ornithological Evaluation Criteria and Impact Assessment Methodology

7.2.5.1 Potential Effects Associated with Proposed Project

As per NatureScot Guidance (2017), wind farms present three potential risks to birds (Drewitt & Langston 2006, 2008; Band *et al.* 2007):

- **Direct habitat loss** through construction of wind farm infrastructure.
- **Disturbance displacement** (sometimes called indirect habitat loss) if birds avoid the wind farm and its surrounding area due to turbine construction and 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 abundance and flight activity within and surrounding the Wind Farm Site has been utilised to predict the potential effects of the Wind Farm Site on birds. Effects are assessed with regard to the construction phase, the operational phase and the decommissioning phase. They are also assessed cumulatively with other projects.

7.2.5.2 Geographical Framework

Guidance on Ecological Impact Assessment (CIEEM, 2018) recommends categories of ornithological or nature conservation value that relate to a geographical framework (e.g., international, through to local). This assessment utilises the geographical framework described in Guidelines for Assessment of Ecological Impact of National Road Schemes (NRA, 2009). The guidelines provide a basis for the determination of whether a site is of importance on the following scales:

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

Locally Important (lower value) receptors contain habitats and species that are widespread and of low ecological significance and importance only in the local area. Internationally Important sites are designated for conservation as part of the Natura 2000 Network (SAC or SPA) 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 Project was quantified according to two assessment criteria: Percival (2003) and the Environmental Protection Agency (EPA, 2022). 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 and Ornithology chapters of this EIAR, while Percival (2003) has also been followed given its specific focus on birds.

Percival (2003) criteria

Percival's (2003) methodology for assessing the effects of wind farms on birds has been applied to assess the sensitivity of a species to the development type, the magnitude of the effect and the significance of

the potential impact. The following tables (Table 7-3, Table 7-4 and Table 7-5) detail the assessment criteria for each stage.

Table 7-3 Evaluation of Sensitivity for Birds (Percival 2003)

Sensitivity	Determining Factor
Very High	› Species that form the cited interest of SPA's 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 an 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% Irish population)
Medium	› Species on Annex 1 of the EU Birds Directive. › Species present in regionally important numbers (>1% regional (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 (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 (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
	Low	Medium	Low	Low	Very Low
	Negligible	Low	Very Low	Very Low	Very Low

EPA Criteria (2022)

EPA impact assessment criteria are described (the duration) below and detailed in Table 7-6 and Table 7-7.

The following terms were utilised when quantifying duration and frequency of effects:

- 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, for example through remediation or restoration.
- Frequency – How often the effect will occur (once, rarely, occasionally, frequently, constantly – or hourly, daily, weekly, monthly, annually).

Table 7-6 Criteria for assessing impact significance based on (EPA, 2022)

Impact Magnitude	Definition
Imperceptible Effect	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 Effect	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate Effect	An effect that alters the character of the environment that is consistent with existing and emerging baseline trends
Significant Effect	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
Very Significant Effect	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment
Profound Effect	An effect which obliterates sensitive characteristics

Table 7-7 Criteria for assessing impact quality based on (EPA, 2022)

Impact Type	Criteria
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)

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 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 7-6 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 has been undertaken at the Wind Farm Site from October 2017 to March 2020 and October 2022 to September 2023. Results are derived from a continuous 2.5 years of surveying undertaken at the Wind Farm Site and hinterland, with an additional year of surveys during the 2022/2023 non-breeding season and the 2023 breeding season. All surveys were conducted in line with NatureScot guidance (2017). These are the results that 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 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 specialist studies, analysis and reporting have been undertaken in accordance with the appropriate guidelines.

Age of Data

Surveying has been ongoing at the Wind Farm Site between 2017 and 2023, this data provides useful information on how the Site usage and the rate of occurrence of birds have changed over time, i.e., October 2017 to March 2020 and October 2022 to September 2023. The age of data is a consideration as older data may no longer be representative of the baseline condition at a site.

The majority of this data meets the age requirement of NatureScot (2017) (< 5 years old). On this matter, CIEEM (2019) recommends using data no greater than three years old unless justifications can be provided. Such justifications can include no significant change to the habitat present onsite, this is the case at the Wind Farm Site. The dominant habitat types throughout the bird survey period between October 2017 and September 2023 remain cut-over bog and conifer plantation. The land-use (turf-cutting and commercial forestry) within the Wind Farm Site has not changed.

In the present case, given the onsite habitats and land uses haven't changed significantly it is reasonable to conclude that the bird assemblage at the Wind Farm Site is unlikely to have changed significantly during this survey period. The data therefore provides useful and robust information on how the Site usage and the rate of occurrence of birds have changed over time.

Viewsheds

One of the vantage point survey locations is located within 500m of the proposed turbine layout as was an unavoidably required in this instance due to local topography/obscuring vegetation and access to private lands. However, the turbines it was designed to cover are all greater than 500m from the vantage point location. The turbines located within 500m of this vantage point are surveyed from the second vantage point location, which ensures a significant observer effect is avoided.

While the majority of the Wind Farm Site is visible, there is a small gap in the viewshed. There is one turbine (T4) that is only partially covered by a vantage point survey at the lowest swept height. The Band Model (Band *et al.*, 2007) can however account for gaps in the viewshed, particularly where the

flight activity is not predicted to be significantly different in the gap compared to other areas of the viewshed (such as in this instance). Therefore, this is not a significant limitation in the viewshed analysis and the associated collision risk model.

Summary

In summary, no significant limitations in the scope, scale or context of the assessment have been identified.

7.2.6.3 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.

The potential effects of the Proposed Project were considered and assessed to ensure that all effects on KORs are adequately addressed, and no significant residual effects are likely to remain following the implementation of mitigation measures and best practice measures. As discussed in further detail in Section 7.7.

7.3 Baseline Conditions and Receptor Evaluation

7.3.1 Identification of Designated Sites within the Likely Zone of Influence of the Development

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 a NIS, but it should refer to the findings of that separate assessment*" and should "*incorporate their key findings as available and appropriate*". Therefore, this section provides a summary of the key screening assessment findings regarding SPAs and nationally designated sites, while a summary of findings regarding Special Areas of Conservation is provided in Chapter 6 of this EIAR. In addition, any potential impacts for SPAs are assessed in detail in the Appropriate Assessment 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 radius of the proposed works are identified. In this case, there were no SPAs identified within 15km of the Wind Farm Site. Then designated sites located outside the 15km buffer 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 Proposed Project was identified.

In addition (and in the absence of any specific European or Irish guidance), the guidance document 'Assessing Connectivity with Special Protection Areas' (NatureScot, 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 and NIS.

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:

- Sharrock, J.T.R. (1976) The atlas of breeding birds in Britain and Ireland.
- Lack, P.C. (1986) The atlas of wintering birds in Britain and Ireland.
- Gibbons, D.W., Reid, J.B. & Chapman, R.A. (1993) The new atlas of breeding birds in Britain and Ireland: 1988-1991.

The entire Wind Farm Site lies within hectad M55. Table 7-8 presents a list of species of conservation interest species recorded from the relevant hectad during the breeding birds' atlases:

Table 7-8 Breeding Bird Atlas Data

Species Name	Breeding Atlas '68–'72 M55	Breeding Atlas '88–'91 M55	Breeding Atlas '07–'11 M55	Conservation Status
Shoveler (*Anas clypeata*)	Probable	-	-	RL
Tufted Duck *(Aythya fuligula)*	Confirmed	-	Possible	RL
Red Grouse *(Lagops lagopus)*	-	Confirmed	-	RL
Grey Partridge *(Perdix perdix)*	-	Confirmed	-	RL
Sparrowhawk *(Accipiter nisus)*	Confirmed	Confirmed	Possible	GL
Buzzard *(Buteo buteo)*	-	-	Probable	GL
Corncrake *(Crex crex)*	Probable	Confirmed	-	BD; RL
Lapwing *(Vanellus vanellus)*	Confirmed	Confirmed	Confirmed	RL
Woodcock *(Scolopax rusticola)*	Confirmed	Probable	-	RL
Snipe *(Gallinago gallinago)*	Confirmed	Confirmed	Confirmed	RL
Curlew *(Numerenius arquata)*	Confirmed	Confirmed	-	RL
Redshank *(Tringa tetanus)*	-	Probable	Possible	RL
Dunlin *(Calidris alpine)*	-	Probable	-	BD; RL
Barn Owl (*Tyto alba*)	Possible	-	-	RL
Long-eared Owl *(Asio otus)*	Possible	Probable	-	GL
Kingfisher (*Alcedo atthis*)	Confirmed	-	-	BD
Kestrel *(Falco tinnunculus)*	Confirmed	Confirmed	-	RL
Peregrine *(Falco peregrinus)*	-	-	Probable	BD
Grey Wagtail *(Motacilla cinereal)*	-	Confirmed	-	RL
Meadow Pipit *(Anthus pratensis)*	-	Confirmed	Confirmed	RL
Yellowhammer *(Emberiza citronella)*	Confirmed	Confirmed	-	RL

BD = EU Birds Directive Annex I; RL = BoCCI Red List; GL = BoCCI Green List; Possible = possible breeding; Probable = probable breeding; Confirmed = confirmed breeding; - = not-recorded.

Table 7-9 shows those species recorded in the relevant hectad (M55) in the wintering birds' atlases that are also protected under the EU Birds Directive or mentioned on the Birds of Conservation Concern in Ireland (BoCCI) red list.

Table 7-9 Wintering Bird Atlas Data

Species Name	Wintering Atlas '81 – '84	Wintering Atlas '07 – '11	Conservation Status
	M55	M55	
Whooper Swan *(Cygnus cygnus)*	-	Pres.	BD
Shoveler *(Anas clypeata)*	-	Pres.	RL
Pochard *(Aythya farina)*	Pres.	Pres.	RL
Red Grouse *(Lagops lagopus)*	Pres.	-	RL
Sparrowhawk *(Accipiter nisus)*	-	Pres.	GL
Lapwing *(Vanellus vanellus)*	Pres.	Pres.	RL
Golden Plover *(Pluvialis apricaria)*	Pres.	Pres.	BD; RL
Woodcock *(Scolopax rusticola)*	Pres.	Pres.	RL
Snipe *(Gallinago gallinago)*	Pres.	Pres.	RL
Curlew *(Numerenius arquata)*	Pres.	-	RL
Redshank *(Tringa tetanus)*	-	Pres.	RL
Kestrel *(Falco tinnunculus)*	Pres.	Pres.	RL
Meadow Pipit *(Anthus pratensis)*	Pres.	Pres.	RL
Yellowhammer *(Emberiza citronella)*	Pres.	-	RL

BD = EU Birds Directive Annex I; RL = BoCCI Red List; GL = BoCCI Green List; Pres. = present in hectad; - = not recorded

7.3.3 Bird Sensitivity Mapping Tool

A Bird Sensitivity Mapping Tool for wind energy development was developed by BirdWatch Ireland and provides 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 Wind Farm Site is partially within an area of low sensitivity, with parts of the Wind Farm Site, to the west and north, located in an unclassified area where there is no data available.

7.3.4 Irish Wetland Bird Survey (I-WeBS) Records

The Wind Farm Site does not overlap with an I-WeBS site and the nearest site is located approximately 2km south-west of the Wind Farm Site at Levally Lough. Data from I-WeBS sites in County Galway have been used to estimate county populations of wintering waterbirds identified as KORs[1]. Datasets for the following sites were downloaded from www.birdwatchireland.ie and reviewed:

Galway I-WeBS Sites

- Ballindeereen Turlough
- Ballinduff Tulough & Grassland
- Ballyboy
- Ballyconneely Bay
- Ballynakill Harbour
- Ballynakill Lough (Gorumna Isl.)
- Bertaghboy Bay
- Caherglassaun Lough
- Cahermore Turlough

[1] *The limitations of using this data to estimate a county population is acknowledged, e.g., as typically all the monthly counts in a given year were not undertaken on the same day there is the potential for under or overestimates, however this is the best available information.*

- Carnus Bay, Connemara
- Caranavoodaun Turlough
- Coole Lough – Newtown Turlough
- Dogs & Gorteen Bay
- Doolough Headford (Turloughcor)
- Glenamaddy Turlough
- Inishbofin
- Inishmore, Aran Islands
- Inner Galway Bay
- Inner Streamstown Bay
- Kiltiernan Turlough
- Kiltullagh Lough
- L. Coy – Blackrock – Bullaunagh – Ballylee
- Lisrivis & Pollshask Turloughs
- Lough Adrehid
- Lough Aughawoolia
- Lough Corrib
- Lough Cutre – Ballynakill L.
- Lough Poll
- Lough Rea
- Lydacan Castle Turlough
- Mannin Bay
- Murvey Machair Beach
- Mweenish Island
- North Central Galway Lakes
- North East Galway Lakes
- Omey Strand
- Polleagh Turlough
- Pollnagarragh Marshes
- Rahasane Turlough
- Rossadillisk
- Termon Turloughs
- Tullaghnafrankagh Lough

7.3.5 NPWS Rare and Protected Species Dataset

An information request was sent to the NPWS requesting records from the Rare and Protected Species Database. The sections below provide the records obtained from the NPWS (reply received on 4th January 2022) regarding rare and protected bird species.

Golden Plover

There was one record of a golden plover approximately 3km south of the Wind Farm Site in 2010.

Whooper Swan

There were two records of whooper swan, both records were approximately 2km north of the Wind Farm Site in 2010.

Curlew

There was one record of a curlew approximately 3km south of the Wind Farm Site in 2010.

Snipe

There were seven records of snipe. Records were between c.2km and c.6km from the Wind Farm Site. All records were from 2010.

7.4 Field Survey Results

A comprehensive list of all bird species recorded during surveys is provided in Table 2 of Appendix 7-1. The target species listed below were recorded within the zone of influence of the Wind Farm Site during the ornithological surveys. The list is ordered in accordance with conservation significance: Annex I species, Red listed species and species considered sensitive to this type of development (i.e., raptor species):

- Golden Plover (Annex I species; BoCCI Red listed)
- Hen Harrier (Annex I species)
- Kingfisher (Annex I species)
- Little Egret (Annex I species)
- Merlin (Annex I species)
- Peregrine (Annex I species)
- Whooper Swan (Annex I species)
- Curlew (BoCCI Red Listed)
- Kestrel (BoCCI Red Listed)
- Lapwing (BoCCI Red Listed)
- Red Grouse (BoCCI Red listed)
- Snipe (BoCCI Red Listed)
- Woodcock (BoCCI Red listed)
- Buzzard (Raptor)
- Long-eared Owl (Raptor)
- Sparrowhawk (Raptor)
- BoCCI Red listed passerine species (Grey Wagtail, Meadow Pipit, Redwing and Swift)

The target species listed below were recorded during waterbird distribution and abundance surveys, up to 5km from the Wind Farm Site. These species were not observed on or near the Wind Farm Site and therefore, there is no potential for impact from the Wind Farm Site. The list is ordered in accordance with conservation significance: Annex I species, SCIs of designated sites and Red listed species.

- Greenland White-fronted Goose (Annex I species)
- Black-tailed Godwit (BoCCI Red Listed)
- Dunlin (BoCCI Red Listed)
- Goldeneye (BoCCI Red Listed)
- Pochard (BoCCI Red Listed)
- Redshank (BoCCI Red Listed)
- Shoveler (BoCCI Red Listed)

The following sections describe the observations of each target species under the individual survey headings. Survey data and mapping for each target species is provided in the technical appendices. Appendix 7-3 presents results summary tables including:

- Monthly distribution of target species during vantage point surveys.
- Monthly distribution of target species during breeding walkover surveys.
- Monthly distribution of target species during breeding raptor surveys.
- Monthly distribution of target species during winter walkover surveys.
- Monthly distribution of target species during hen harrier roost surveys.
- Monthly distribution of target species during waterbird distribution and abundance surveys.

- Monthly distribution of target species during connectivity vantage point surveys.
- Monthly distribution of target species during breeding red grouse surveys.
- Monthly distribution of non-target species observations during on-site surveys.

7.4.1 Golden Plover

Raw Survey data for golden plover is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3.

Vantage Point Surveys

Golden plover were recorded on 78 occasions during vantage point surveys (see Appendix 7-4, Figure 7.4.1). Sixty-six flights occurred within the potential collision height. All observations of golden plover occurred during the winter and passage seasons (September – April). Seventeen observations occurred during the passage season (April and September), which were likely to be migrants from the wintering population.

Forty-five observations were recorded during the 2017/2018 winter season, thirteen observations were recorded during the 2018/2019 winter season, two observations occurred during the 2019/2020 winter season, 12 during winter 2022/23, and the remaining six observations occurred during September 2023. Observations ranged from an individual to a flock of 400 birds. The majority of observations were of birds commuting or circling over the Wind Farm Site. There were seven observations of golden plover utilizing habitats within 500m of the proposed turbine layout.

Winter Walkover Surveys

Golden plover were observed on five occasions during the winter walkover surveys conducted at the Wind Farm Site (see Appendix 7-4. Figure 7.4.2). There was one observation of 1,000 golden plover on the 15th of March 2018. These birds were flushed by a helicopter, greater than 500m to the west of the Wind Farm Site. On the 11th of March 2019, 300 golden plover were recorded roosting close to Kilmurray Turlough, greater than 500m from the Wind Farm Site. On the 15th of October 2019, an individual golden plover was heard calling, but not seen. This observation was not mapped. There was one observation at Kilmurray Turlough on the 15th of January 2020, 2,500 birds were roosting at the edge of the turlough, greater than 500m from the Wind Farm Site. The final observation was of a flock of five birds flushed from within 500m of the Wind Farm Site

Waterbird Distribution and Abundance Surveys

Golden plover were observed on 36 occasions during the waterbird distribution and abundance surveys, up to 5km from the Wind Farm Site. The majority of these observations were at Kilmurray Turlough (approximately 1km from the Wind Farm Site) and Levally Lough (approximately 2km from the Wind Farm Site). Observations ranged from two to 2,100 birds. There were nine observations during the 2017/2018 non-breeding season, three during the 2018/2019 non-breeding season, nine during the 2019/2020 non-breeding season, 13 during the 2022/2023 non-breeding season and two in September 2023.

Connectivity Vantage Point Surveys

Golden plover was observed on 24 occasions during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.4.3). Observations ranged from an individual to a flock of 200 birds. There were 13 observations during the 2017/2018 non-breeding season, one observation during the 2018/2019 non-breeding season, three observations during the 2019/2020 non-breeding season and seven during the 2022/2023 non-breeding season. The majority of observations were of golden plover commuting or circling, with one observation of a flock being flushed, and one observation of a flock landing on the

bog. Some flights could suggest movement between Levally Lough/Summerville Lough and Kilmurray Turlough. However, most observations appear to be randomly distributed. Therefore, no regularly used flight paths were identified.

Incidental Observations

Golden plover were recorded as incidental observations on 19 occasions. Sixteen of these were recorded during hen harrier roost surveys, where flocks of between one and 250 were observed commuting or circling. There were two incidental observations of golden plover at Kilmurray Turlough during winter walkover surveys, on the 11th of March 2019, a flock of 300 birds were recorded and on the 18th of January, a flock of 2,500 birds were recorded roosting at the turlough. There was also one observation of golden plover during a red grouse survey, where five golden plover were recorded commuting.

7.4.2 Hen Harrier

Raw Survey data for hen harrier is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3.

Vantage Point Surveys

Hen harrier were recorded on ten occasions during vantage point surveys (see Appendix 7-4, Figure 7.4.4). All observations occurred within, or partially within, 500m of the proposed turbine layout and were during the non-breeding season months (October – March).

Nine observations were recorded during the 2017/2018 winter season. The remaining observation was recorded in October 2018. All observations were of individual birds. Eight observations were of hen harrier hunting, and the remaining two observations were of birds being mobbed by hooded crows. Seven of the ten flights occurred within the potential collision height.

Winter Walkover Surveys

Hen harrier were recorded on only one occasion during the winter walkover surveys (see Appendix 7-4, Figure 7.4.5). In February 2023, an adult male was observed travelling within the Wind Farm Site.

Hen Harrier Roost Surveys

During these surveys no regularly used roost site was identified. Hen harrier were recorded on nine occasions during the dedicated hen harrier roost surveys (see Appendix 7-4, Figure 7.4.6). There were five observations in the 2017/2018 winter season, two observations during the 2019/2020 winter season and two observations during the 2022/2023 winter season. There were five observations of hen harrier commuting and two of hen harrier hunting during these surveys. On the 6th of November 2017, a female hen harrier was observed perched on cutover bog before flying over heather and dropped into a potential roost site in raised bog. This potential roost site was located within the Wind Farm Site. On the 15th of December 2017, a ringtail (female/juvenile) hen harrier was observed flying into a potential roost site in bog, approximately 1.2km south of the Wind Farm Site. There were no hen harrier observed utilising either of these roost sites on subsequent visits. Observations relating to roosting behaviour are presented in Confidential Appendix 7-5, Figure 7.5.1.

Connectivity Vantage Point Surveys

Hen harrier were observed on only four occasions during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.4.7). All observations were of individual ringtails (female/juvenile). There were

three observations within, or partially within, the Wind Farm Site and were during the non-breeding season (September – March). On the 20th of November 2017, a female hen harrier was observed going to roost within 70m of the Wind Farm Site. This roost site was not observed being used on any subsequent surveys. The observation relating to roosting behaviour are presented in Confidential Appendix 7-5, Figure 7.5.2.

Incidental Observations

Hen harrier were recorded as incidental observations on three occasions during the waterbird distribution and abundance surveys. All observations were of individual females hunting, one of which was within the Wind Farm Site.

Roost Summary

There were three irregularly used roost sites identified for hen harrier during surveys. The first was approximately 120m from the nearest proposed turbine. The second was approximately 400m from the nearest turbine, while the third was within the Wind Farm Site, approximately 1.4km from the nearest turbine. Hen harrier were only observed utilising these roosts on one occasion in each instance. Although hen harrier roost surveys were conducted at these locations throughout the four winter seasons of surveys, these roosts were not found to be active on subsequent survey visits. The locations of these roosts are presented in Confidential Appendix 7-5, Figure 7.5.3.

7.4.3 Kingfisher

Raw Survey data for kingfisher is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3.

Winter Walkover Surveys

Kingfisher was recorded on only two occasions during the winter walkover surveys (see Appendix 7-4, Figure 7.4.8). Both of these observations were during the January 2018 surveys. In both instances, an individual kingfisher was recorded along a stream within the Wind Farm Site.

Incidental Observations

Kingfisher was recorded on only one occasion as an incidental observation. In March 2023, an individual was flushed during a hen harrier roost survey.

7.4.4 Little Egret

Raw Survey data for little egret is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3.

Vantage Point Surveys

Little egret was only observed once during the vantage point surveys (see Appendix 7-4, Figure 7.4.9). This observation was on the 9th of February 2018 and was of an individual bird commuting within the potential collision height, within the Wind Farm Site.

Breeding Walkover Surveys

Little egret was observed on only one occasion during the breeding walkover surveys (see Appendix 7-4, Figure 7.4.10). In July 2023, an individual was observed commuting over the Wind Farm Site.

Winter Walkover Surveys

Little egret was observed on only two occasions during the winter walkover surveys (see Appendix 7-4, Figure 7.4.11). On the 18th of January 2018, two little egret were observed travelling 100m south of the Wind Farm Site. On the 11th of December 2019, an individual was observed commuting over improved agricultural grassland within 500m of the Wind Farm Site, to the north.

Waterbird Distribution and Abundance Surveys

Little egret was observed on three occasions during the waterbird distribution and abundance surveys. All observations were in February and March 2023. There were two observations at Summerville Lough, approximately 6.5km form the Wind Farm Site and one observation at Lough Nahask, approximately 6.1km from the Wind Farm Site.

Incidental Observations

Little egret was observed as an incidental observation on four occasions during breeding raptor and hen harrier roost surveys. There were three observations of little egret at Lomaunaghbaun, approximately 2.7km from the nearest turbine, during surveys in July 2023. An individual little egret was observed commuting over HHVP4, approximately 1.4km south of the Wind Farm Site.

7.4.5 Merlin

Raw Survey data for merlin is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3.

Vantage Point Surveys

Merlin were observed on nineteen occasions during the vantage point surveys between October 2017 and March 2020 (see Appendix 7-4, Figure 7.4.12). There were no observations between October 2022 and September 2023. Eighteen of these observations were on the 20th of April 2018, when a pair of merlin were observed in a nest on a tree in bog, within the Wind Farm Site. All of these observations occurred within 200m of the nest site. The pair of merlin were observed copulating twice during this survey. A large amount of disturbance in the area was recorded by the surveyor, the majority of which was peat cutting activities in the vicinity of the nest site. This pair of merlin were not observed on site on any subsequent visits during the 2018 breeding season. There was no evidence of breeding merlin observed in the subsequent breeding seasons (2019 and 2023). Observations relating to breeding behaviour are presented in Confidential Appendix 7-5, Figure 7.5.4 and the nest site is presented in Confidential Appendix 7-5, Figure 7.5.5.

The remaining observation of merlin occurred on the 7th of November 2019, when an individual was seen landing on the bog.

Breeding Walkover Surveys

Merlin was recorded on only one occasion during the breeding walkover surveys (see Appendix 7-4, Figure 7.4.13). In June 2023, an individual was observed commuting approximately 500m from the Wind Farm Site.

Winter Walkover Surveys

Merlin was recorded on only three occasions during the winter walkover surveys (see Appendix 7-4, Figure 7.4.14). On the 16th of January 2018, a merlin was observed approximately 400m to the west of the Wind Farm Site. During the 2018/2019 winter season, merlin was recorded on two occasions, once eating prey on the ground before flying from view, and once in flight before landing on a tree. Both observations occurred within the Wind Farm Site.

Connectivity Vantage Point Surveys

Merlin was observed on four occasions during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.4.15). There was one observation in March 2018, two in December 2018 and one in February 2020. On the 13th of March 2018, a pair of merlin were observed in flight together calling. These birds are likely associated with the nest that was located on the 20th of April 2018. All other observations were of individuals commuting, with one observation of a merlin landing on the bog.

Incidental Observations

Merlin was recorded as an incidental observation on five occasions during the comprehensive suite of surveys conducted at the Wind Farm Site. There were two observations at the Wind Farm Site before/after vantage point surveys. On the 22nd of April 2018, at least one merlin was heard alarm calling due to disturbance by turf cutters near the location of the nest site observed on the 20th of April 2018. There was one incidental observation of merlin at Kiltullagh Lough during a waterbird distribution and abundance survey in February 2018 and one observation of a merlin at HHVP3a during a hen harrier roost survey, approximately 500m east of the Wind Farm Site, in February 2020.

7.4.6 Peregrine

Raw Survey data for Peregrine is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3.

Vantage Point Surveys

Peregrine were recorded on nine occasions during vantage point surveys (see Appendix 7-4, Figure 7.4.16). All of the observations were of individual birds in flight. Five observations occurred during November and December, with three of these observations occurring in December 2017. There was one observation of peregrine in July 2018, one in February 2023, one in July 2023 and one in September 2023.

Seven flights occurred within, or partially within, 500m of the proposed turbine layout. There were three observations within the potential collision height. Seven observations were of peregrine commuting, while the remaining observations were of a peregrine being mobbed by a hooded crow or meadow pipit.

Breeding Walkover Surveys

Peregrine was recorded on only one occasion during the breeding walkover surveys (see Appendix 7-4, Figure 7.4.17). In May 2023, an individual was observed commuting partially within the Wind Farm Site.

Winter Walkover Surveys

Peregrine was recorded on only three occasions during the winter walkover surveys (see Appendix 7-4, Figure 7.4.18). There were two observations on the 13th of December 2017. One of which was of a

peregrine in a conifer plantation approximately 100m west of the Wind Farm Site. The other observation was of a peregrine in flight, partially within the Wind Farm Site. Additionally, there was one observation of a bird travelling within the Wind Farm Site in February 2023.

Connectivity Vantage Point Surveys

Peregrine were observed on ten occasions during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.4.19). All observations were of individuals commuting or hunting within the Wind Farm Site.

Incidental Observations

Peregrine were recorded as incidental observations on nine occasions during hen harrier roost surveys and three occasions during waterbird distribution and abundance surveys. All of these observations were of individual peregrine commuting.

7.4.7 Whooper Swan

Raw Survey data for whooper swan is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3.

Vantage Point Surveys

Whooper swan were recorded in flight on 15 occasions during vantage point surveys (see Appendix 7-4, Figure 7.4.20). Four observations occurred during the 2017/2018 winter season; with a maximum flock size of four birds. During the 2018/2019 winter season, there were four observations; with a maximum flock size of seven birds. Five observations occurred during the 2019/2020 winter season; with a maximum flock size of six birds. The remaining two observations were during the 2022/2023 winter season; with a maximum flock size of seven birds.

All 15 observations occurred within the potential collision height. Twelve of the flights occurred within, or partially within, 500m of the proposed turbine layout. All observations were of birds commuting.

Winter Walkover Surveys

Whooper swan were observed on eight occasions during the winter walkover surveys (see Appendix 7-4, Figure 7.4.21). Six of these observations were of flocks of whooper swan, ranging from two to 47 birds, at Kilmurray Turlough[2], approximately 1km from the Wind Farm Site. The remaining two observations were during the 2017/2018 winter season. On the 13th of December 2017, a flock of fourteen whooper swans were recorded approximately 450m to the west of the Wind Farm Site. On the 16th of January 2018, a flock of three whooper swans was observed approximately 100m to the north-west of the Wind Farm Site.

Waterbird Distribution and Abundance Surveys

Whooper swan were recorded on 87 occasions during the waterbird distribution and abundance surveys, up to 5km from the Wind Farm Site. The majority of these observations were at Kilmurray Turlough (approximately 1km from the Wind Farm Site), Levally Lough (approximately 2km from the Wind Farm Site) and Glenamaddy Turlough (approximately 7.5km from the Wind Farm Site). Observations ranged from an individual to a flock of 57 birds. There were 24 observations during the 2017/2018 winter season, 20 during the 2018/2019 winter season, eight during the 2019/2020 winter

[2] *These observations were not mapped by the observer but as stated were at this turlough.*

season and 34 during the 2022/2023 winter season. The largest flock (57 birds) was observed at Glenamaddy Turlough, with flocks of up to 54 birds at Levally Lough and flocks of up to 49 birds at Kilmurray Turlough.

Connectivity Vantage Point Surveys

Whooper swan was observed on ten occasions during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.4.22). There were four observations during the 2017/2018 winter season, one observation in both March and April 2019 and four between October and December 2022. Observations ranged from an individual to a flock of 25 birds. All observations were of birds commuting.

Incidental Observations

Whooper swan were recorded as incidental observations on 18 occasions during surveys. There were five incidental observations of this species at Kilmurray Turlough during winter walkover surveys, flocks ranged from six to 47 birds. The majority of the remaining incidental records were of whooper swan recorded during hen harrier roost surveys. These observations ranged from one to eighteen birds commuting.

7.4.8 Curlew

Raw Survey data for curlew is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3.

Vantage Point Surveys

Curlew was recorded on five occasions during the vantage point surveys (see Appendix 7-4, Figure 7.4.23). Observations ranged from an individual to five birds. Most observations were of birds commuting. There was one observation of an individual curlew alarm calling and following a peregrine on the 13th of July 2018. This flight was below potential collision height and was partially within 500m of the proposed turbine layout. This observation is likely related to a non-breeding bird given that no previous, or subsequent, observations of this species were recorded at this location. It is therefore presumed that this curlew was a bird passing through the area, reacting to a predator hunting overhead, and not protecting a possible nest location.

Breeding Walkover Surveys

Curlew were observed on only one occasion during the breeding walkover surveys (see Appendix 7-4, Figure 7.4.24). This observation was of eleven birds commuting over the Wind Farm Site in June 2023. Given the number of birds and the time of year, this observation is likely a flock of non-breeding birds on passage.

Winter Walkover Surveys

Curlew were recorded on only one occasion during the winter walkover surveys. This observation was at Kilmurrary Turlough, approximately 1km west of the Wind Farm Site, on the 17th of October 2019. Two birds were observed at the edge of the turlough.

Waterbird Distribution and Abundance Surveys

Curlew were recorded on 58 occasions during the waterbird distribution and abundance surveys, up to 5km from the Wind Farm Site. The majority of these observations were at Levally Lough

(approximately 2km from the Wind Farm Site) and Glenamaddy Turlough (approximately 7.5km from the Wind Farm Site). Observations ranged from an individual to a flock of 38 birds. There were twelve observations during the 2017/2018 winter season, five during the 2018/2019 winter season, twelve during the 2019/2020 winter season, 17 during the 2022/2023 winter season and 12 in August/September 2023.

7.4.9 Kestrel

Raw Survey data for kestrel is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3.

Vantage Point Surveys

Kestrel were recorded in flight on 61 occasions during the vantage point surveys (see Appendix 7-4, Figure 7.4.25). Fifty-eight of these observations were within, or partially within, 500m of the proposed turbine layout. Forty-five of the observations were at the potential collision height. The majority of these observations were of kestrel hunting or commuting over improved agricultural grassland, woodland and bog habitats. Twenty-two of these observations occurred during the core breeding season months between April and August, while there were 39 observations of kestrel during non-breeding season months (September – March). In August 2023, there was one observation of a kestrel mobbing and chasing a raven. Given the location of this observation, it was possibly protecting juvenile birds which had recently fledged from the nest identified during the breeding raptor surveys.

Breeding Walkover Surveys

Kestrel were only observed on six occasions during the breeding walkover surveys (see Appendix 7-4, Figure 7.4.26). In 2018, an individual kestrel was observed within the Wind Farm Site. There were five observations during the 2023 breeding season, all of which were of individuals hunting or commuting. No evidence of breeding was observed for this species during the breeding walkover surveys.

Breeding Raptor Surveys

Kestrel were observed on 19 occasions during the breeding raptor surveys (see Appendix 7-4, Figure 7.4.27), fourteen of these observations were of birds commuting or hunting. There were two observations of a kestrel landing in trees during the July 2019 surveys and one observation of two recently fledged chicks in a conifer plantation. This nest site was located approximately 2.6km north of the Wind Farm Site. In 2023, there were two observations of birds carrying prey towards a nest site. The exact location of this nest is unknown, but is likely on, or adjacent to, the Wind Farm Site given the location of these two flights. Observations relating to breeding behaviour are presented in Confidential Appendix 7-5, Figure 7.5.6 and the location of the breeding territories are presented in Confidential Appendix 7-5, Figure 7.5.7.

Winter Walkover Surveys

Kestrel were recorded on six occasions during the winter walkover surveys (see Appendix 7-4, Figure 7.4.28). There were three observations during the 2017/2018 winter season, two during the 2018/2019 winter season and one during the 2019/2020 winter season. Of the four flights which were mapped, there was one observation within the Wind Farm Site and three within 500m of the Wind Farm Site.

Connectivity Vantage Point Surveys

Kestrel was observed on 14 occasions during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.4.29). There were ten observations during the non-breeding season (September to March) and

four observations during the breeding season. There were 12 observations of kestrel hunting. In November 2017, a kestrel was observed flying into trees to consume prey.

Incidental Observations

Kestrel were observed on 22 occasions as incidental observations, 16 of which were during hen harrier roost surveys and on six occasions during a waterbird distribution and abundance surveys. All observations during hen harrier roost surveys were of individuals hunting or commuting at HHVP1, HHVP2, HHVP3a and HHVP4a. The observations during waterbird distribution and abundance surveys were of individuals at Kiltullagh Lough, Glenamaddy Turlough, Doo Lough and Shanvally.

7.4.10 Lapwing

Raw Survey data for lapwing is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3.

Vantage Point Surveys

Lapwing were recorded on 17 occasions during vantage point surveys (see Appendix 7-4, Figure 7.4.30). Seven observations occurred during the 2017/2018 winter season (maximum flock size of 120 birds), there were two observations during the 2018/2019 winter season (maximum flock of 400 birds), there were four observations during the 2019/2020 winter season (maximum flock of 250 birds), three observations during the 2022/2023 winter season (maximum flock of 70 birds) and one observation of 60 birds in September 2023.

Sixteen of the observations occurred at the potential collision height. Nine of the observations occurred within, or partially within, 500m of the proposed turbine layout. All observations were of birds commuting or circling over improved agricultural grassland or bog habitats.

Winter Walkover Surveys

Lapwing were observed on nine occasions during the winter walkover surveys (see Appendix 7-4, Figure 7.4.31). There were five observations during the 2017/2018 winter season, one during the 2018/2019 winter season and three during the 2019/2020 winter season. All observations during the 2018/2019 and 2019/2020 seasons were at Kilmurray Turlough, approximately 1km west of the Wind Farm Site. These observations ranged from flocks of fifteen to 150 birds. During the 2017/2018 winter season, there were two observations in December 2017 and three observations in January 2018. These observations ranged from an individual to 80 birds. Only two of these observations were within the Wind Farm Site, with the remaining three being between 400m and 550m from the Wind Farm Site.

Waterbird Distribution and Abundance Surveys

Lapwing were recorded on 93 occasions during the waterbird distribution and abundance surveys, up to 5km from the Wind Farm Site. The majority of these observations were at Kilmurray Turlough (approximately 1km from the Wind Farm Site) and Levally Lough (approximately 2km from the Wind Farm Site). Observations ranged from an individual to a flock of 500 birds. There were 21 observations during the 2017/2018 winter season, 17 during the 2018/2019 winter season, 20 during the 2019/2020 winter season, 30 during the 2022/2023 winter season and five in August/September 2023. The largest flock was observed at Levally Lough and there were flocks of up to 200 birds at Kilmurray Turlough. There was one observation of lapwing within 500m of the Wind Farm Site, this observation was of a flock of 34 birds in improved agricultural grassland in January 2018.

Connectivity Vantage Point Surveys

Lapwing were observed on five occasions during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.4.32). These observations ranged from flocks of 60 to 200 birds and were all during the 2019/2020 winter season. All observations were of birds commuting, with only one observation within the Wind Farm Site.

Incidental Observations

Lapwing were recorded as incidental observations on 11 occasions. There were three incidental observations of this species at Kilmurray Turlough during winter walkover surveys, flocks ranged in size from 27 to 150 birds. The remaining incidental records were during hen harrier roost surveys. These observations ranged from an individual to 130 birds seen commuting near HHVP1, HHVP2 and HHVP4a. Additionally, there was one observation of an individual at Levally Lough in May 2023.

7.4.11 Red Grouse

Raw Survey data for red grouse is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3.

Red Grouse Surveys

Red Grouse were observed on three occasions during the dedicated red grouse surveys (see Appendix 7-4, Figure 7.4.33). There were two observations of red grouse on the 8th of March 2018, and one observation on the 24th of February 2019. There were no observations of red grouse during the 2023 red grouse survey. Both observations in 2018 were of birds calling, and the observation in 2019 was of a bird being flushed by the observer. All observations occurred in an area of raised bog to the east of the Wind Farm Site, within 500m.

7.4.12 Snipe

Raw Survey data for snipe is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3.

Vantage Point Surveys

Snipe were recorded in flight on 84 occasions during vantage point surveys (see Appendix 7-4, Figure 7.4.34). Forty-three of these observations occurred during the core breeding season months between April and August, while there were 37 observations of snipe recorded during non-breeding season months (September – March). There were four observations during the 2018 breeding season and 39 during the 2023 breeding season. There were no observations during the 2019 breeding season.

Nine flights occurred during the 2017/2018 winter season (October – March), seven during the 2018/2019 winter season, one observation occurred during the 2019/2020 winter season and 12 observations during the 2022/2023 winter season.

Seventy-one observations occurred within, or partially within, 500m of the proposed turbine layout. Forty-six flights occurred within, or partially within, the potential collision height. Observations ranged from an individual to 37 birds. The majority of observations were of snipe commuting. There were three observations of snipe drumming/displaying during the 2018 breeding season, two of which were mapped. There were 26 observations of snipe drumming/displaying during the 2023 breeding season, all of which were in the same area, within the Wind Farm Site. There was a minimum of three breeding pairs of snipe in this area. Observations relating to breeding behaviour are presented in Confidential Appendix 7-5, Figure 7.5.8.

Breeding Walkover Surveys

Snipe were recorded on 44 occasions during the breeding walkover surveys (see Appendix 7-4, Figure 7.4.35). There were eight observations during the 2018 breeding season, thirteen during the 2019 breeding season and 23 during the 2023 breeding season. During the 2018 breeding season, there were two breeding territories for snipe identified, both of which were within the Wind Farm Site. During the 2019 breeding season, there were also two breeding territories identified, one of which was also identified in the 2018 breeding season. The second territory during the 2019 breeding season was located approximately 30m west of the Wind Farm Site. During the 2023 breeding season, there were five breeding territories for snipe identified, three of which were within, or partially within, the Wind Farm Site. Observations relating to breeding behaviour are presented in Confidential Appendix 7-5, Figure 7.5.9

Winter Walkover Surveys

Snipe were recorded on 86 occasions during winter walkover surveys (see Appendix 7-4, Figure 7.4.36). There were 61 observations during the 2017/2018 winter season, ten during the 2018/2019 winter season, six during the 2019/2020 winter season and five during the 2022/2023 winter season. Of the 73 flights which were mapped, there were 37 observations within, or partially within, the Wind Farm Site and an additional 35 within, or partially within, 500m of the Wind Farm Site. There were 67 observations of individual snipe. The remaining fourteen observations were flocks ranging from two to 29 birds.

Waterbird Distribution and Abundance Surveys

Snipe were recorded on only 11 occasions during the waterbird distribution and abundance surveys, up to 5km from the Wind Farm Site. There were four observations at Levally Lough, one at Carrownagur Lough, one at Gortnagier East, two at Lough Nahask, two at Shanvally and one within the Wind Farm Site. Observations ranged from an individual to a flock of sixteen birds. There was one observation during the 2017/2018 winter season, three observations during the 2018/2019 winter season, one observation during the 2019/2020 winter season, four observations during the 2022/2023 winter season and two in August/September 2023.

Connectivity Vantage Point Surveys

Snipe were observed on 40 occasions during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.4.37). There were seven observations during the core breeding season (April to August) and 33 observations during the non-breeding season (September to March). There was one observation of a snipe displaying during the 2018 breeding season, and six observations of snipe displaying during the 2019 breeding season. Observations relating to breeding behaviour are presented in Confidential Appendix 7-5, Figure 7.5.10. The majority of the remaining observations were of snipe commuting, with observations ranging from one to 75 birds. There were 30 observations within, or partially within, the Wind Farm Site.

Incidental Observations

Snipe were recorded as an incidental observation on 62 occasions. thirteen of these were during breeding raptor surveys, 26 during hen harrier roost surveys, six before/after a connectivity vantage point survey, six during red grouse surveys and eleven before/after a vantage point survey. There were 13 observations of snipe calling, 32 observations of snipe in flight or being flushed by an observer and 17 observations of birds drumming or chipping. Observations ranged from an individual to 32 birds.

Breeding Summary

Snipe territories were identified in each breeding season surveyed. There were four territories identified in 2018, five in 2019 and six in 2023. The locations of these territories is provided in Confidential Appendix 7-5, Figure 7.5.11.

7.4.13 Woodcock

Raw Survey data for woodcock is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3.

Winter Walkover Surveys

Woodcock were observed on four occasions during the winter walkover surveys (see Appendix 7-4, Figure 7.4.38). There were two observations in February 2018, and two observations in March 2018. All of these observations were of individual woodcock within the Wind Farm Site.

Incidental Observations

Woodcock were recorded as an incidental observation on only three occasions. There were two observations during the hen harrier roost surveys. On both occasions, an individual was observed travelling. Additionally, there was an observation of an individual being flushed by the observer before a vantage point survey. All observations were during the winter season.

7.4.14 Buzzard

Raw Survey data for Buzzard is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3.

Vantage Point Surveys

Buzzard were observed on 34 occasions during the vantage point surveys (see Appendix 7-4, Figure 7.4.39). Seven of these observations occurred during the non-breeding season (September – March), with only one occurring during the 2018/2019 winter season and the remaining six during the 2019/2020 winter season. The remaining observations were during the breeding season, one in 2018 and 26 during the 2023 breeding season.

All observations were of individuals commuting, soaring or hunting. Thirty-two observations were within the potential collision height and 33 observations were within 500m of the proposed turbine layout.

Breeding Walkover Surveys

Buzzard was only observed on four occasions during the breeding walkover surveys (see Appendix 7-4, Figure 7.4.40). In June 2019, a single buzzard was observed commuting across the Wind Farm Site. This flight was partially within the Wind Farm Site. In 2023, there were three observations of individual buzzards commuting or flushed by the observer. No evidence of breeding was observed for this species during the breeding walkover surveys.

Breeding Raptor Surveys

During the breeding raptor surveys, buzzard were observed on nine occasions. One of which was during the 2018 breeding season, two were during the 2019 breeding season and six during the 2023

breeding season. All observations were of individuals commuting or circling. No breeding activity was recorded. These observations are provided in Appendix 7-4, Figure 7.4.41.

Winter Walkover Surveys

Buzzard was recorded on eight occasions during the winter walkover surveys (see Appendix 7-4, Figure 7.4.42). There was one observation during the 2017/2018 winter season, three during the 2018/2019 winter season, one during the 2019/2020 winter season and three during the 2022/2023 winter season. All observations were of buzzard in flight/soaring. There were three observations within the Wind Farm Site, four within 500m of the Wind Farm Site and the remaining observation was not mapped.

Connectivity Vantage Point Surveys

Buzzard was only observed on five occasions during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.4.43). There were three observations were during the 2018 breeding season, with observations of individuals soaring and hunting, and two observations during the 2022/2023 winter season. There were five observations within, or partially within, the Wind Farm Site.

Incidental Observations

Buzzard was recorded as an incidental observation on 21 occasions. Buzzard was observed on eight occasions during the hen harrier roost surveys. In February 2018, a buzzard was observed landing in a conifer tree to roost and in February 2023, a pair were observed displaying. The remaining observations were of buzzard circling and hunting. Buzzard was observed on eight occasions during the waterbird distribution and abundance surveys. These observations were at Moylough, Levally Lough, Glenamaddy Turlough, Summerville Lough and Kilmurray Lough. The remaining observations were of one or two birds commuting at the Wind Farm Site during on-site surveys.

7.4.15 Long-eared Owl

Raw Survey data for long-eared owl is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3.

Connectivity Vantage Point Surveys

Long-eared owl was observed on only one occasion during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.4.44). This observation was of an individual flushed from conifers as the surveyor was leaving the Wind Farm Site, on the 10th of November 2018.

7.4.16 Sparrowhawk

Raw Survey data for sparrowhawk is provided in Appendix 7-4. Results summary tables are presented in Appendix 7-3.

Vantage Point Surveys

Sparrowhawk were recorded in flight on 20 occasions during vantage point surveys (see Appendix 7-4. Figure 7.4.45). Only six of these observations occurred during the core breeding season months between April and August, while there were 14 observations of sparrowhawk during non-breeding season months (September – March). Most observations were of individuals commuting or hunting. There was one observation on the 18th of July 2019, where a sparrowhawk was observed catching and carrying off prey.

Seven observations occurred during the 2017/2018 winter season (October – March), one observation occurred during the 2018/2019 winter season and six during the 2022/2023 winter season. All observations were of sparrowhawk commuting or hunting.

All flight activity occurred within, or partially within, 500m of the proposed turbine layout. Four flights occurred within the potential collision height.

Breeding Walkover Surveys

Sparrowhawk were only observed on six occasions during the breeding walkover surveys (see Appendix 7-4, Figure 7.4.46). There were three observations during the 2019 breeding season and three observations during the 2023 breeding season. There were two observations of sparrowhawk within, or partially within, the Wind Farm Site. On the 11th of July 2019, a young sparrowhawk was heard calling from a conifer plantation, approximately 150m from the Wind Farm Site. In 2023, there was one observation of a sparrowhawk chasing a magpie and one of a bird carrying prey towards a nest site. There was one confirmed nest site identified adjacent to the Wind Farm Site in 2019 and 2023. Observations relating to breeding behaviour are presented in Confidential Appendix 7-5, Figure 7.5.12.

Breeding Raptor Surveys

Sparrowhawk were observed on only four occasions during the breeding raptor surveys (see Appendix 7-4, Figure 7.4.47). One of these observations was on the 20th of July 2018 and was of two juvenile sparrowhawk calling from a nest in a conifer plantation approximately 2km north of the Wind Farm Site. The second observation was on the 18th of April 2019, which was of an adult sparrowhawk displaying over a conifer plantation. This probable breeding territory was located approximately 1.2km south of the Wind Farm Site. Observations relating to breeding behaviour are presented in Confidential Appendix 7-5, Figure 7.5.13. In 2023, there were two observations of individuals commuting. There was no breeding evidence observed during the 2023 breeding season.

Winter Walkover Surveys

Sparrowhawk were recorded on ten occasions during the winter walkover surveys (see Appendix 7-4, Figure 7.4.48). There were seven observations during the 2017/2018 winter season and three during the 2018/2019 winter season. Of the seven flights which were mapped, there were four observations within the wind farm site, two within the 500m survey radius of the Wind Farm Site and one observation outside the 500m survey radius. There were two observations of sparrowhawk hunting and one of a sparrowhawk flying out of a treeline.

Connectivity Vantage Point Surveys

Sparrowhawk was only observed on one occasion during the connectivity vantage point surveys (see Appendix 7-4, Figure 7.4.49). An individual was observed commuting over the Wind Farm Site in October 2022.

Incidental Observations

Sparrowhawk were observed on ten occasions as incidental observations, four of which were during hen harrier roost surveys, five during a waterbird distribution and abundance survey and one before a vantage point survey. All observations during hen harrier roost surveys were of individuals hunting or commuting at HHVP1, HHVP3a and HHVP4a. The observations during waterbird distribution and abundance surveys were of individuals hunting at Levally Lough, commuting at Lough Nahask or commuting at Shanvally.

Breeding Summary

Up to two sparrowhawk territories were identified during surveys during each of the breeding seasons surveys (2018, 2019 and 2023). There was one confirmed territory identified in 2018, approximately 2km north of the Wind Farm Site. In 2019, there was one confirmed territory adjacent to the Wind Farm Site and one probable territory identified approximately 1.2km south of the Wind Farm Site. In 2023, there was one confirmed territory identified adjacent to the Wind Farm Site. Breeding territories are presented in Confidential Appendix 7-5, Figure 7.5.14.

7.4.17 Passerines (Red Listed)

The BoCCI Red listed species grey wagtail, meadow pipit, redwing and swift were recorded during the surveys undertaken.

Meadow pipit were seen on numerous occasions across most survey types. Redwing were observed on 60 occasions, with flocks of up to 110 birds recorded. Grey wagtail were only recorded on one occasion during a breeding walkover survey on the 13th of April 2018. Swift were recorded on occasion during vantage point surveys.

7.5 Receptor Evaluation

7.5.1 Determination of Population Importance

A determination of the population importance of birds within the likely zone of influence is provided in the sections below following criteria described in Section 7.2.5. Estimates of National population sizes were obtained from the NPWS Article 12 Reporting (2013-2018) which details the status and trends of Ireland's bird species. The Wind Farm Site lies in County Galway, where relevant, estimates for mean county populations has been derived following a review of I-WeBS sites in County Galway[3]. The Irish Wetland Bird Survey (I-WeBS) is a national monitoring scheme coordinated by BirdWatch Ireland (BWI) in conjunction with NPWS.

7.5.1.1 Golden Plover

Wintering

The estimated national wintering population of Golden Plover 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 Wind Farm Site from the winter seasons surveyed was 420 birds. This maximum number does not correspond with the classification criteria for National or International Importance (Burke *et al.,* 2018). There were flocks of over 807 recorded on six occasions greater than 500m from the Wind Farm Site.

Flocks of up to 2,500 golden plover were recorded at Kilmurray Turlough, approximately 1km from the Wind Farm Site. A connectivity vantage point survey was undertaken from October 2017 to March 2020 and from October 2022 to March 2023 to establish if there were any commuting corridors from Kilmurray Turlough across the Wind Farm Site. While some commuting flights were observed in the direction of Levally Lough and Summerville Lough, no regularly used commuting corridors were

[3] *The limitations of using this data to estimate a county population is acknowledged, e.g., as typically all the monthly counts in a given year were not undertaken on the same day there is the potential for under or overestimates, however this is the best available information.*

identified. Golden plover were recorded on 24 occasions during these surveys, in small numbers, and the maximum flock size recorded was 200 birds.

To estimate the county population, a review of all County Galway I-WeBS sites 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[4]. 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, as this is a survey of wetland habitats. An estimate of the number of birds utilising terrestrial habitats and wetlands/loughs where no data was available from I-WeBS was used to better estimate the county population.

To account (partly) for the birds that occur in other wetland sites and terrestrial habitats that would not have been counted by I-WeBS surveyors, the golden plover that occurred at the Wind Fam Site and other non-I-WeBS sites, as well as some I-WeBS sites where no data was available, were included in the county population estimate. The mean of the peak counts from the four winters surveyed were used to estimate the number of birds using each site.

I-WeBS Sites

The following mean count values have been 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):

- Ballindeereen Turlough (44)
- Ballyconneely Bay (13)
- Caravoodaun Turlough (124)
- Doolough Headford (Turloughcor) (140)
- Inner Galway Bay (1,628)
- Kiltiernan Turlough (41)
- Lough Corrib (240)
- Mannin Bay (97)
- North Central Galway Lakes (200)
- North East Galway Lakes (57)
- Omey Strand (78)
- Polleagh Turlough (47)
- Pollnagarragh Marshes (93)
- Rahasane Turlough (1,420)
- Termon Turloughs (44)

Surveyed Sites

- Glenamaddy Turlough (58)
- Kilmurray Turlough (713)
- Kiltullagh Lough (11)
- Levally Lough (126)
- Lough Nahask (100)
- Moylough (15)
- Summerville Lough (1)
- Wind Farm Site (397)

[4] *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."*

Based on the above, the mean wintering population[5] from Galway wetland sites is 5,687. Therefore, taking a precautionary approach, a regularly occurring population of 56 birds (1% of Galway County population) is considered of County Importance in the context of the Wind Farm Site. This species is wide ranging in the winter months that utilise habitats, such as those present on site (agricultural grassland and peatland), that are common throughout the county. The birds recorded at the Site are judged to be associated with the larger county population, given this is a widespread species (as per Bird Atlas distribution maps) that utilises an abundant and widespread habitat at the county level (i.e. agricultural grassland).

Flocks of 56 birds or more (County Importance) were recorded flying over the Wind Farm Site on 21 occasions during the extensive suite of surveys undertaken. The population recorded at the Wind Farm Site was therefore assigned **County Importance** on the basis of a resident/regularly occurring wintering population assessed to be important to the county level.

Breeding

This species was not observed at the Wind Farm Site during the core breeding season. The Wind Farm Site is of **No Ecological Importance** to breeding golden plover.

7.5.1.2 Hen Harrier

Wintering

As per NPWS Article 12 Reporting (2013-2018), the estimated national wintering population of hen harrier in Ireland is 311-435 therefore 1% of the ROI National wintering population is 3-4 birds. As per NRA 2009, a regularly occurring wintering population of 3-4 hen harrier is required for classification as Nationally/Internationally Importance.

Hen harrier were observed on 27 occasions during the winter season. The majority of these observations were during vantage point and hen harrier roost surveys and were of birds hunting and commuting. There were three infrequently used roost sites identified, one within the wind farm site, one within 70m and one within 1.2km of the Wind Farm Site. Despite repeat visits to confirm ongoing occupancy, these roosts were only observed in use on a single occasion each between October 2017 and March 2020. There were no roost sites identified during the 2022/2023 winter season (October 2022 to March 2023).

Taking a precautionary approach, it is assumed that the individuals recorded during the winter season are associated with a **Nationally/Internationally important** wintering population.

Breeding

This species was not observed at the Wind Farm Site during the core breeding season (May to July). The Wind Farm Site is of **No Ecological Importance** to breeding hen harrier.

7.5.1.3 Kingfisher

As reported (2013-2018) under Article 12 of the Birds Directive (Directive 2009/147/EC), the estimated national population of kingfisher is between 368 – 1,031 breeding pairs.

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

Kingfisher were only recorded on two occasions during surveys at the Wind Farm Site. The Wind Farm Site is of **No Ecological Importance** to this species given how infrequently the Site is utilised by this species.

7.5.1.4 Little Egret

Little egret were recorded on the Wind Farm Site on only four occasions. The wind farm site is of **No Ecological Importance** to this species given how infrequently the Site is utilised by this species.

7.5.1.5 Merlin

As reported (2013-2018) under Article 12 of the Birds Directive (Directive 2009/147/EC), the estimated population of merlin is between 200 – 400 pairs. There are no published figures for the County Galway population of merlin. Taking a precautionary approach, a regularly occurring population of a single bird is required for classification of County Importance.

Merlin were recorded on 32 occasions during surveys between October 2017 and September 2023. During the 2018 breeding season, merlin attempted to breed within the Wind Farm Site. On the 20th of April a pair of merlin were observed at a nest. On the 22nd of April a merlin was seen at this location, alarm calling due to disturbance by turf cutters. There were no subsequent observations of merlin at the nest site, and it is presumed that the nest site was abandoned due to continued disturbance by turf cutters. No other nest sites were identified within the Wind Farm Site, or within 5km from the Wind Farm Site. Merlin were observed at the Wind Farm Site in both the breeding and non-breeding seasons.

Taking a precautionary approach, the population recorded was assigned **County Importance**.

7.5.1.6 Peregrine

The estimated national breeding population of peregrine in Ireland is 425 breeding pairs as per the National Breeding Peregrine Survey 2017 (IRSG 2018, Unpublished Report).

There are no published figures for the County Galway population of peregrine. Assuming an even distribution of peregrine across the 26 counties of the Republic of Ireland, the population of peregrine in County Galway is estimated to be 33 birds each (national population divided by 26 counties). It is possible that the Galway population of peregrine falcon is higher than 33 birds, given that there is a higher population density around coastal counties according to peregrine distribution in bird atlas maps. Furthermore, the habitat (cutover bog/agricultural grassland) of the Wind Farm Site and wider surroundings are not unique to the Site or rare in the county. Peregrine are a wide ranging species (SNH, 2016). Adult peregrine are also site faithful and less likely to disperse from their territories (Smith *et al.,* 2015). In the absence of data on peregrine populations at a county level, the best information was used. Taking a precautionary approach using the above as a guide; a regularly occurring population of a single bird is required for classification of County Importance. The birds recorded at the Site are judged to be associated with the larger county population, given this is a widespread species (as per Bird Atlas distribution maps) that utilises an abundant and widespread habitat at the county level (i.e. agricultural grassland).

There were 32 observations of peregrine during surveys. Taking a precautionary approach, the population recorded was assigned **County Importance**.

7.5.1.7 Whooper Swan

Wintering

As per the latest national wintering estimates provided in Burke *et al.* (2021), the national wintering population of Whooper Swan in the Republic of Ireland is 14,467. Using the International Swan Census 2021, 1% of the National population of Whooper Swans is 144. Therefore, as per NRA 2009, a regularly occurring population of 144 Whooper Swans is required for classification as Nationally Important.

The Swan Census 2021 (Burke *et al.,* 2021) was consulted regarding the population data for Whooper Swans in County Galway. In January 2020, the County Galway population was 1,485 individuals. Based on the above, a population of 14 Whooper Swans is required for County Importance classification in the Galway area.

Whooper swan flocks of national importance were not observed during surveys. Whooper swan flocks of county importance were observed on 41 occasions. Only two of these observations were within 500m of the Wind Farm Site. The remaining observations were at either Kilmurray Turlough (1km from the Wind Farm Site) or during the waterbird distribution and abundance surveys, up to 5km from the Wind Farm Site.

Flocks of up to 49 whooper swan were recorded at Kilmurray Turlough, approximately 1km from the Wind Farm Site. A connectivity vantage point survey was undertaken from October 2017 to March 2020 and from October 2022 to March 2023 to establish if there were any commuting corridors from Kilmurray Turlough across the Wind Farm Site. While some commuting flights were observed in the direction of Levally Lough, Summerville Lough and Kiltullagh Lough, no regularly used commuting corridors were identified. Whooper swan were only recorded on 10 occasions during these surveys, and in small numbers. A flock of County Importance was only observed on one occasion, on the 22nd of March 2019, a flock of 25 whooper swan were observed flying from Kilmurray Turlough in the direction of Levally Lough. The Wind Farm Site is located partially within the flight path between these two lakes, however this is not a regularly used commuting corridor for this species.

The population recorded regularly within 5km of the Wind Farm Site was assigned County Importance. The flocks recorded flying over the Wind Farm Site were assigned **County Importance** on a precautionary basis. This species was not recorded to occur regularly or in high numbers at the Wind Farm Site.

Breeding

This species does not ordinarily breed in Ireland; therefore, the Wind Farm Site is of **No Ecological Importance** for breeding to this species.

7.5.1.8 Curlew

Wintering

As reported (2013-2018) under Article 12 of the Birds Directive (Directive 2009/147/EC), the national wintering population estimate of curlew in the Republic of Ireland is 28,300. Using these latest figures, 1% of the National population of curlew is 283. Therefore, as per NRA 2009, a regularly occurring population of 283 curlew is required for classification as Nationally Important.

Curlew were observed on only one occasion at, or within 500m of, the Wind Farm Site during the comprehensive suite of surveys during the winter months. Curlew were observed on 46 occasions during waterbird distribution and abundance surveys, up to five kilometres from the Wind Farm Site, with most observations located at Levally Lough, approximately 2km from the Wind Farm Site.

The wind farm site is of **No Ecological Importance** to this species, given that the Site is little visited by this species during winter months.

Breeding

The most recent estimated breeding population of curlew in the Republic of Ireland is between 105 and 119 pairs (Colhoun *et al.*, 2022). Using these latest figures, 1% of the National population of curlew is one pair. Therefore, as per NRA 2009, a regularly occurring population of one pair is required for classification as Nationally Important.

Curlew were only observed on five occasions at, or within 500m of, the Wind Farm Site during the comprehensive suite of surveys during the breeding season. As outlined in Section 7.4.8, these observations were of non-breeding birds late in the breeding season. The wind farm site is of **No Ecological Importance** to this species during the breeding season.

7.5.1.9 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 Republic of Ireland 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 Galway population of kestrel. Assuming an even distribution of kestrel across the 26 counties of the Republic of Ireland[6], the County Galway population of kestrel is estimated to be 519 birds (national population divided by 26 counties). While density across counties may vary throughout Ireland, kestrel populations are present in all counties according to the bird atlas and distribution is roughly even. Furthermore, the habitat (cutover bog and agricultural grassland) of the Wind Farm Site and wider surroundings are not unique to the Site or rare in the county. Kestrel are largely resident, often remaining in breeding territories if winters are mild (Riegert & Fuchs, 2011) or moving to lowlands if breeding territories are upland. In the absence of data on kestrel populations at a county level, an even distribution of kestrel across all counties is currently the best available estimate of the kestrel population in Galway County. Therefore, a regularly occurring population of five birds is required for classification of County Importance.

There is one resident pair of kestrel at the Wind Farm Site. This population would be bolstered by fledglings at the end of the breeding season, which will remain present at the Wind Farm Site 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[7], it is likely that there would be a population of approximately two adults and two juvenile birds by the end of each winter season. The population is thus likely to be below the county importance threshold.

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.

7.5.1.10 Lapwing

Wintering

The estimated national wintering population of lapwing in Ireland is 69,823 for the Republic of Ireland (ROI) (Burke *et al.* 2018). 1% of the ROI National wintering population of lapwing is 698 birds. As per

[6] *While acknowledging the unfavourable conservation status of this species with an identified population decline, this remains a species with a widespread distribution in Ireland (BoCCI, 2020-2026).*
[7] *https://app.bto.org/birdfacts/results/bob3040.htm*

NRA 2009, a regularly occurring population of 698 lapwing is required for classification as Nationally Important. The maximum number of birds recorded from the winter season was 400 birds. This maximum number does not correspond with the classification criteria for National or International Importance (Burke *et al.,* 2018).

To estimate the county population, a review of all County Galway I-WeBS sites 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. This is due to the foraging ecology of wintering lapwing that will utilise agricultural grasslands and other terrestrial habitats not typically surveyed during I-WeBS counts, as this is a survey of wetland habitats. An estimate of the number of birds utilising terrestrial habitats and wetlands/loughs where no data was available from I-WeBS was used to better estimate the county population.

To account (partly) for the birds that occur in other wetland sites and terrestrial habitats that would not have been counted by I-WeBS surveyors, the golden plover that occurred at the Wind Fam Site and other non-I-WeBS sites, as well as some I-WeBS sites where no data was available, were included in the county population estimate. The mean of the peak counts from the four winters surveyed were used to estimate the number of birds using each site.

I-WeBS Sites

The following mean count values have been 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):

- Ballindeereen Turlough (69)
- Ballinduff Turlough & Grassland (34)
- Ballyboy (49)
- Ballyconneely Bay (17)
- Caherglassaun Lough (74)
- Cahermore Turlough (132)
- Caranavoodaun Turlough (247)
- Coole Lough - Newtown Turlough (30)
- Doolough Headford (Turloughcor) (20)
- Glenamaddy Turlough (64)
- Inishmore, Aran Islands (87)
- Inner Galway Bay (1599)
- Kiltiernan Turlough (113)
- L. Coy - Blackrock - Bullaunagh – Ballylee (204)
- Lough Corrib (113)
- Lough Rea (200)
- Lydacan Castle Turlough (106)
- North Central Galway Lakes (300)
- North East Galway Lakes (223)
- Polleagh Turlough (69)
- Pollnagarragh Marshes (12)
- Rahasane Turlough (472)
- Termon Turloughs (106)
- Tullaghnafrankagh Lough (90)

Surveyed Sites

- Glenamaddy Turlough (51)
- Kilmurray Turlough (60)
- Kiltullagh Lough (1)

- Levally Lough (286)
- Lough Nahask (16)
- Moylough (4)
- Summerville Lough (86)
- Wind Farm Site (9)

Based on the above, the mean wintering population[8] from Galway wetland sites is 4,943. Therefore, taking a precautionary approach, a regularly occurring population of 49 birds (1% of Galway County population) is considered of County Importance in the context of the Wind Farm Site. The birds recorded at the Site are judged to be associated with the larger county population, given this is a widespread species (as per Bird Atlas distribution maps) that utilises an abundant and widespread habitat at the county level (i.e. cutover bog and agricultural grassland).

Flocks of County Importance were recorded flying over the Wind Farm Site on 10 occasions during the extensive suite of surveys undertaken. Furthermore, flocks of County Importance were observed on 16 occasions at Kilmurray Tulough, approximately 1km from the Wind Farm Site.

Therefore, taking a precautionary approach, the population recorded at the Wind Farm Site was assigned **County Importance** on the basis of a regularly occurring wintering population assessed to be important to the county level.

Breeding

As reported (2013-2018) under Article 12 of the Birds Directive (Directive 2009/147/EC), the estimated population of breeding lapwing is 520 pairs. Therefore, 1% of the National breeding population is five breeding pairs. As per NRA 2009, a regularly occurring population of five pairs of breeding lapwing is required for classification as Nationally Important.

During the breeding seasons, lapwing was only observed on two occasions. these observations were in August and September and are presumed to be early migrants and not associated with a breeding population at the Wind Farm Site or in the wider area. The Wind Farm Site is of **No Ecological Importance** to breeding lapwing.

7.5.1.11 Red Grouse

Red Grouse is a BoCCI Red Listed species during the breeding season in Ireland. The European population of the species is identified as Secure. As per the latest NPWS Article 12 reporting document, the estimated population of red grouse in Ireland is 1,898 breeding pairs. Therefore 1% of the ROI National breeding population is 19 breeding pairs. As per NRA 2009, a regularly occurring breeding population of 19 red grouse pairs is required for classification as Nationally Important. The most recent national survey for red grouse, estimates the population for West Connacht to number 1,376 individuals (Cummins, 2010).

The population recorded at the Wind Farm Site does not correspond to national importance and falls well below the threshold of 19 breeding pairs with only three observations of red grouse within 500m of the Wind Farm Site. Furthermore, there were no red grouse observed during the dedicated breeding red grouse survey in 2023.

There were only three observations of red grouse during the comprehensive suite of surveys between October 2017 and March 2020 and there were no observations between October 2022 and September 2023. The evidence of surveys is that the species is no longer present onsite (last recorded on 24th of February 2019). The Wind Farm Site is of **No Ecological Importance** to this species.

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

7.5.1.12 Snipe

As reported (2013-2018) under Article 12 of the Birds Directive (Directive 2009/147/EC), the national breeding population estimates of snipe in the Republic of Ireland is 4,275 pairs. Using these latest figures, 1% of the National population of snipe is 43 pairs. Therefore, as per NRA 2009, a regularly occurring population of 43 pairs is required for classification as Nationally Important.

There are no published figures for the County Galway population of snipe. Assuming an even distribution of snipe across the 26 counties of the Republic of Ireland, the County Galway population of snipe is estimated to be 164 pairs (national population divided by 26 counties). While density across counties may vary throughout Ireland, snipe populations are present in all counties according to the bird atlas and distribution is roughly even. Furthermore, the habitat (cutover bog and agricultural grassland) of the Wind Farm Site and wider surroundings are not unique to the Site or rare in the county. In the absence of data on snipe populations at a county level, an even distribution of snipe across all counties is currently the best available estimate of the snipe population in Galway County. Therefore, a regularly occurring population of two birds is required for the classification of County Important. The birds recorded at the Site are judged to be associated with the larger county population, given this is a widespread species (as per Bird Atlas distribution maps) that utilises an abundant and widespread habitat at the county level (i.e. agricultural grassland).

Given that there were between two and six breeding territories identified each breeding season at the wind farm site in 2018, 2019 and 2023, the population recorded was assigned **County Importance**.

7.5.1.13 Woodcock

Woodcock is a BoCCI Red listed species during the breeding season in Ireland. The species is not Red Listed in Ireland with regard to wintering populations. Consequently, this species is only considered with regard to breeding populations in this EIAR.

This species was not recorded during bird surveys during the 2018, 2019 or 2023 breeding seasons. The Wind Farm Site is of **No Ecological Importance** during the breeding season for this species.

7.5.1.14 Buzzard

The national population of buzzard is estimated to be 1,938 breeding pairs (NPWS Article 12 Reporting). Buzzard is a Green Listed BoCCI species, which is widely distributed and utilises a wide variety of habitats and is therefore of lower conservation concern.

Buzzard was regularly observed within the Wind Farm Site and surrounds during the breeding and winter seasons. Birds were hunting within the Wind Farm Site, one confirmed and one probable breeding territory were identified within the Wind Farm Site, and further probable territories were identified in the hinterland. Thus, this species is considered to be a population of **Local Importance (Higher value)** on the basis of a resident/regularly occurring population assessed to be important at the local level.

7.5.1.15 Long-eared Owl

Long-eared owl is not listed on Annex I of the Birds Directive. The species is Green listed in Ireland (BoCCI). This species was only recorded once during extensive surveys between October 2017 and March 2023. Numbers of ecological significance were not recorded. The Wind Farm Site is of **No Ecological Importance** to this species.

7.5.1.16 Sparrowhawk

The national population of sparrowhawk is estimated to be 11,859 birds (Lewis *et al.*, 2019). Sparrowhawk is a Green Listed BoCCI species, which is widely distributed and utilises a wide variety of habitats and is therefore of lower conservation concern.

Sparrowhawk was regularly observed within the Wind Farm Site and surrounds during the breeding and winter seasons. Birds were hunting within the Wind Farm Site and a confirmed breeding territory was identified adjacent to the Wind Farm Site in both 2019 and 2023. Thus, this species is considered to be a population of **Local Importance (Higher value)** on the basis of a resident/regularly occurring population assessed to be important at the local level.

7.5.1.17 Passerines (Red Listed)

Grey wagtail, meadow pipit, redwing and swift are Red listed in Ireland during the breeding season. Populations recorded were deemed to be of no greater than **Local Importance (Lower Value)**.

7.5.2 Identification of Key Ornithological Receptors

Table 7-10 Avifaunal Receptor Evaluation and Selection Criteria Rational

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
Golden Plover	Annex I, EU Birds Directive; BoCCI Red List & Irish Wildlife Act.	**Wintering** County Importance	This species was regularly recorded within the Wind Farm Site and within 500m of same during winter months. The potential for habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded within the Wind Farm Site. Taking a precautionary approach, **the potential for displacement exists.** This species was recorded flying over the Wind Farm Site within the potential collision risk zone. **A collision risk assessment is required**.	Yes
		Breeding No population of ecological significance recorded	This species was not observed within the Wind Farm Site during the core breeding season. There was no evidence of breeding recorded within Wind Farm Site, or within 500m of same. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.1 for further detailed discussion. **No pathways for significant effects were identified.**	No
Hen Harrier	Annex I, EU Birds Directive; BoCCI Amber List & Irish Wildlife Act.	**Wintering** Population of National/International Importance recorded	This species was occasionally recorded foraging and commuting within the Wind Farm Site. The potential for direct habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded within the Wind Farm Site. Taking a precautionary approach, the **potential for displacement exists.**	Yes

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
			This species was recorded flying over the Wind Farm Site within the potential collision risk zone. **A collision risk assessment is required.**	
		Breeding No population of ecological significance recorded	This species was not observed within the Wind Farm Site during the core breeding season. There was no evidence of breeding recorded within Wind Farm Site, or within 500m of same. There is no evidence to suggest that the Wind Farm Site is of significance to this species for breeding. Please refer to Section 7.5.1.2 for further detailed discussion. **No pathways for significant effects were identified.**	No
Kingfisher	Annex I, EU Birds Directive; BoCCI Amber List & Irish Wildlife Act	**All Seasons** No population of ecological significance recorded	Kingfisher were recorded infrequently and in low numbers. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.3 for further detailed discussion. **No pathways for significant effects were identified.**	No
Little Egret	Annex I, EU Birds Directive; BoCCI Green List & Irish Wildlife Act	**All Seasons** No population of ecological significance recorded	Little egret were recorded infrequently and in low numbers. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.4 for further detailed discussion. **No pathways for significant effects were identified.**	No
Merlin	Annex I, EU Birds Directive; BoCCI Amber List & Irish Wildlife Act	**All Seasons** County Importance	This species was recorded on 32 occasions within 500m of the Wind Farm Site during surveys. There was also a failed breeding attempt recorded within the Wind Farm Site in 2018. The potential for direct habitat loss cannot be excluded. **An assessment of direct habitat loss is required.**	Yes

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
			This species was observed on 32 occasions within 500m of the Wind Farm Site during surveys. Taking a precautionary approach, an **assessment of displacement effects is required.** This species was not recorded flying over the Wind Farm Site within the potential collision risk zone. A collision risk assessment is not required.	
Peregrine	Annex I, EU Birds Directive; BoCCI Green List & Irish Wildlife Act.	**All Seasons** County Importance	This species was occasionally recorded utilizing habitats within the Wind Farm Site. The potential for direct habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded within the Wind Farm Site. Taking a precautionary approach, **the potential for displacement exists.** This species was recorded flying over the Wind Farm Site within the potential collision risk zone. **A collision risk assessment is required.**	Yes
Whooper Swan	Annex I, EU Birds Directive; BoCCI Amber List & Irish Wildlife Act.	**Wintering** County Importance	This species was only recorded commuting within the Wind Farm Site and within 500m of same during winter months. This species was not observed utilitsing habitats on, or within 500m of, the Wind Farm Site. **There is little potential for direct habitat loss.** Birds were recorded flying over the Wind Farm Site and within 500m of the proposed turbine layout. Taking a precautionary approach, **the potential for displacement exists.** This species was recorded flying over the Wind Farm Site within the potential collision risk zone. **A collision risk assessment is required**.	Yes

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
		Breeding No population of ecological significance recorded	This species is a winter migrant that does not breed in Ireland and was not recorded within the Wind Farm Site or within 500m of the Wind Farm Site during breeding season. There is no potential for any significant effects. Please refer to Section 7.5.1.7 for further detailed discussion. **No pathways for significant effects were identified.**	No
Curlew	BoCCI Red Listed & Irish Wildlife Act.	**Wintering** No population of ecological significance recorded	Curlew were recorded infrequently and in low numbers. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.8 for further detailed discussion. **No pathways for significant effects were identified.**	No
		Breeding No population of ecological significance recorded	Curlew were recorded infrequently and in low numbers. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.8 for further detailed discussion. **No pathways for significant effects were identified.**	No
Kestrel	BoCCI Red Listed & Irish Wildlife Act.	**All Seasons** Local Importance (Higher Value)	The potential for habitat loss, while minimal, cannot be excluded. **An assessment of direct habitat loss is required.** The species was recorded within the Wind Farm Site. **An assessment of displacement effect is required.** This species was recorded flying over the Wind Farm Site within the potential collision risk zone. **A collision risk assessment is required.**	Yes

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
Lapwing	BoCCI Red Listed & Irish Wildlife Act.	**Wintering** Flocks of County Importance recorded	This species was regularly recorded within the Wind Farm Site and within 500m of same during winter months. The potential for habitat loss cannot be excluded. **An assessment of direct habitat loss is required.** Birds were recorded flying over the Wind Farm Site and within 500m of the proposed turbine layout. Taking a precautionary approach, **the potential for displacement exists.** This species was recorded flying over the Wind Farm Site within the potential collision risk zone. **A collision risk assessment is required**.	Yes
		Breeding No population of ecological significance recorded	Lapwing were only recorded on one occasion during the breeding season. There is no evidence to suggest that the Wind Farm Site is of significance to this species during the breeding season. Please refer to Section 7.5.1.10 for further detailed discussion. **No pathways for significant effects were identified.**	No
Red Grouse	BoCCI Red Listed (Breeding Populations)	**All Seasons** No population of ecological significance recorded	Red grouse were recorded infrequently and in low numbers. The evidence from surveys indicate that this species is no longer present at the Wind Farm Site. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.11 for further detailed discussion. **No pathways for significant effects were identified.**	No
Snipe	BoCCI Red List & Irish Wildlife Act.	**All Seasons** County Importance	The potential for habitat loss, while minimal, cannot be excluded. **An assessment of direct habitat loss is required.**	Yes

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
			The species was recorded within the Wind Farm Site. **An assessment of displacement effect is required.** This species was recorded flying over the Wind Farm Site within the potential collision risk zone. **A collision risk assessment is required.**	
Woodcock	BoCCI Red Listed (Breeding Populations)	**All Seasons** No population of ecological significance recorded	Woodcock were recorded infrequently and in low numbers. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 7.5.1.13 for further detailed discussion. **No pathways for significant effects were identified.**	No
Buzzard	BoCCI Green List & Irish Wildlife Act.	**All Seasons** Local Importance (Higher Value)	The potential for habitat loss, while minimal, cannot be excluded. **An assessment of direct habitat loss is required**. The species was recorded within the Wind Farm Site. **An assessment of displacement effect is required.** This species was recorded flying over the Wind Farm Site within the potential collision risk zone. **A collision risk assessment is required.**	Yes
Long-eared Owl	BoCCI Green List & Irish Wildlife Act.	**All Seasons** No population of ecological significance recorded	Long-eared owl were recorded infrequently and in low numbers. There is no evidence to suggest that the Wind Farm Site is of significance to this species. Please refer to Section 0 for further detailed discussion. **No pathways for significant effects were identified.**	No
Sparrowhawk	BoCCI Amber List & Irish Wildlife Act.	**All Seasons**	The potential for habitat loss, while minimal, cannot be excluded. **An assessment of direct habitat loss is required.**	Yes

Species	Conservation Status	NRA Evaluation (NRA, 2009)	Rational for inclusion/exclusion as KOR	KOR Yes/No
		Local Importance (Higher Value)	The species was recorded within the Wind Farm Site. **An assessment of displacement effect is required.** This species was recorded flying over the Wind Farm Site within the potential collision risk zone. **A collision risk assessment is required.**	
Passerines (Red Listed)	BoCCI Red List & Irish Wildlife Act	**All Seasons** Local Importance (Lower Value)	As per NatureScot guidance, it is generally considered that passerine species are not significantly impacted by wind farms. Furthermore, the populations recorded at the Site were recorded to be of no greater than local importance (lower value).	No

7.5.3 Key Ornithological Receptor Sensitivity Determination

Criteria developed by Percival (2003) is presented in Table 7-3 (Section 7.2.5.3) for assessing bird sensitivity within the Wind Farm Site. The sensitivity of each KOR is outlined below including the rationale for their respective sensitivity classification:

High Sensitivity KORs include:

- Hen Harrier (Ecologically sensitive species)

Medium Sensitivity KORs include:

- Golden Plover (Annex I; EU Birds Directive)
- Merlin (Annex I; EU Birds Directive)
- Peregrine (Annex I; EU Birds Directive)
- Whooper Swan (Annex I; EU Birds Directive)
- Kestrel (BoCCI Red Listed)
- Lapwing (BoCCI Red Listed)
- Snipe (BoCCI Red Listed)

The remaining KORs identified in the Wind Farm Site were classified as Low Sensitivity:

- Buzzard
- Sparrowhawk

7.6 Potential Effects

This section of the assessment of effects is structured as follows:

- Assessment of 'Do nothing' Effect.
- Assessment of effects in relation to Key Ornithological Receptors.
- Assessment of effects in relation to sites designated for nature conservation.
- Summary of potential effects associated with proposed infrastructure.

All elements of the Proposed Project have been considered in assessing effects on ecological receptors, including: 11 no. turbines with a blade tip height of 180m, a substation, 1 no. borrow pits and all ancillary infrastructure. The assessment examines the Wind Farm Site and the Proposed Grid Connection for each potential effect assessed. A Residual Effect is then provided for the Proposed Project (the Proposed Wind Farm Site and the Proposed Grid Connection) for each potential effect assessed.

7.6.1 Do-Nothing Effect

If the Proposed Project were not to proceed, no changes would be made to the current land-use practices in the area. Small-scale agriculture and commercial forestry practices in the area would continue to be managed under existing commercial forestry arrangements and farming practices and the impact associated with this would be neutral. It is noted that at the Wind Farm Site, there has been a degradation of the habitats including drainage, removal of vegetation and large-scale disturbance as a result of historical peat extractionIt is noted that cutover peatland is of low ecological value, particularly during the breeding season when disturbance is at its peak.

If the Proposed Project were not to proceed, the opportunity to generate renewable energy and electrical supply to the national grid would be lost, as would the opportunity to further contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions.

7.6.2 Effects on Key Ornithological Receptors during Construction and Operation (Wind Farm Site)

7.6.2.1 Golden Plover (Wintering)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	Flocks deemed to be of County Importance were recorded flying over, or within 500m of, the Wind Farm Site on 21 occasions. All of these observations occurred throughout the winter seasons surveyed. It should be noted that 61% of all flight activity for golden plover within, and adjacent to, the Wind Farm Site occurred during the 2017/2018 winter season. With only 15% during the 2018/2019 winter season, 7% during the 2019/2020 winter season and 18% during the 2022/2023 winter season. The majority of observations were of golden plover commuting or circling over the Wind Farm Site. There were only seven observations of golden utilizing habitats on, or within 500m, of the Wind Farm Site including roosting in close proximity to the development footprint. The land lost to the development footprint is small (i.e., 33.7ha/9.5% of Proposed Project site) relative to the total area within the Wind Farm Site. The species was not dependent on the Wind Farm Site for foraging or roosting during the wintering period, given how infrequently the Site was utilized by birds for roosting. Additionally, there was no evidence to suggest golden plover were foraging within the Wind Farm Site. Extensive areas of suitable foraging and roosting habitat will remain post construction and no significant impacts are predicted. No significant effects are 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 Project		Significance (Percival 2003)	Significance (EPA 2022)
Disturbance	Research indicates that this species is susceptible to disturbance impacts during the construction works (Pearce-Higgins *et al.*, 2012). Additionally, Goodship and Furness (2022) reported disturbance mean disturbance distances of 143m for golden plover during the winter season. This species was not regularly recorded utilising habitats within the Wind Farm Site for roosting or foraging. During the four winter seasons surveyed, there were only seven observations of birds landing on, or adjacent to, the Wind Farm Site. There was no evidence to suggest that golden plover were utilising the Wind Farm Site for foraging. Significant areas of more suitable roosting and foraging habitat for the species occur in the wider landscape and will be retained, e.g. bogland at Clonkee and Bracklagh, Kilmurray turlough and Levally Lough. In the event of displacement, there are extensive areas of suitable habitat in the wider area including Clonkee Bog to the east, Bracklagh Bog to the north as well as several local turloughs and abundant improved agricultural grassland suitable for this species. Significant displacement effects are not anticipated.	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	Short-term **Slight** Negative Effect
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated	**No Effect**	**No Effect**
Displacement & Barrier Effect	A review of 29 other studies suggests golden plover will approach wind turbines to an average distance of 175 m in non-breeding season (Hötker *et al.,* 2006). Only 48 of the 99 observations of golden plover were within 175m of the proposed turbine layout during surveys. In the event of displacement, there are extensive areas of suitable habitat in the wider area. This would likely render such an effect inconsequential. Furthermore, there is no evidence to suggest that the Wind Farm Site lies on a migratory/ regular commuting route for the species, therefore barrier effect is not anticipated.	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 Project		Significance (Percival 2003)	Significance (EPA 2022)
	Observations during the connectivity vantage point survey were of birds circling or commuting. However, no regularly used commuting routes were identified, and flight activity appeared random. Additionally, the majority of observations were within the first winter surveyed, with significantly fewer observations in the subsequent three winter seasons. The rate occurrence of golden plover in these subsequent winter seasons is low when compared to the survey effort. Significant displacement effects are not anticipated at any geographical scale.		
Collision	The species was recorded flying within the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-6. The collision risk assessment has followed a precautionary approach and utilises flight observations recorded across the winter season and the autumn migration period in September. Therefore, the assessment provided below is highly conservative. To account for the crepuscular flight activity of golden plover, the collision risk analysis for this species has assumed nocturnal flight activity occurred for 25% of the night. Please see Appendix 7-6 for further discussion. A key factor in calculating the predicted rate of collisions for a given species is the application of an avoidance rate. A review of golden plover collision avoidance from four UK wind farms has been undertaken and is outlined in Appendix 7-6. The output of this new research was a golden plover avoidance rate of between 99.6% and 99.8%. This avoidance rate was used in the collision risk analysis.	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 **Imperceptible** Negative Effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
	The collision risk has been calculated at a rate of 15.1 collisions per year[9]. Annual mortality of adult golden plover has been calculated at 27% per annum (Sandercock, 2003). If 15.1 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[10] (i.e., 5,687 birds (please see Section 7.5.1.1 for further details)) by ~0.98%. The predicted collision risk is therefore negligible in the context of the county population.		

[9] It is noted that 61% of flight activity was during the first winter surveyed (2017/18), which means that the trend is for much less flight activity at the Site in more recent years. This first year of data may have been an anomaly.

[10] 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 a widespread habitat type (agricultural grassland), 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 the county.

7.6.2.2 Hen Harrier (Wintering)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	No regular roosting sites were recorded at, or within 2km of, the Wind Farm Site during the survey period. Three infrequently used hen harrier winter roosts were identified which did not overlap with any proposed infrastructural elements. The first was approximately 1.8km from the nearest proposed turbine. The second was approximately 400m from the nearest turbine, while the third was within the Wind Farm Site, approximately 120m from the nearest turbine. Hen harrier were only observed utilising these roosts on one occasion in each instance. Although hen harrier roost surveys were conducted at these locations throughout the four winter seasons of surveys, these roosts were not found to be active on subsequent survey visits. Therefore, given that these roosts sites were only utilised on one occasion each, hen harrier are not dependent on these areas. There were no observations of birds roosting at any other location within 2km of the Wind Farm Site throughout the 2017/2018, 2018/2019, 2019/2020 and 2022/2023 winter seasons. Hen harrier were observed hunting within the Wind Farm Site, however, the land lost to the development footprint is small (i.e., 33.7ha/9.5% of Proposed Project site) relative to the total area within the Wind Farm Site. Given that hen harrier were observed on 20 occasions in 24 months of winter surveys within the Wind Farm Site, this limits the potential for construction works to result in ecologically significant habitat loss for hen harrier. Furthermore, suitable habitat is abundant in the wider surroundings of the Wind Farm Site, e.g. Clonkee Bog to the east and Bracklagh Bog to the north. Significant effects are not anticipated.	The magnitude of the effect is assessed as ***Low***. The cross tablature of a *High* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance	Long-term **Slight** Negative Effect
Disturbance	Three infrequently used winter roost site was identified during wintering bird surveys. These were located within the Wind Farm Site, and c.70m and c.1.2km	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 Project		Significance (Percival 2003)	Significance (EPA 2022)
	from the Wind Farm Site. Hen harrier are not reliant on these roost locations, as they were only utilised on one occasion at each location and subsequent surveys did not record any further roosting activity. This species was not found to be dependent on the Wind Farm Site for foraging at any time of the year. Therefore, based on this, there is little potential for significant disturbance effects given that hen harrier are not dependent on the habitats within the Wind Farm Site for roosting or foraging. Furthermore, the habitats on site are not unique to the Wind Farm Site and are abundant in the wider surroundings. Significant disturbance effects are not anticipated.	The cross tablature of a *High* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance	
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated	**No Effect**	**No Effect**
Displacement & Barrier Effect	As previously mentioned, three infrequently used winter roost sites were identified during wintering bird surveys. These were located within the Wind Farm Site, and c.70m and c.1.2km from the Wind Farm Site. Hen harrier are not reliant on these roost locations, as they were only observed being utilised on one occasion each, over the four winter seasons surveyed. Hen harrier have been recorded to be subject to displacement impacts within a 500m radius of turbines (Pearce-Higgins *et al.,* 2009). However, foraging and commuting hen harrier were infrequently recorded within the Wind Farm Site and were only recorded within 500m of the proposed turbine layout on 20 occasions, over the four winter seasons surveyed at the Wind Farm Site (i.e., less than one observation per month). Furthermore, the habitats on site are not unique to the Wind Farm Site and are abundant in the wider surroundings. Significant effects are not predicted given the low numbers recorded and infrequency of these observations.	The magnitude of the effect is assessed as ***Low***. The cross tablature of a *High* 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 Project		Significance (Percival 2003)	Significance (EPA 2022)
Collision	The species was recorded flying with the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-5. The collision risk has been calculated at a rate of 0.02 collisions per year, or one bird every 50 years. The predicted collision risk is insignificant over the 35-year life-time of the proposed wind farm.	The magnitude of the effect is assessed as ***Negligible***. The cross tablature of a *High* sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance	Long-term **Imperceptible** Negative Effect

7.6.2.3 Merlin (All Seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	Merlin were recorded on 32 occasions during surveys. Approximately two-thirds (nineteen) of these observations related to the failed nesting attempt within the Wind Farm Site in 2018. This nesting attempt was unsuccessful due to local disturbance by turf-cutting works. Merlin were only observed on two dates at the nest site during surveys. The remaining observations (thirteen) were of merlin hunting or commuting, within 500m of the Wind Farm Site. There was no evidence to suggest that merlin attempted to breed at, or adjacent to, the Wind Farm Site during the 2019 or 2023 breeding seasons. Furthermore, any nesting attempt in this area is unlikely to be successful, given the high level of human disturbance at the Wind Farm Site during the breeding season due to turf-cutting works (which usually commence after territories have been established). Significant effects are not predicted particularly given the low levels of activity recorded following the abandonment of the nest site. Extensive areas of suitable foraging and breeding habitat will remain post construction and there is an abundance of suitable habitat in the surrounding area, including Clonkee Bog to the east and Bracklagh Bog to the north.	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 previously discussed, merlin attempted to breed within the Wind Farm Site during the 2018 breeding season. There was no evidence to suggest merlin attempted to breed at the Wind Farm Site during the 2019 or 2023 breeding seasons. The current level of disturbance at the Wind Farm Site led to merlin abandoning their nesting attempt in 2018 and not returning to the area in 2019 or 2023. Since abandoning the nest in 2018, the Wind Farm Site was infrequently visited by this species, and they are no longer reliant on the Wind Farm Site for breeding or	The magnitude of the effect is assessed as ***Low***. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Very Low** effect significance	Short-term **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
	foraging. Additionally, construction activity is unlikely to add significantly to the disturbance already present at the Wind Farm Site during the breeding season, due to turf cutting activities. Furthermore, given the availability of potential nesting and foraging habitat in the wider area, no significant effects are anticipated. Significant disturbance effects are not anticipated.		
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated	**No Effect**	**No Effect**
Displacement & Barrier Effect	Significant effects are not anticipated particularly given the low levels of activity recorded since the Site was abandoned due to local human disturbance. Merlin attempted to breed within the Wind Farm Site during the 2018 breeding season but abandoned the nest site due to high levels of disturbance due to turf-cutting activities. Following the disturbance from the 2018 breeding attempt, there were only five observations during subsequent surveys at the Wind Farm Site, with no observations during the following 2019 breeding season. There was only one observation during the 2023 breeding season, of an individual commuting within the Wind Farm Site. Given, merlin have already been displaced from the Wind Farm Site due to ongoing human activity and the availability of potential nesting and foraging habitat in the wider area (e.g. Clonkee Bog to the east and Bracklagh Bog to the north), no significant additional displacement effects are anticipated. Significant displacement effects are not anticipated.	The magnitude of the effect is assessed as ***Low***. The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a **Very Low** effect significance	Long-term **Slight** Negative Effect
Collision	This species was not recorded flying at potential collision height during the extensive vantage point survey work undertaken at the Wind Farm Site. Collision related mortality is not likely to significantly impact this species.	**No Effect**	**No Effect**

7.6.2.4 Peregrine (All Seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	Peregrine were infrequently recorded commuting or hunting over the Wind Farm Site during the survey period. Additionally, no evidence of breeding or roosting was recorded. Significant effects are not anticipated particularly given the low levels of activity recorded. Extensive areas of suitable foraging habitat will remain post construction and there is an abundance of suitable habitat in the surrounding area. Furthermore, this species is unlikely to be dependent on the onsite habitats, given the wide-ranging nature of the species and the availability of similar suitable habitats in the surroundings (e.g., bog/ heath/ grassland/ coniferous plantation). Significant effects are not predicted.	The magnitude of the effect is assessed as ***Negligible***. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance	Long-term **Imperceptible** Negative Effect
Disturbance	The majority of observations were of birds commuting over the Wind Farm Site, there were also occasional observations of birds foraging. There was no evidence of breeding activity recorded. Disturbance during construction is unlikely to discourage flight activity or foraging in the vicinity of the Wind Farm Site particularly given the low levels of activity recorded and given that peregrine has been documented to become accustomed to various sources of human disturbance (Ruddock *et al.,* 2007). Significant disturbance effects are not anticipated.	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	Short-term **Slight** Negative Effect
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated	**No Effect**	**No Effect**
Displacement & Barrier Effect	There was no evidence of breeding recorded. In total, this species was recorded on 21 occasions within 500m of the proposed turbine layout during the survey	The magnitude of the effect is assessed as ***Low***.	Long-term **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
	period. The availability of alternative suitable habitat in the surroundings, limits the potential for significant displacement effects. Furthermore, peregrine has been documented to become accustomed to various sources of human disturbance (Ruddock *et al.,* 2007). It is therefore reasonable to conclude that following a period of habituation, the population will become accustomed to the wind farm in the landscape. Significant displacement effects are not predicted.	The cross tablature of *Medium* sensitivity species and *Low* Impact corresponds to a ***Low*** effect significance	
Collision	The species was recorded flying with the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-6. The collision risk has been calculated at a rate of 0.005 collisions per year, or one bird every c. 200 years. The predicted collision risk is insignificant over the 35-year life-time of the proposed wind farm.	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 **Imperceptible** Effect

7.6.2.5 Whooper Swan (Wintering)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	This species was not recorded utilising habitats within the Wind Farm Site. All observations of this species within 500m of the Wind Farm Site were of birds commuting. The majority of observations of this species were during waterbird distribution and abundance surveys, up to 5km from the Wind Farm Site, or at Kilmurray Turlough, 1km to the west of the Wind Farm Site. The species was not recorded utilising habitats within the Wind Farm Site for foraging or roosting during the wintering period. There are some areas within the Wind Farm Site that are potentially suitable for foraging and roosting whooper swan, however, the land lost to the development footprint is small (i.e., 33.7ha/9.5% of Proposed Project site) relative to the total area within the Wind Farm Site. Direct loss of suitable habitat for this species will be minimal. Significant displacement effects are not anticipated at any geographical scale.	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.	Short-term **Imperceptible** Negative Effect
Disturbance	As per McGuinness *et al.* (2015), the zone of sensitivity for the species is 600m. This species was recorded in flight within 600m of the proposed turbine layout on 23 occasions. Numbers recorded ranged from a pair to a flock of 25 birds. Additionally, there were no observations of whooper swan foraging or roosting within 600m of the Wind Farm Site. The nearest foraging/roosting flock was observed at Kilmurray Turlough, approximately 1km from the Wind Farm Site. A study undertaken by Rees (2005) in relation to whooper swan behavioural responses to human activity suggests that swans become less sensitive to disturbance if the frequency of daily disturbance is high. Rees *et al.* (2006) conducted a study at Black Cart Special SPA near Glasgow in relation to whooper swan behavioural and disturbance responses to different types of human activity. The study found that activities relating to cars, tractors, bicycles,	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.	Short-term **Imperceptible** Negative Effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
	farm workers on foot and cattle (livestock) exhibited the least disturbance to whooper swan flocks (within 100m disturbance distance bands). The wind farm site is subject to regular peat/turf extraction activity and the construction will require works similar to those described in the Rees assessment. Significant disturbance to whooper swan is therefore not anticipated as the populations are expected to become habituated to the levels of disturbance. This species was recorded on only 23 occasions within 600m of the Wind Farm Site during 24 months of winter surveys. Furthermore, all of these observations were of birds in flight and there were no observations of birds roosting or foraging within 600m of the Wind Farm Site. Significant displacement effects are not anticipated at any geographical scale given the infrequency of observations. Furthermore, Flocks of county importance were observed at Kilmurray Turlough, approximately 1km west of the Wind Farm Site. However, given the separation distance between the turlough and the Wind Farm Site, significant disturbance effects are not anticipated on these birds. No significant effects are predicted.		
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated at any geographical scale.	**No Effect**	**No Effect**
Displacement & Barrier Effect	As per McGuinness *et al.* (2015), the zone of sensitivity for the species is 600m. This species was recorded in flight within 600m of the proposed turbine layout on 24 occasions. Numbers recorded ranged from a pair to a flock of 25 birds. As previously mentioned, there were no observations of whooper swan foraging or roosting within 600m of the Wind Farm Site. The nearest foraging/roosting flock was observed at Kilmurray Turlough, approximately 1km from the Wind Farm Site.	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 **Imperceptible** Negative Effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
	Observations of whooper swan non-breeding activity from 8 European studies have given a mean minimum avoidance distance of 150 m from the base of wind turbines (Hötker *et al.,* 2006). Only 13 of the observed flights of whooper swan were recorded within 150m of the proposed turbine layout. This few transits across the Site limits the potential for significant impact to result. Furthermore, there is no evidence to suggest that the Wind Farm Site lies on a migratory/ regular commuting route for the species therefore barrier effect is not anticipated. There were only infrequent observations of birds commuting over the wind farm site during the connectivity vantage point surveys, and all observations were of low numbers of birds. However, no regularly used commuting routes were identified. Flocks of county importance were observed at Kilmurray Turlough, approximately 1km west of the Wind Farm Site. However, given the separation distance between the turlough and the Wind Farm Site, displacement effects are not anticipated on these birds. Significant displacement effects are not anticipated at any geographical scale.		
Collision	The species was recorded flying within the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-6. The collision risk has been calculated at a rate of 0.22 collisions per year or one bird every ~5 years. Annual mortality of adult whooper swan has been calculated at 20% per annum (Brazil, 2003). If 0.22 collisions were to occur per year, it would mean that the losses at the proposed wind farm would increase	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 **Imperceptible** Effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
	the annual mortality of the county population[11] (i.e., 1,485 birds (please see Section 7.5.1.7 for further details)) by 0.07%. The predicted collision risk is therefore negligible in the context of the county, national or international populations.		

[11] *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 a widespread habitat type (wetlands, agricultural grassland and peatland), 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 the county.*

7.6.2.6 Kestrel (All Seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	This species was frequently recorded within the Wind Farm Site during the breeding and winter seasons. There was a confirmed breeding territory partially within the Wind Farm Site during the 2023 breeding season. Additionally, there was one confirmed nest site located approximately 2.6km to the north of the Wind Farm Site in 2019. Kestrel were observed hunting within the Wind Farm Site, however, the land lost to the development footprint is small (i.e., 33.7ha/9.5% of Proposed Project site) relative to the total area within the Wind Farm Site. Direct loss of foraging habitat will be minimal. Furthermore, the suitable foraging habitats on-site (bogland and agricultural grassland) are not a rare resource locally. Substantial areas of undisturbed suitable breeding and foraging habitat will remain post construction. Significant effects are not anticipated.	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	The construction of the Proposed Project has the potential to give rise to disturbance impacts, however, significant impacts are not predicted based on the following rationale. While this species was frequently recorded within the Wind Farm Site during the breeding and winter seasons, the Wind Farm Site does not contain habitats that are unique to the local area. Therefore, were disturbance to occur it would not result in the loss of a scarce resource for the local kestrel population. While no breeding was recorded previously, there was a confirmed breeding territory partially within the Wind Farm Site during the 2023 breeding season. However as previously outlined, significant effects are not anticipated, given that extensive areas of suitable foraging and nesting habitat exist and will remain in the wider area. Onsite habitats are not considered unique to the Wind Farm Site or rare locally. Significant disturbance effects are not predicted at the county, national or international scale.	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	Short-term **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated	**No Effect**	**No Effect**
Displacement & Barrier Effect	Raptor studies have generally found only 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 and nesting habitat exist and will remain in the wider area. Onsite habitats are not considered unique to the Wind Farm Site or rare locally. Significant displacement effects are not predicted at the county, national or international scale.	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
Collision	The species was recorded flying within the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-6. The collision risk has been calculated at a rate of 1.35 collisions per year. Annual mortality of adult kestrel has been calculated at 31% per annum (Village, 1990). If 1.35 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 breeding population[12] (i.e., 816 birds (please see Section 7.5.1.9 for further details)) by 0.53%. The predicted collision risk is therefore negligible in the context of the county, national or international kestrel population.	The magnitude of the effect is assessed as ***Negligible***. The cross tablature of *Medium* sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance	Long-term **Imperceptible** 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 the county.

7.6.2.7 Lapwing (Wintering)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	Lapwing were observed on 125 occasions during the non-breeding season months (September – March), 26 of which were within 500m of the Wind Farm Site. All of the flight activity within 500m of the Wind Farm Site were of flocks commuting or circling over the Wind Farm Site, or the adjacent farmland habitats. The species was not recorded utilising habitats within the Wind Farm Site for foraging or roosting during the wintering period. There are some areas within the Wind Farm Site that are potentially suitable for foraging and roosting lapwing. However, the land lost to the development footprint is small (i.e., 33.7ha/9.5% of Proposed Project site) relative to the total area within the Wind Farm Site. Direct loss of suitable habitat for this species will be minimal and the cutover peat that covers much of the Wind Farm Site is suboptimal for this species. Significant displacement effects are not anticipated at any geographical scale.	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.	Short-term **Imperceptible** Effect
Disturbance	Wintering lapwing favour agricultural grassland for foraging during the winter months. The dominant habitat onsite is cutover bog this habitat is considered to provide sub-optimal foraging habitat for lapwing. This species was not observed to utilise any areas of the Wind Farm Site during winter months but was primarily recorded commuting over the Site. The abundant surrounding agricultural land is considered to provided more favourable winter foraging habitat than the habitats within the Wind Farm Site. Disturbance during construction is unlikely to discourage flight activity in the vicinity of the Proposed Project. Significant displacement effects on foraging or roosting lapwing are not anticipated.	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.	Short-term **Imperceptible** Effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated	**No Effect**	**No Effect**
Displacement & Barrier Effect	Hotker *et al.* (2006) undertook a meta-analysis of existing literature on disturbance distances. This review reported from the 32 studies examined the mean disturbance distance for wintering lapwing was 260m. This species was not observed to utilise any areas of the Wind Farm Site during winter months but was recorded commuting over the Site. Flocks of county importance were recorded flying over the Site on 15 occasions during surveys. This species was recorded in flight within 260m of the proposed turbines on seven occasions, during winter months. Given the level of activity on site, that the habitats within the Wind Farm Site are not unique or rare locally and the suboptimal condition of the on-site habitats, no significant effects are anticipated. Furthermore, the abundant surrounding agricultural land is considered to provided more favourable winter foraging habitat than the habitats within the Wind Farm Site. There are extensive areas of suitable habitat in the wider area, outside any potential displacement buffer (260m), should any potential displacement effect occur. No significant displacement (or barrier) effects on foraging or roosting lapwing are anticipated.	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 **Imperceptible** Effect
Collision	The species was recorded flying within the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-6.	The magnitude of the effect is assessed as ***Low***. The cross tablature of a *Medium* Sensitivity species and *Low*	Long-term **Slight** Effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
	The collision risk has been calculated at a rate of 20.6 collisions per year. Annual mortality of adult lapwing has been calculated at 29.5% per annum (Peach *et al.*, 1994). If 20.6 collisions were to occur per year, it would mean that the losses at the Wind Farm Site would increase the annual mortality of the county population[13] (i.e., 4, 943 birds (please see Section 7.5.1.10 for further details)) by 1.4%. The predicted collision risk is therefore low in the context of the county population.	Impact corresponds to a ***Low*** effect significance.	

[13] *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, peatland), 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 the county.*

7.6.2.8 Snipe (All Seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	Snipe were regularly recorded during surveys, with observations of drumming or displaying snipe during the breeding season occasionally recorded. In 2018, four breeding territories were recorded. All of which were within the Wind Farm Site. In 2019, five breeding territories were recorded. Four of which were within the Wind Farm Site. In 2023, six breeding territories were recorded. Three of which were within, or partially within, the Wind Farm Site. The loss of breeding habitat will be minimal as the infrastructure is confined to a narrow corridor (i.e., 33.7ha/9.5% of Proposed Project site). Significant areas of suitable nesting and foraging habitat will continue to remain post construction and there is an abundance of suitable habitat in the surrounding area. Significant habitat loss effects are not predicted.	The magnitude of the effect is assessed as ***Medium***. The cross tablature of *Medium* sensitivity species and *Medium* Impact corresponds to a ***Low*** effect significance	Long-term **Slight** Negative Effect
Disturbance	Pearce-Higgins *et al.* (2009), found that breeding snipe showed significant avoidance of turbines extending to a distance of 400m, and there is also evidence of avoidance of access tracks. Snipe were recorded within 400m of the proposed turbine layout on 189 occasions. Disturbance associated with construction works will result in a measurable reduction in the breeding density of snipe onsite/around the margins of the Wind Farm Site. However, given the extent of suitable habitat in the wider area; significant displacement during the construction phase is not predicted at the county, national or international scale.	The magnitude of the effect is assessed as ***Medium***. The cross tablature of *Medium* sensitivity species and *Medium* Impact corresponds to a ***Low*** effect significance	Short-term **Slight** Negative Effect
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated	**No Effect**	**No Effect**

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Displacement & Barrier Effect	As previously discussed, Snipe breeding density can be reduced by 50% within 400m of turbines (Pearce-Higgins *et al.,* 2009). In 2018, four breeding territories were identified with five in 2019 and six in 2023. Most of these territories were recorded within 400m of the proposed turbine layout. Disturbance displacement associated with operational turbines will result in a measurable reduction in the breeding density of snipe onsite/around the margins of the Wind Farm Site. However, there are extensive areas of suitable habitat in the wider area, outside any potential displacement buffer. Furthermore, peat extraction is likely to cease in the early years of the operational life of the Wind Farm Site. Once ceased, it is likely that the cutover peatland will revegetate with scrub making the Site increasingly unsuitable for this species. Significant displacement effects are not predicted at the county, national or international scale.	The magnitude of the effect is assessed as ***Medium***. The cross tablature of *Medium* sensitivity species and *Medium* Impact corresponds to a ***Low*** effect significance	Long-term **Slight** Negative Effect
Collision	It is acknowledged that the predicted number of transits, and hence predicted rate of collision for snipe may be underestimated, as flight activity for this species is predominantly crepuscular in nature while the vantage point surveys are largely diurnal (Table 1.4, NatureScot (2017)). To account for this, the collision risk analysis for this species has assumed nocturnal flight activity occurred for 25% of the night. Please see Appendix 7-6 for further discussion. The species was recorded flying within the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-6. The collision risk has been calculated at a rate of 1.9 collisions per year. Annual mortality of snipe has been calculated at 37.5% per annum (Spence, 1988). If 1.9 collisions were to occur per year, it would mean that the losses at the proposed	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 Project		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
	wind farm would increase the annual mortality of the county population[14] (i.e. c.328 birds (please see Section 7.5.1.12 for further details)) by 1.5%. The predicted collision risk is therefore low in the context of the county population.		

7.6.2.9 Buzzard (All Seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	This species was occasionally recorded within the Wind Farm Site during the breeding and winter seasons. This low level of recorded activity limits the potential for ecologically significant impacts to result from the Wind Farm Site. Furthermore, the direct loss of suitable habitat will be minimal as the infrastructure is confined to a narrow corridor (i.e., 33.7ha/9.5% of Proposed Project site). 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 **Slight** Negative Effect
Disturbance	There was no evidence of breeding activity within the Wind Farm Site during the 2018, 2019 or 2023 breeding seasons. This species was only observed occasionally commuting and foraging within the Wind Farm Site. Significant effects are not predicted particularly given the low levels of activity recorded. Extensive areas of suitable foraging habitat will remain post construction.	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	Short-term **Slight** Negative Effect
Operational Phase			

[14] *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, peatland), 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 the county*

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
Direct Habitat Loss	Direct or indirect effects are not anticipated	No Effect	No Effect
Displacement & Barrier Effect	This species was occasionally recorded within the Wind Farm Site during the breeding and winter seasons. However, there was no evidence of breeding activity within the Wind Farm Site during the 2018, 2019 or 2023 breeding seasons. Pearce-Higgins (2009) states that buzzard has been found to show significant turbine avoidance extending to at least 500m. Despite this, significant effects are not anticipated, given that extensive areas of suitable foraging habitat exist and will remain in the wider area (i.e., outside the 500m buffer zone). Significant displacement effects are not anticipated.	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 **Slight** Negative Effect
Collision	The species was recorded flying within the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-6. The collision risk has been calculated at a rate of 0.6 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 0.6 birds per year from the local population of a Green-listed (BoCCI) species is considered of low significance.	The magnitude of the effect is assessed as ***Negligible.*** The cross tablature of a *Low* Sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance.	Long-term **Imperceptible** Effect

7.6.2.10 Sparrowhawk (All Seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	Sparrowhawk were confirmed breeding in 2019 approximately 150m from the Wind Farm Site, and 400m from the nearest proposed turbine and in 2023 immediately adjacent to the Wind Farm Site, and 800m from the nearest proposed turbine. In addition, there was one confirmed nest location in 2018, approximately 2km from the Wind Farm Site, and one possible territory in 2019, approximately 1.2km from the Wind Farm Site. The construction of the Wind Farms Site will not result in the loss of a significant amount of foraging habitat given the development footprint is small (i.e., 33.7ha/9.5% of Proposed Project site) relative to the total area within the Wind Farm Site. Significant areas of suitable nesting and foraging habitat will continue to remain post construction and there is an abundance of suitable habitat in the surrounding area. Significant displacement effects are not anticipated.	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 **Slight** Negative Effect
Disturbance	Breeding sparrowhawk were identified during 2019 and 2023, within 500m of the Wind Farm Site. Additionally, there was one confirmed nest site in 2018 and one possible territory in 2019, within 2km of the Wind Farm Site. Construction adjacent to these nests could potentially cause displacement of breeding and foraging sparrowhawk. However, significant effects are not predicted particularly given the low levels of activity recorded within the Wind Farm Site based on the below rationale. Extensive areas of suitable foraging and nesting habitat will remain post construction. The Wind Farm Site does not contain habitats that are unique to the local area. Therefore, were displacement to occur it would not result in the	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	Short-term **Slight** Negative Effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
	loss of a scarce resource for the local sparrowhawk population. Significant displacement effects are not anticipated.		
Operational Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated	**No Effect**	**No Effect**
Displacement & Barrier Effect	As previously discussed, the 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 turbines as with other raptors (Pearce-Higgins *et al.,* 2009). This species was only occasionally recorded within the Wind Farm Site and there was only one confirmed nest site located within 500m of the Wind Farm Site, in both 2019 and 2023. In addition, none of the habitats found onsite are considered to be a scarce resource locally. Therefore, displacement effects are likely to be inconsequential. Significant effects are not predicted particularly given the low levels of activity recorded. Extensive areas of suitable foraging and breeding habitat will remain post construction. Significant displacement effects are not anticipated.	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 **Slight** Negative Effect
Collision	The species was recorded flying with the potential collision risk zone during vantage point surveys. A "Random" collision risk analysis has been undertaken and full details are provided in Appendix 7-6. The collision risk has been calculated at a rate of 0.03 collisions per year, or one collision every ten years. The loss of 0.03 birds from the local population of a Green-listed (BoCCI) species is considered insignificant.	The magnitude of the effect is assessed as ***Negligible***. The cross tablature of a *Low* sensitivity species and *Negligible* Impact corresponds to a ***Very Low*** effect significance	Long-term **Imperceptible** Negative Effect

7.6.3 Effects on Key Ornithological Receptors during Decommissioning (Wind Farm Site)

7.6.3.1 All Species

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
Construction Phase			
Direct Habitat Loss	Direct or indirect effects are not anticipated as no new infrastructure is proposed.	**No Effect**	**No Effect**
Displacement	As above for construction phase for each species listed as a KOR.	As above for construction phase for each KOR	As above for construction phase for each KOR

7.6.4 Effects on Designated Areas (Proposed Project)

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 this report and its appendices. The measures ensure that the construction, and operation of the Proposed Project does not adversely affect the integrity of any European sites.

Following an examination, evaluation and analysis, in light of best scientific knowledge and the conservation objectives of the Site, and, on the basis of objective information, having taken into account the relevant mitigation measures, it can be concluded that the Proposed Project will not have an adverse impact on any European Sites, either alone or in combination with other plans or projects.

7.6.5 Effects Associated with the Turbine Delivery Route

To facilitate the delivery of large turbine components and other abnormal loads during the construction of the wind farm, this application includes for the construction of three temporary accommodation areas.

The majority of habitats along the turbine delivery route are of low ecological value (i.e. existing roads/track) 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 displacement may occur during construction works. However, given the extent of suitable habitat in the wider area; significant displacement effects are not predicted. The turbine delivery route does not have the potential to result in any significant habitat loss or displacement of any KOR species.

As per Percival (2003) the magnitude of the effect on KOR is assessed as **Negligible**. The cross tablature of a **High** sensitivity species (e.g. Hen Harrier) and **Negligible** impact corresponds to a **Very Low Effect Significance**. Hen harrier was used as an example as it is one of the highest sensitivity species identified as a KOR at this site. The significance of the potential impact is classed as a **Short-term Slight Negative** effect following EPA criteria (2022).

7.6.6 Effects Associated with the Grid Connection Route

It is proposed to construct a 220kV substation within the Wind Farm Site and to connect from here to the existing 220Kv overhead line in the townland of Laughil, located approximately 2.8km to the east of the proposed on-site substation. Connection via the Laughil route would comprise underground cabling, located mainly on existing tracks and the public road corridor, and the provision of a proposed new operational access track.

The majority of habitats along the grid connection route are of low ecological value (i.e. existing roads/track) 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 displacement may occur during construction works. However, given the extent of suitable habitat in the wider area; significant displacement effects are not predicted. The turbine delivery route does not have the potential to result in any significant habitat loss or displacement of any KOR species.

As per Percival (2003) the magnitude of the effect on KOR is assessed as **Negligible**. The cross tablature of a **High** sensitivity species (e.g. Hen Harrier) and **Negligible** impact corresponds to a **Very Low Effect Significance**. Hen harrier was used as an example as it is one of the highest sensitivity species identified as a KOR at this site. The significance of the potential impact is classed as a **Short-term Slight Negative** effect following EPA criteria (2022).

7.7 Mitigation and Best Practice Measures

This section describes the measures that are in place to mitigate adverse 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 development phases.

7.7.1 Mitigation by Design

The project design has followed the basic principles outlined below to eliminate the potential for significant effects on avian receptors:

- The Proposed Project avoids wildlife refuge sites (e.g., waterbodies)
- Hard standing areas have been designed to the minimum size necessary to accommodate the turbine model that is selected.
- The turbine delivery route has been selected to utilise built infrastructure i.e., public roads.
- The grid connection route has been selected to utilise built infrastructure for the majority of its length (i.e., cables to be laid within public roads). Cables will be laid underground to avoid effects on roadside hedgerows and disturbance to nesting birds.

7.7.2 Mitigation During Construction, Operation and Decommissioning

The following section describe the mitigation measures to be implemented during each phase of the Proposed Project.

7.7.2.1 Construction Phase Mitigation

The following measures are proposed for the construction phase:

- A Construction and Environmental Management Plan (CEMP) has been prepared. The CEMP will be in place prior to the start of the construction phase. Best practice measures which form part of the design of the project are included in Chapter 4 of this EIAR. The CEMP is included as an Appendix 4-4 to Chapter 4.
- Construction works will begin outside the bird nesting season as defined by the Wildlife Act 1976 as amended (1st of March to the 31st of August).
- All removal of woody vegetation will be undertaken in accordance with Section 40 of the Wildlife Act 1976 as amended.
- 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.
- Plant machinery will be turned off when not in use.
- All plant and equipment for use will comply with the European Communities (Noise Emission by Equipment For Use Outdoors) Regulations, 2001 (S.I. No. 632/2001) and other relevant legislation.
- An Ecological Clerk of Works (ECoW) will be appointed. Duties will include:
    - Oversee that a pre-construction transect/walkover bird survey is undertaken, to avoid significant effects on breeding birds will be avoided. Further details are provided in Section 7.8 below.
    - Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Proposed Project.

- Oversee management of ornithological and ecological 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.

7.7.2.2 Operational Phase Mitigation

No operational phase impacts requiring mitigation were identified. However, monitoring in line with best practice is proposed, please see Section 7.8 below for details.

7.7.2.3 Decommissioning Phase Mitigation

During the decommissioning phase, disturbance limitation measures will be as per the construction phase described in Section 7.7.2.1. Please also see Section 6 of the Decommissioning Plan (Appendix 4-6 of this EIAR) for further details.

7.8 Monitoring

The following Sections, 7.8.1 to 7.8.3, outline the proposed construction, operational and decommissioning phase monitoring. All monitoring will be undertaken by a suitably qualified ornithologist.

7.8.1 Pre-Construction and Construction Surveys

It is proposed that construction works will commence outside the bird nesting season (1st of March to 31st of August inclusive) to avoid the most sensitive time of the year for most bird species with the potential to use the Site and its environs. Pre-commencement confirmatory surveys will be undertaken within one month prior to the initiation of works at the Proposed Project to identify sensitive sites (e.g. roosts). Any requirement for construction works to run into the subsequent breeding and winter seasons following commencement will be subject to a repeat of the pre-commencement bird surveys to confirm the absence of breeding birds of conservation concern once per month during the breeding season (April to July) and once during the winter season (October). The survey will aim to identify sensitive sites e.g., nests or roosts depending on the season in question.

The survey will be undertaken by a suitably qualified ornithologist. The survey will comprise a thorough walkover survey of the development footprint and/or all works areas to a 500m radius, where access allows. If winter roosts or nests of birds of high conservation concern are identified, the roost/nest will be earmarked for continued monitoring during works. If the roost/nest is found to be active during works, works will cease within a species-specific buffer of its location in line with best practice guidance (Forestry Commission Scotland, 2006; Goodship and Furness 2022; Ruddock and Whitfield, 2007) to avoid disturbance. No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.

All site staff and subcontractors will be made aware of any restrictions to be imposed by means of a toolbox talk and a map of the 'no-work zone' will be made available to all construction staff. The restricted area will also be marked to alert all personnel on site to the suspension of works within that area.

7.8.2 Operational Phase Surveys

In line with best practice measures, a detailed post-construction Bird Monitoring Programme has been prepared for the operational phase of the Proposed Project, please refer to Appendix 7-7 for further

details. The programme of works will monitor parameters associated with collision, displacement/barrier effects and habituation during the lifetime of the project. Surveys will be scheduled to coincide with years 1, 2, 3, 5, 10 & 15 of the lifetime of the wind farm. Monitoring measures are broadly based on guidelines issued by the NatureScot (SNH, 2009). The following individual components are proposed:

- Flight activity surveys: vantage point surveys.
- Breeding Bird surveys: O'Brien & Smith
- Winter Distribution & Abundance Surveys: hen harrier roost surveys
- Targeted bird collision surveys (corpse searches) will be undertaken with trained dogs. The surveys will include detection and scavenger trials, to correct for these two biases and ensure the resulting data is robust.

The proposed programme of monitoring was not proposed in response to any identified significant effect but rather as a best practice measure (as per guidance outlined in NatureScot, 2009). The monitoring is comprehensive and considered entirely adequate in this regard. The results of this 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.

7.8.3 Decommissioning

It is proposed that decommissioning works will commence outside the bird nesting season (1st of March to 31st of August inclusive) to avoid the most sensitive time of the year for most bird species with the potential to use the Site and its environs. Pre-commencement confirmatory surveys will be undertaken within one month prior to the initiation of works at the Proposed Project to identify sensitive sites (e.g. roosts). Any requirement for construction works to run into the subsequent breeding and winter seasons following commencement will be subject to a repeat of the pre-commencement bird surveys to confirm the absence of breeding birds of conservation concern once per month during the breeding season (April to July) and once during the winter season (October). The survey will aim to identify sensitive sites e.g., nests or roosts depending on the season in question.

The surveys will be undertaken by a suitably qualified ornithologist. The surveys will comprise a thorough walkover survey of the development footprint and/or all works areas to a 500m radius, where access allows. If winter roosts or nests of birds of high conservation concern are identified, the roost/nest will be earmarked for continued monitoring during works. If the roost/nest is found to be active during works, works will cease within a species-specific buffer of its location in line with best practice guidance (Forestry Commission Scotland, 2006; Goodship and Furness 2022; Ruddock and Whitfield, 2007). No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.

All site staff and subcontractors will be made aware of any restrictions to be imposed by means of a toolbox talk and a map of the 'no-work zone' will be made available to all construction staff. The restricted area will also be marked to alert all personnel on site to the suspension of works within that area.

7.9 Residual Effects

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

- Golden Plover
- Hen Harrier
- Merlin
- Peregrine
- Whooper Swan
- Kestrel

- Lapwing
- Snipe
- Buzzard
- Sparrowhawk

As per Percival (2003) criteria, effect significance of greater than **Low** was not identified for any KOR.

As per EPA (2022) criteria, effect significance of greater than **Slight Negative** was not identified for any KOR.

Taking into consideration the effect significance levels identified and the proposed best practice and mitigation; significant residual effects on KORs from the Proposed Project with regard to direct habitat loss, displacement or collision mortality are not anticipated.

7.10 Assessment of Cumulative Effects

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

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

7.10.1 Other Plans and Projects

Assessment material for this in combination impact assessment was compiled on the relevant developments within the vicinity of the Proposed Project and was verified on the 23/11/2023. The material was gathered through a search of relevant online Planning Registers, reviews of relevant EIS/EIAR documents, planning application details and planning drawings, and served to identify past and future projects, their activities and their environmental impacts. The projects considered in relation to the potential for in combination effects and for which all relevant data was reviewed (e.g., individual EISs/EIARs, layouts, drawings etc.) include those listed below.

7.10.1.1 Plans Considered in the Cumulative Impact Assessment

The following plans were considered in the cumulative impact assessment:

- Galway County Development Plan 2022-2028.
- National Biodiversity Action Plan 2017-2021

These policies and objectives of these plans have been taken into account in this cumulative assessment.

7.10.1.2 Projects Considered in the Cumulative Impact Assessment

NatureScot guidance *"Assessing the Cumulative Impacts of onshore Wind Energy Developments"* (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 Wind Farm Site was considered a reasonable approximation of

the size of a county and a 5km radius of the Wind Farm Site was considered a reasonable approximation for the local level.

To conduct the cumulative impact assessment, Galway County Councils online planning registers, relevant EIAR (or historical EIS) documents, planning application details and planning drawings in the vicinity of the 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 for forestry and agricultural practices, other developments/land uses, and other wind farm developments.

7.10.1.3 Forestry and Agricultural Practices

Some areas within the surrounding area are planted with commercial forestry. The forestry works (felling/planting) associated with the forestry in the wider surroundings of the Proposed Project will be subject to relevant licencing and guidance from the Forestry Service.

The remaining land use in the surrounding area is predominantly agriculture in the form of livestock grazing. These applications and land uses have also been taken into account in this cumulative assessment.

7.10.1.4 Peat Extraction Activities

There is a history of peat extraction at the Wind Farm Site, which has resulted in the degradation of the habitats, including drainage, removal of vegetation and large-scale disturbance during active peat extraction periods (April-August). It is noted that cutover peatland is of low ecological value, particularly during the breeding season when disturbance is at its peak. It is noted that at the Wind Farm Site, there has been a degradation of the habitats including drainage, removal of vegetation and large-scale disturbance as a result of historical peat extraction. These applications and land uses have also been taken into account in this cumulative assessment.

7.10.1.5 Other Developments/Land Uses

The review of the Galway County Council planning register documents relevant general development planning applications in the vicinity of the proposed site of the wind farm and all its associated works, most of which relate to the provision and/or alteration of housing and agriculture-related structures. Owing to the scale and nature of these developments significant cumulative impacts are not anticipated. More detail can be found in Chapter 2, Section 2.5.

7.10.1.6 Other Wind Farm Developments

The wind farm projects within a 25-kilometre radius of the Proposed Project are provided in Table 7-11 below and are presented in terms of whether the project is permitted/operational or pending/under appeal. There are 15 existing/permitted turbines and 29 proposed turbines within a 25-kilometre radius of the proposal as detailed in Table 7-11.

Table 7-11 Wind Farms located within the wider surroundings of the Wind Farm Site.

No.	Name	County	No. of Turbines	Status	Separation Distance from nearest turbine (km)
1	Cooloo	Co. Galway	9	Proposed	5.3
2	Clooncon East	Co. Galway	1	Permitted	11.3
3	Cloonlusk	Co. Galway	2	Existing	11.6
4	Cloonascragh	Co. Galway	1	Proposed	12.2
5	Laurclavagh	Co. Galway	8	Proposed	20

No.	Name	County	No. of Turbines	Status	Separation Distance from nearest turbine (km)
6	Ballykinaca/Cuillmore	Co. Mayo	6	Existing	21.8
7	Shancloon	Co. Galway	11	Proposed	22.3
8	Cloontooa	Co. Mayo	6	Existing	23.2

The following wind farms from the wider surroundings of the Wind Farm Site were considered in further detail.

7.10.1.7 Cooloo Wind Farm

The potential for the Proposed Project to result in significant cumulative or in combination effects when assessed alongside Cooloo Wind Farm, which is c.5.3km from the Wind Farm Site was considered. Cooloo Wind Farm is at the preplanning stage and therefore no planning application has been lodged and no impact assessment has been completed. Cooloo Wind Farm is located within predominantly agricultural grassland.

7.10.1.8 Clooncon East Turbine

The potential for the Proposed Project to result in significant cumulative or in combination effects when assessed alongside Clooncon East turbine, which is c.11.3km from the Wind Farm Site was considered. The Environmental Report was reviewed on the Galway County Council website[15]. There were no Key Ornithological Receptors for the Clonberne Wind Farm observed at the development site. The Environmental Report concluded that the development "*will have no long term negative impacts on the local environment provided that all mitigation measures are implemented.*"

The planning file for amendments to this development were reviewed on the Galway Count Council[16] website. Due to the nature of the amendments, an Environmental Impact Assessment Report was not required for this application. The Appropriate Assessment Screening was consulted. The screening report concluded that the "*Amendments to the permitted single turbine development at Clooncon East is not likely to result in significant effects on Natura 2000 sites.*"

7.10.1.9 Cloonlusk Wind Farm

The potential for the Proposed Project to result in significant cumulative or in combination effects when assessed alongside Cloonlusk wind farm, which is c.11.6km from the Wind Farm Site was considered. The Further Information request for impacts on flora and fauna was consulted to determine cumulative impacts from the proposed development site[17]. This document stated that "*the grassland habitat present on the site is a wholly man-made habitat and has little national or international ecological significance*". The document outlined the species likely to occur at the wind farm site. The following Key Ornithological Receptors for Clonberne Wind Farm were mentioned: peregrine, kestrel, snipe, buzzard and sparrowhawk. Furthermore, the nature of the habitat on site, i.e., improved agricultural grassland, were widespread and abundant within the surrounding areas resulting in a predicted low effect significance for both habitat loss and displacement for all bird species within the development site. High concentrations of bird populations were not predicted to be on or near the wind farm, nor was there any evidence of regular commuting/migratory flight activity observed over the development site. It was therefore predicted that collision risk was not anticipated for any avian species at Cloonlusk.

[15] *https://www.eplanning.ie/GalwayCC/AppFileRefDetails/131139/0*
[16] *https://www.eplanning.ie/GalwayCC/AppFileRefDetails/201617/0*
[17] *https://www.eplanning.ie/GalwayCC/AppFileRefDetails/082407/0*

7.10.1.10 Cloonascragh Turbine

The potential for the Proposed Project to result in significant cumulative or in combination effects when assessed alongside the Cloonascragh turbine, which is c.12.2km from the Wind Farm Site was considered. The Environmetal Report and Ecological Impact Assessment (EIA) document were reviewed on the Galway County Council website[18]. The EIA document concluded that, with the implication of the outlined mitigation measures that "*the proposed development will not have the potential to result in significant negative residual impacts to habitats or fauna*". The document outlined the species observed at the wind farm site. The following Key Ornithological Receptors for Clonberne Wind Farm were mentioned: lapwing. Furthermore, the nature of the habitat on site, i.e., cutover bog, were widespread and abundant within the surrounding areas resulting in a predicted low, or very low, effect significance for both displacement and collision risk for lapwing within the development site and no effect for habitat loss.

7.10.1.11 Laurclavagh Wind Farm

The potential for the Proposed Project to result in significant cumulative or in combination effects when assessed alongside Laurclavagh Wind Farm, which is c.20km from the Wind Farm Site was considered. Laurclavagh Wind Farm is at the preplanning stage and therefore no planning application has been lodged and no impact assessment has been completed. Laurclavagh Wind Farm is located within predominantly agricultural grassland.

7.10.1.12 Ballykinaca/Cuillmore Wind Farm

The potential for the Proposed Project to result in significant cumulative or in combination effects when assessed alongside Ballykinaca/Cuillmore wind farm, which is c.21.8km from the Wind Farm Site was considered. The Environmental Impact Statement was reviewed on the Mayo County Council website[19]. The EIS states that "*bird survey work at the site did not indicate that there are likely to be significant negative impacts on local populations of birds species of conservation significance*". The document outlined the species observed at the wind farm site. The following Key Ornithological Receptors for Clonberne Wind Farm were mentioned: golden plover, kestrel and snipe. This EIAR assessed collision risk for the operational phase of this development. Collision risk was assessed as a long-term negligible negative impact on birds.

The cumulative assessment for the Ballykinaca/Cuillmore Wind Farm considers wind farms within a 40km-by-40km block of land around the wind farm for the assessment. It was concluded that the cumulative impact of habitat loss on birds would be negligible.

7.10.1.13 Cloontooa Wind Farm

The potential for the Proposed Project to result in significant cumulative or in combination effects when assessed alongside Cloontooa Wind Farm, which is c.23.2km from the Wind Farm Site was considered. The Environmental Impact Statement was reviewed on the Mayo County Council website[20]. The EIS concluded that "*following suggested mitigation, the potential impacts are reduced to give a negligible residual effect*". The following Key Ornithological Receptors for Clonberne Wind Farm were mentioned: kestrel and snipe. The EIS outlined that the disturbance and collision impacts on birds were of imperceptible negative magnitude.

[18] *https://www.eplanning.ie/GalwayCC/AppFileRefDetails/221175/0*
[19] *https://www.eplanning.ie/MayoCC/AppFileRefDetails/13617/0*
[20] *https://www.eplanning.ie/MayoCC/AppFileRefDetails/09663/0*

7.10.1.14 Shancloon Wind Farm

The potential for the Proposed Project to result in significant cumulative or in combination effects when assessed alongside Shancloon Wind Farm, which is c.22.3km from the Wind Farm Site was considered. Shancloon Wind Farm is at the preplanning stage and therefore no planning application has been lodged and no impact assessment has been completed. Shancloon Wind Farm is located within predominantly agricultural grassland and bog habitats.

7.10.2 Assessment of Cumulative Effects

There were ten key ornithological receptors (KOR) identified at the Wind Farm Site: golden plover, hen harrier, merlin, peregrine, whooper swan, kestrel, lapwing, snipe, buzzard, and sparrowhawk. Construction disturbance is a short-term impact and as such is not predicted to give rise to significant cumulative impacts. For most KOR species collision risk no greater than Very Low (as per Percival 2003 criteria) and Long-term Imperceptible (as per EPA 2022 criteria) were predicted. Cumulative collision risk is therefore not considered further given these predicted impacts are effectively zero. The collision risk for lapwing and snipe was also predicted to be a very rare event (i.e. Low (as per Percival 2003 criteria) and Long-term Slight (as per EPA 2022 criteria)), however as these two species had the highest risk of a collision cumulative impacts for collision risk are addressed below.
Following NatureScot (2012) guidance, the cumulative impact assessment has been carried out at the scale of the importance rating of the receptor: National Importance (hen harrier); County Importance (golden plover, merlin, peregrine, whooper swan, lapwing,); and Local Importance Higher Value (kestrel, snipe, buzzard and sparrowhawk). For the purposes of this cumulative assessment, the local scale is considered to be a 5km radius of the Wind Farm Site. A 25km radius has been used to approximate the county scale[21]. There are only four wind farms and two one-off turbine within 25km of the Wind Farm Site. The assessment of cumulative effects on key ornithological receptors is provided in sections below. In particular, cumulative habitat loss and displacement associated with operational turbines is assessed.

7.10.2.1 Golden Plover (County Importance)

The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered.

The potential for developments at a county scale (within 25km) to result in significant cumulative or in combination effects when assessed alongside the Proposed Project were considered. Cooloo, Laurclavagh, Shancloon, Clooncon East, Cloonlusk, Ballykinaca/Cuillmore and Cloontooa are all location within, or partially within agricultural grassland habitats. Cooloo, Cloonascragh, Shancloon and Cloontooa are located within, or partially within bog habitats. Both of these habitat types are suitable for foraging and roosting golden plover. However, these habitats are not considered to be a scarce resource in the area and in particular agricultural grassland (which is favoured by foraging golden plover) is abundant locally. As provided in Figure 14-20 of EIAR Chapter 14 there is a low density of turbines within 25km of the Wind Farm Site, such that extensive areas of suitable foraging habitat will remain post construction, and there will be a continuing abundance of suitable habitat in the surrounding area.

One wind energy development was located within the maximum foraging range of golden plover. The maximum foraging range of wintering golden plover is 12km (Gillings and Fuller, 1999). The closest wind farm to the Proposed Project is the proposed Cooloo Wind Farm, which is within 5.3km of the Wind Farm Site. However, this development is in the pre-planning stage and no survey data is available. Furthermore, Clooncon East and Cloonlusk are within the wintering foraging range of the

[21] *Rationale: as bird movements are not influenced by county boundaries, it was necessary to choose a reasonable approximation of the area of a county. A 25km radius of the wind farm is a reasonable approximation of the county scale for the assessment.*

Wind Farm Site. However, given the location of the wind farm, and the lack of significant residual impacts on this species, no significant impacts on this species were identified.

No significant impacts on this species were identified at the local scale (5km), given that there are no turbines located within 5km of the Wind Farm Site. Furthermore, no significant effects were reported for any of the wind farms located within a 25km radius (county scale) of the Wind Farm Site.

Peat extraction is likely a cause of habitat loss and disturbance locally and the habitat is likely to alter following the cessation of peat extraction. It is likely that peat extraction will either cease or reduce considerably during the early years of the operation of the wind farm. The Site is likely to then revegetate resulting in the development of scrub habitat. Independent of a successful grant of the Proposed Project, this site is likely to become increasingly unsuitable for this open habitat species. Therefore, significant cumulative effects are not anticipated.

Taking into consideration the above and the predicted effects with the Proposed Project, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.
Significant cumulative impacts are not predicted.

7.10.2.2 Hen Harrier (National Importance)

Article 12 reporting includes a description of threats and pressures acting on hen harrier. The impacts associated with wind farms (renewable abiotic energy use) are classified as of medium importance. However, in this part of the country this is not considered a key issue for the species. As provided in Table 7-11 above and Figure 14-20 of EIAR Chapter 14 there is a low density of turbines within 25km of the proposed wind farm site.

The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered.

The potential for developments at a county scale (within 25km) to result in significant cumulative or in combination effects when assessed alongside the Proposed Project were considered. Cooloo, Laurclavagh, Shancloon, Clooncon East, Cloonlusk, Ballykinaca/Cuillmore and Cloontooa are all location within, or partially within agricultural grassland habitats. This habitat is of limited value to foraging and roosting hen harrier, therefore significant cumulative impacts with these developments is not anticipated. Cooloo, Cloonascragh, Shancloon and Cloontooa are located within, or partially within bog habitats. This habitat is suitable for foraging and roosting hen harrier. However, bog habitats are not considered to be a scarce resource in the area. As provided in Figure 14-20 of EIAR Chapter 14 there is a low density of turbines within 25km of the proposed wind farm site, such that extensive areas of suitable foraging and roosting habitat will remain post construction, and there will be a continuing abundance of suitable habitat in the surrounding area.

One wind energy development was located within the maximum foraging range of hen harrier. The core foraging range of hen harrier is 2km, with a maximum foraging range of 10km (NatureScot, 2016). The proposed Cooloo Wind Farm is within 10km of the Wind Farm Site. However, this development is in the pre-planning stage and no survey data is available. However, given the location of the wind farm, and the lack of significant residual impacts on this species, no significant impacts on this species were identified.

No significant impacts on this species were identified at the local scale (5km), given that there are no turbines located within 5km of the Wind Farm Site. Furthermore, no significant effects were reported for any of the wind farms located within a 25km radius (county scale) of the Wind Farm Site.

Taking into consideration the above reported effects and the predicted effects with the Proposed Project, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted.

7.10.2.3 Merlin (County Importance)

The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered.

The potential for developments at a county scale (within 25km) to result in significant cumulative or in combination effects when assessed alongside the Proposed Project were considered. Cooloo, Laurclavagh, Shancloon, Clooncon East, Cloonlusk, Ballykinaca/Cuillmore and Cloontooa are all location within, or partially within agricultural grassland habitats. This habitat is of limited value to foraging and breeding merlin, therefore significant cumulative impacts with these developments is not anticipated. Cooloo, Cloonascragh, Shancloon and Cloontooa are located within, or partially within bog habitats. This habitat type is suitable for foraging and breeding merlin. However, bog habitats are not considered to be a scarce resource in the area. Extensive areas of suitable foraging and breeding habitat will remain post construction, and there is an abundance of suitable habitat in the surrounding area. In the specific case of the proposed Wind Farm Site, the bog habitat is of limited ecological value due to the cutover nature of the habitats and the related disturbance associated with the peat extraction. Once peat extraction ceases the Site is likely to become increasingly unsuitable for merlin with the encroachment of woody vegetation (woodland/scrub is likely to proliferate).
The core foraging range of merlin is 5km (NatureScot, 2016). There are no wind farms within 5km of the proposed Clonberne Wind Farm. No significant impacts on this species were identified at the local scale (5km), given that there are no turbines located within 5km of the Wind Farm Site. Furthermore, no significant effects were reported for any of the wind farms located within a 25km radius (county scale) of the Wind Farm Site.

Taking into consideration the above reported effects and the predicted effects with the Proposed Project, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted.

7.10.2.4 Peregrine (County Importance)

The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered.

The potential for developments at a county scale (within 25km) to result in significant cumulative or in combination effects when assessed alongside the Proposed Project were considered. Cooloo, Laurclavagh, Shancloon, Clooncon East, Cloonlusk, Ballykinaca/Cuillmore and Cloontooa are all location within, or partially within agricultural grassland habitats. This habitat is of limited value to foraging peregrine, therefore significant cumulative impacts with these developments is not anticipated. Cooloo, Cloonascragh, Shancloon and Cloontooa are located within, or partially within bog habitats. This habitat type is suitable for foraging peregrine. However, bog habitats are not considered to be a scarce resource in the area. Extensive areas of suitable foraging and breeding habitat will remain post construction, and there is an abundance of suitable habitat in the surrounding area.

The maximum foraging range of peregrine is 18km (NatureScot, 2016). There are four wind energy developments located within the maximum foraging range of peregrine. The proposed Cooloo wind farm, the Clooncon East turbine, the Cloonlusk wind farm and the Cloonascragh turbine are all located within 18km of the Wind Farm Site. No significant impacts on peregrine were anticipated from any of

these developments. Furthermore, the Cloncoon East Turbine, the Cloonlusk Wind Farm and the majority of the Cooloo Wind Farm turbines are located within improved agricultural grassland, a habitat of limited ecological value for peregrine.

No significant impacts on this species were identified at the local scale (5km), given that there are no turbines located within 5km of the Wind Farm Site. Furthermore, no significant effects were reported for any of the wind farms located within a 25km radius (county scale) of the Wind Farm Site.

Taking into consideration the above reported effects and the predicted effects with the Proposed Project, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted.

7.10.2.5 Whooper Swan (County Importance)

The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered.

The potential for developments at a county scale (within 25km) to result in significant cumulative or in combination effects when assessed alongside the Proposed Project were considered. Cooloo, Laurclavagh, Shancloon, Clooncon East, Cloonlusk, Ballykinaca/Cuillmore and Cloontooa are all location within, or partially within agricultural grassland habitats. Cooloo, Cloonascragh, Shancloon and Cloontooa are located within, or partially within bog habitats. Both of these habitat types are suitable for foraging and roosting whooper swan, particularly where winter flooding occurs. However, these habitats are not considered to be a scarce resource in the area. Extensive areas of suitable foraging habitat will remain post construction (e.g. the abundant local grassland), and there is an abundance of suitable roosting habitat in the surrounding area (e.g. the many local turloughs).

There were no wind energy developments located within the foraging range of whooper swan. The core foraging range of whooper swan is 5km (NautreScot, 2016). There are no wind farms within 5km of the proposed Clonberne Wind Farm.

No significant impacts on this species were identified at the local scale (5km), given that there are no turbines located within 5km of the Wind Farm Site. Furthermore, no significant effects were reported for any of the wind farms located within a 25km radius (county scale) of the Wind Farm Site.

Taking into consideration the above reported effects and the predicted effects with the Proposed Project, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted.

7.10.2.6 Kestrel (Local Importance)

The potential for local developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered.

There were no wind energy developments located within the foraging range of kestrel. The core foraging range of kestrel is 1.8km (based off a maximum home range of 10km^2 (Village, 1990)). There are no wind farms within 1.8km of the proposed Clonberne Wind Farm. Furthermore, the Wind Farm Site is predominantly in a cutover bog with a mixture of agricultural grassland and forestry habitats throughout, habitat types that are predominantly utilized for hunting and/or nesting. However, these habitat types are not rare locally. Therefore, significant cumulative impacts are not predicted.

No significant impacts on this species were identified at the local scale (5km), given that there are no turbines located within 5km of the Wind Farm Site. Furthermore, no significant effects were reported for any of the wind farms located within a 25km radius (county scale) of the Wind Farm Site.

Taking into consideration the above reported effects and the predicted effects with the Proposed Project, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted.

7.10.2.7 Lapwing (County Importance)

The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered.

All of the wind farms within 25km of the Wind Farm Site are located within habitats suitable for foraging and breeding lapwing (farmland and bog habitats). However, given the separation distance and that these habitats are not considered to be a scarce resource within 25km of the Wind Farm Site, significant cumulative impacts are not anticipated.

No significant impacts on this species were identified at the local scale (5km), given that there are no turbines located within 5km of the Wind Farm Site. Furthermore, no significant effects were reported for any of the wind farms located within a 25km radius (county scale) of the Wind Farm Site. Furthermore, no significant collision risk was anticipated at any of the wind farms located within a 25km radius of the Wind Farm Site, based on a review of the relevant application documents.

Peat extraction is likely a cause of habitat loss and disturbance locally and the habitat is likely to alter following the cessation of peat extraction. It is likely that peat extraction will either cease or reduce considerably during the early years of the operation of the wind farm. The Site is likely to then revegetate resulting in the development of scrub habitat. Independent of a successful grant of the Proposed Project, this site is likely to become increasingly unsuitable for this open habitat species. Therefore, significant cumulative effects are not anticipated.

Taking into consideration the above reported effects and the predicted effects with the Proposed Project, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted.

7.10.2.8 Snipe (County Importance)

The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered.

The potential for developments at a county scale (within 25km) to result in significant cumulative or in combination effects when assessed alongside the Proposed Project were considered. Cooloo, Laurclavagh, Shancloon, Clooncon East, Cloonlusk, Ballykinaca/Cuillmore and Cloontooa are all location within, or partially within agricultural grassland habitats. Cooloo, Cloonascragh, Shancloon and Cloontooa are located within, or partially within bog habitats. Both of these habitat types are suitable for foraging snipe. However, these habitats are not considered to be a scarce resource in the area. Extensive areas of suitable foraging habitat will remain post construction, and there is an abundance of suitable habitat in the surrounding area. In the specific case of the Wind Farm Site, the bog habitat is of limited ecological value due to the cutover nature of the habitats and the related disturbance associated with the peat extraction. Once peat extraction ceases, the Site is likely to become increasingly

unsuitable for snipe with the encroachment of woody vegetation (woodland/scrub is likely to proliferate).

No significant impacts on this species were identified at the local scale (5km), given that there are no turbines located within 5km of the Wind Farm Site. Furthermore, no significant effects were reported for any of the wind farms located within a 25km radius (county scale) of the Wind Farm Site. Furthermore, no significant collision risk was anticipated at any of the wind farms located within a 25km radius of the Wind Farm Site.

Taking into consideration the above reported effects and the predicted effects with the Proposed Project, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted.

7.10.2.9 Buzzard (Local Importance)

The potential for local developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered.

There were no wind energy developments located within the foraging range of buzzard. The core foraging range of buzzard is 1km (based off a maximum home range of 3km^2 (Walls & Kenward, 2001)). There are no wind farms within 1km of the proposed Clonberne Wind Farm. Furthermore, the Wind Farm Site is predominantly in a cutover bog with a mixture of agricultural grassland and forestry habitats throughout, habitat types that are predominantly utilized for hunting and/or nesting. However, these habitat types are not rare locally. Therefore, significant cumulative impacts are not predicted.

No significant impacts on this species were identified at the local scale (5km), given that there are no turbines located within 5km of the Wind Farm Site. Furthermore, no significant effects were reported for any of the wind farms located within a 25km radius (county scale) of the Wind Farm Site.

Taking into consideration the above reported effects and the predicted effects with the Proposed Project, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted.

7.10.2.10 Sparrowhawk (Local Importance)

The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered.

There were no wind energy developments located within the foraging range of sparrowhawk. The core foraging range of sparrowhawk is 3.3km (based on a maximum home range of 3,528ha (Marquiss and Newton, 1981)). There are no wind farms within 3.3km of the proposed Clonberne Wind Farm. Furthermore, the Wind Farm Site is predominantly in a cutover bog with a mixture of agricultural grassland and forestry habitats throughout, habitat types that are predominantly utilized for hunting and/or nesting. However, these habitat types are not rare locally. Therefore, significant cumulative impacts are not predicted.

No significant impacts on this species were identified at the local scale (5km), given that there are no turbines located within 5km of the Wind Farm Site. Furthermore, no significant effects were reported for any of the wind farms located within a 25km radius (county scale) of the Wind Farm Site.

Taking into consideration the above reported effects and the predicted effects with the Proposed Project, no residual additive, antagonistic or synergistic effects have been identified with regard to habitat loss, displacement or collision mortality.

Significant cumulative impacts are not predicted.

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. A comprehensive suite of bird surveys was undertaken at the Proposed Project which have informed the impact assessment.

Provided that the Proposed Project is constructed, operated and decommissioned in accordance with the design, best practice and mitigation that is described within this application, significant individual or cumulative effects on ornithology are not anticipated at the international, national or county scales or on any of the identified KORs.