

7. ORNITHOLOGY

7.1 Introduction

This chapter assesses the likely significant impacts of the Borrisbeg Renewable Energy Development (hereafter the “Proposed Project”) on avian receptors. Particular attention has been paid to bird species with national and international protection under the Irish Wildlife Acts 1976-2022 and the European Union (EU) Birds Directive (2009/147/EC). Where potential impacts on avian receptors are identified, mitigation is described and the residual effects are assessed.

This chapter is supported by Technical Appendices 7-1 to 7-5, which contain data from the ornithological surveys undertaken at the Site, including full details of the survey effort, weather conditions and bird records. Appendix 7-6 contains the results of the collision risk assessment. Finally, Appendix 7-7 presents the proposed Bird Mitigation Plan and Appendix 7-8 presents the proposed Bird Monitoring Programme.

The chapter is structured as follows:

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

For the purposes of this EIAR:

- The ‘**Proposed Wind Farm**’ refers to the 9 no. turbines and supporting infrastructure which is the subject of this Section 37E application.
- The ‘**Proposed Grid Connection**’ refers to the 110kV substation and supporting infrastructure which will be the subject of a separate Section 182A application.
- The ‘**Proposed Project**’ comprises the Proposed Wind Farm and the Proposed Grid Connection, all of which are located within the EIAR Study Boundary (the ‘**Site**’) and assessed together within this EIAR.

Please see section 1.1.1 of this EIAR for further details. A detailed description of the Proposed Project is provided in Chapter 4 of this EIAR.

The following other definitions are used in this chapter:

- The ‘**Zone of Influence**’ (ZOI) for individual ornithological receptors refers to the area within which potential effects are anticipated. ZOIs differ depending on the sensitivities of particular species and were assigned in accordance with best available guidance (SNH, 2016 and McGuinness et al., 2015), adopting a precautionary approach.
- ‘**Key Ornithological Receptor**’ (KOR) is defined as a species occurring within the ZOI of the Proposed Project upon which potential impacts are anticipated and assessed.

7.1.1 Description of the Proposed Project

A full description of the Proposed Wind Farm is provided in Chapter 4 of this EIAR. In brief, the Applicant is seeking a 10-year planning permission under Section 37E of the Planning and Development Act 2000, as amended, for a Proposed Wind Farm which comprises nine turbines and the associated meteorological mast, temporary construction compound and security cabin, temporary borrow pit, ancillary infrastructure, underground cabling and junction accommodation works. The turbines will be 103.5m at hub height, with 3 blades forming a rotor diameter of 163m, giving a maximum turbine tip height of 185m and minimum rotor height of 22m and will have an operational life of 30 years from the date of commissioning.

The Proposed Grid Connection consisting of a permanent onsite 110kV substation, c.2km underground grid connection cable route, temporary construction compound and loop-in loop-out connection to the existing 110kV Ikerrin to Thurles overhead line, will be subject of a separate application to An Bord Pleanála under Section 182A of the Planning and Development Act 2000, as amended. Both the Proposed Wind Farm and the Proposed Grid Connection infrastructure (i.e. the Proposed Project) are assessed throughout this EIAR.

7.1.2 Legislation, Guidance and Policy Context

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

- Irish Wildlife Acts 1976 to 2022. The original Act of 1976 (39/1976) was amended in 2000 (38/2000), 2010 (19/2010), 2012 (29/2012) and 2022 (485/2022), as well as in Part 3 of the Heritage Act 2018 (15/2018), Part 2 Chapter 3 of the Planning and Development, Heritage and Broadcasting (Amendment) Act 2021 (11/2021) and in the Flora (Protection) Order 2022 (235/2022).
- The Birds Directive (EU Directive 2009/147/EC on the conservation of wild birds)
- The European Communities (Birds and Natural Habitats) Regulations 2011, as amended (S.I. no. 477 of 2011). These regulations transpose the EU Birds Directive into Irish law. The regulations were amended in 2013 (290/2013 and 499/2013), 2015 (355/2015) as well as Chapter 4 of the Planning, Heritage and Broadcasting (Amendment) Act 2021 (11/2021) and in 2021 (293/2021).
- The International Convention on Wetlands of International Importance (the Ramsar Convention), 1971. This convention protects 45 wetland sites of significant value for nature in Ireland.

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

- SNH (2000). Wind farms and birds: calculating a theoretical collision risk assuming no avoidance action. Scottish Natural Heritage, Inverness, Scotland. Available at: <https://www.nature.scot/sites/default/files/2017-09/Guidance%20Note%20-%20Windfarms%20and%20birds%20-%20Calculating%20a%20theoretical%20collision%20risk%20assuming%20no%20avoiding%20action.pdf>
- SNH (2009). Monitoring the impact of onshore wind farms on birds. Scottish Natural Heritage, Inverness, Scotland. Available at: <https://www.nature.scot/sites/default/files/2017-09/Guidance%20Note%20-%20Monitoring%20the%20impact%20of%20onshore%20windfarms%20on%20birds.pdf>
- SNH (2016). Assessing connectivity with Special Protection Areas (SPAs). Scottish Natural Heritage, Inverness, Scotland. Available at: <https://www.nature.scot/sites/default/files/2018-08/Assessing%20connectivity%20with%20special%20protection%20areas.pdf>
- SNH (2017). Recommended bird survey methods to inform impact assessment of onshore wind farms. Scottish Natural Heritage, Inverness, Scotland. Available at: <https://www.nature.scot/sites/default/files/2018-06/Guidance%20Note%20-%20Recommended%20bird%20survey%20methods%20to%20inform%20impact%20assessment%20of%20onshore%20windfarms.pdf>
- SNH (2018a) Avoidance rates for the onshore SNH wind farm collision risk model. Scottish Natural Heritage, Inverness, Scotland. Available at: <https://www.nature.scot/sites/default/files/2018-09/Wind%20farm%20impacts%20on%20birds%20-%20Use%20of%20Avoidance%20Rates%20in%20the%20SNH%20Wind%20Farm%20Collision%20Risk%20Model.pdf>
- SNH (2018b). Assessing the cumulative impacts of onshore wind farms on birds. Scottish Natural Heritage, Inverness, Scotland. Available at: <https://www.nature.scot/sites/default/files/2018-08/Guidance%20-%20Assessing%20the%20cumulative%20impacts%20of%20onshore%20wind%20farms%20on%20birds.pdf>
- SNH (2018c). Assessing significance of impacts from onshore wind farms out with designated areas. Scottish Natural Heritage, Inverness, Scotland. Available at: <https://www.nature.scot/doc/guidance-assessing-significance-impacts-bird-populations-onshore-wind-farms-do-not-affect-protected>

The following Irish guidance documents were also consulted:

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

Furthermore, this assessment has been prepared with respect to the various planning policies and strategy guidance documents listed below:

- 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 Act 2000 (as amended).
- NRA (2009). Guidelines for Assessment of Ecological Impacts of National Road Schemes. National Roads Authority, Ireland.
- EPA (2022). Guidelines on the information to be contained in Environmental Impact Statement reports. Environmental Protection Agency, Johnstown Castle Estate, Wexford.
- DoHPLG (2018). Guidelines for planning authorities and An Bord Pleanála on carrying out Environmental Impact Assessment. Department of Housing, Planning and Local Government, Government of Ireland, Dublin.
- Tipperary County Development Plan 2022-2028.

7.1.3

Statement of Authority and Competence

This ornithology chapter has been prepared by Róisín Towe (BSc.), Project Ornithologist of MKO and reviewed by Susan Doyle (PhD), Senior Ornithologist. Both are suitably qualified ornithologists with experience in completing avifaunal assessments and competent experts for the purposes of the preparation of this EIAR. Róisín holds a BSc in Zoology. She has over 2 years' experience in ecological consultancy, and has worked on wind farm projects, public infrastructure projects and conservation projects. Susan holds a PhD in Ecology. She has 7 years' experience in ecological consultancy and has worked on wind farm projects, residential developments, data centres, county council projects and conservation projects, including the preparation of EIARs.

The scope of works and survey methodology was devised by Padraig Cregg (MSc.) and is fully compliant with recent NatureScot guidance (SNH, 2017). Padraig holds a MSc in Ecology. He has over 11 years' experience in environmental consultancy, and experience taking projects through their full lifecycle - from site selection through survey design, constraints studies, impact assessment and lodgement of the planning application. Field surveys were undertaken by Padraig Webb (BSc.), Sean O'Brien (BSc.), Geoffrey Hunt, Kristina O'Connor (MSc.), Mike Sylvia (BSc.), John Hehir (BSc.), James O'Mahony (MSc.), Tom Rea (BSc.), Róisín Towe (BSc.), Kathryn Sheridan (MSc.), Jamie Quirke (MSc.), Sheriene Acun (BSc.), Ian Hynes (BSc.) and Tom Ryan (PgDip/MSc.). All surveyors are suitably qualified for the purposes of the data collection for this EIAR.

7.2 Assessment Approach and Methodology

7.2.1 Desk Study

A comprehensive desk study was undertaken to search for any relevant information on species of conservation concern that may use the Site. The assessment included a thorough review of the available ornithological data including:

- Designated sites within the likely ZOI of the Proposed Project;
- Bird atlases;
- Bird sensitivity mapping tool;
- Online web-mappers from the National Biodiversity Data Centre;
- Irish Wetland Bird Survey data;
- Review of specially requested records from the National Parks and Wildlife Service (NPWS) Rare and Protected Species Database.

7.2.2 Consultation

Consultation was undertaken with the relevant statutory and non-statutory organisations as part of the EIAR scoping to inform the current assessment. Full details can be found in Chapter 2 of this EIAR. Table 7-1 Consultation responses. Table 7-1 below 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. Chapter 2 describes where the comments raised in the scoping responses received have been addressed.

Table 7-1 Consultation responses

	Consultee	Response
01	An Taisce	Acknowledgement response received on 28 October 2022 and noted that resources to respond are limited.
02	BirdWatch Ireland	Acknowledgement response received on 28 October 2022 and noted that resources to respond are limited.
03	Department of Agriculture, Food and the Marine	No response to date.
04	Department for Environment, Climate and Communications	Response received on 01 December 2022 from Geological Survey Ireland. No response to date from other divisions within the Department.
05	Department of Tourism, Culture, Arts, Gaeltacht, Sport and Media	No response to date.
06	Irish Raptor Study Group	No response to date.
07	Irish Wildlife Trust	Acknowledgement response received on 01 November 2022 and noted that resources to respond are limited.
08	Tipperary County Council	Response received on 26 April 2023. No ornithological issues were raised.
09	The Heritage Council	No response to date
10	National Parks and Wildlife Service	Response received on 26 April 2023. No ornithological issues were raised. Meeting held 13 June 2023. No ornithological issues raised.

7.2.3 Identification of Target Species and Key Ornithological Receptors

Following a comprehensive desk study, initial site visits and consultation, a list of ‘target species’ likely to occur in the ZOI of the Site was compiled. Bird surveys conducted were then specifically designed to survey for these target species, in accordance with SNH (2017). The target species list was drawn from:

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

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

7.2.4 Field Surveys

Field surveys were undertaken during the survey period September 2020 to September 2023, consisting of three breeding seasons (April – September) and three non-breeding seasons (October – March). Based on the results of the desk study, consultation and reconnaissance field visits described in the previous sections (Section 7.2.1 to 7.2.3), the assemblage of bird species in the Site and the likely importance of the Site for these species was ascertained. Then, adopting a precautionary approach, a site-specific scope for ornithological surveys was devised. The data provided in the field surveys is robust and allows clear, precise and definitive conclusions to be made on the avian receptors identified within the Site.

The survey work that was undertaken between September 2020 and September 2023 forms the core dataset for the assessment of impacts on ornithology. In the absence of specific national bird survey guidelines, the ornithological surveys were designed and undertaken in full accordance with the guidance document ‘Recommended bird survey methods to inform impact assessment of onshore wind farms’ (SNH, 2017). The various ornithological surveys undertaken at the Site and hinterland are described in detail below. In these sections, the ornithology study area was defined as a 500m radius of the potential turbine positions. The c.2km Proposed Grid Connection underground cable route was surveyed as part of a multidisciplinary walkover (described in Chapter 6 of this EIAR).

7.2.4.1 Vantage Point Surveys

Vantage point surveys were undertaken in accordance with SNH (2017) to monitor flight activity within the ornithology study area. Surveys were conducted from 3 fixed point vantage points with comprehensive coverage of this survey area (Figure 7-1). The vantage point locations were selected by undertaking a viewshed analysis (described below) and confirmed by a reconnaissance visit and initial field surveys to ensure that the proposed turbine layout was entirely covered.

Viewsheds were calculated using Resoft Wind Farm ZTV (Zone of Theoretical Visibility) software in combination with Mapinfo Professional (Version 10.0) using a notional layer suspended at 20m, which is representative of the minimum height considered for the Potential Collision Risk Area based on the turbine model at the time the vantage point locations were selected. Note that while the relevance of being able to view as much of the site to ground level is acknowledged, the NatureScot guidance emphasises the importance of visibility of the ‘collision risk volume’ when the data is to be used to estimate the risk of collision with turbines by birds. Therefore, the viewshed analysis aims to identify the most suitable locations to site vantage points such that the airspace of the turbine rotor swept area is in view using the fewest possible number of vantage points. The vantage point locations were tested for visibility coverage by creating a viewshed point 1.75m in height (to represent the height of observer) on a map using 10m contours terrain data. The relative height of any surrounding trees and their effects on visibility

are also accounted for in the analysis. Using the ZTV software, a viewshed of 360° was produced calculating an area 20m from ground level up to a 2km radius. The resulting viewshed image was then cropped to 180° to give the viewshed. The reconnaissance visit to the Site confirmed that the lowest swept height of the existing turbines was visible from the vantage points present in Figure 7-1. The visible viewsheds as modelled by software are presented in Figure 7-2.

Survey methodology followed SNH (2017). The surveyor collected data on bird observations and flight activity from the scanning arc of 180° to a 2km radius at the fixed vantage point locations for two 3 hour watches separated by a minimum 30 minute break (i.e. 6 hours total) per month. Surveys were conducted monthly throughout the survey period, and were scheduled to provide a minimum of 36 hours per winter or breeding season and spread over the full daylight period, including dawn and dusk watches to coincide with the highest periods of bird activity (Table 7-2).

Table 7-2 Vantage point survey watch duration

Survey Season and Number of Vantage Points (VPs)	Effort per Vantage Point (VP)
September 2020 & Winter Season 2020/2021 (3 VPs)	42 hours per VP
Breeding Season 2021 (3 VPs)	36 hours per VP
Winter Season 2021/2022 (3 VPs)	36 hours per VP
Breeding Season 2022 (3 VPs)	36 hours per VP
Winter Season 2022/2023 (3 VPs)	36 hours per VP
Breeding Season 2023 (3 VPs)	36 hours per VP

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 0-15m, 15-25m, 25-200m and >200m. All flight activity within height bands 15-25m and 25-200m is considered to be within the Potential Collision Height (PCH) with regard to the turbine swept area. 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, including full details of dates, times and weather conditions.

7.2.4.2 Winter Walkover Surveys

Winter walkover surveys were undertaken to record the presence of bird species within the ornithology study area to a 500m radius, including areas between vantage point locations. The methodology was adapted from the breeding walkover methodology outlined in O'Brien and Smith (1992) and Gilbert *et al.* (1998) combined with Common Bird Census methods (British Trust for Ornithology, 2021). Transect routes were walked across different habitat complexes within this survey area where access allowed. All target species were recorded and mapped. In addition, the presence of any non-target species was recorded to inform the evaluation of supporting habitat.

Winter walkover surveys (consisting of 5 transects) were conducted in daylight hours over four visits between October and March (i.e. four visits in winter 2020/2021, four visits in winter 2021/2022 and four visits in winter 2022/2023). Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions for each survey. Figure 7-3 shows the transect routes.

7.2.4.3 Breeding Walkover Surveys

Breeding walkover surveys were undertaken to determine possible, probable or confirmed breeding bird activity within the ornithology study area to a 500m radius. The methodology was based on O'Brien and

Smith (1992) and Gilbert *et al.* (1998), combined with Common Bird Census methods (British Trust for Ornithology, 2021) for dense habitat. Transect routes were walked across different habitat complexes within this survey area where access allowed. Using binoculars, the surveyor regularly scanned the surroundings of each transect for target species. All target species were mapped and breeding status was assigned following British Trust for Ornithology (BTO) breeding status codes (<https://www.bto.org/our-science/projects/birdatlas/methods/breeding-evidence>). In addition, the presence of any non-target species was recorded to inform the evaluation of supporting habitat.

Breeding walkover surveys (consisting of 5 transects) were conducted during daylight hours over four visits during the core breeding season months April to July. Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions for each survey. Figure 7-3 shows the transect routes.

7.2.4.4 Waterbird Distribution Surveys

For the purposes of these surveys, waterbirds include: swans, geese and ducks; cormorant, shag, divers and grebes; auks and seabirds; gulls, terns and skuas; herons, egrets and crane; rails and crakes; waders; kingfisher; and the species grey wagtail and dipper as these have strong associations with aquatic habitats. Significant wetlands and waterbodies within 1km of the ornithology study area and any notable wetlands close to the 1km radius were surveyed for waterbirds during the 2020/2021, 2021/2022 and 2022/2023 winter and passage seasons (August to May inclusive, between September 2020 and May 2023) to provide information on their distribution in relation to the Site. The area surveyed follows the 500m radius for foraging waterbirds and 1km radius for roosting waterbirds guidelines in SNH (2017) and the recommendations of SNH (2016).

Survey methodology followed Gilbert *et al.* (1998) and the Irish Wetland Bird Survey (BirdWatch Ireland, 2021). Surveys were undertaken during daylight hours from suitable vantage points at wetlands and waterbodies. All target waterbird species were recorded and mapped. Survey effort, including details of survey duration and weather conditions, is presented in Appendix 7-2. Figure 7-4 shows the surveyed area.

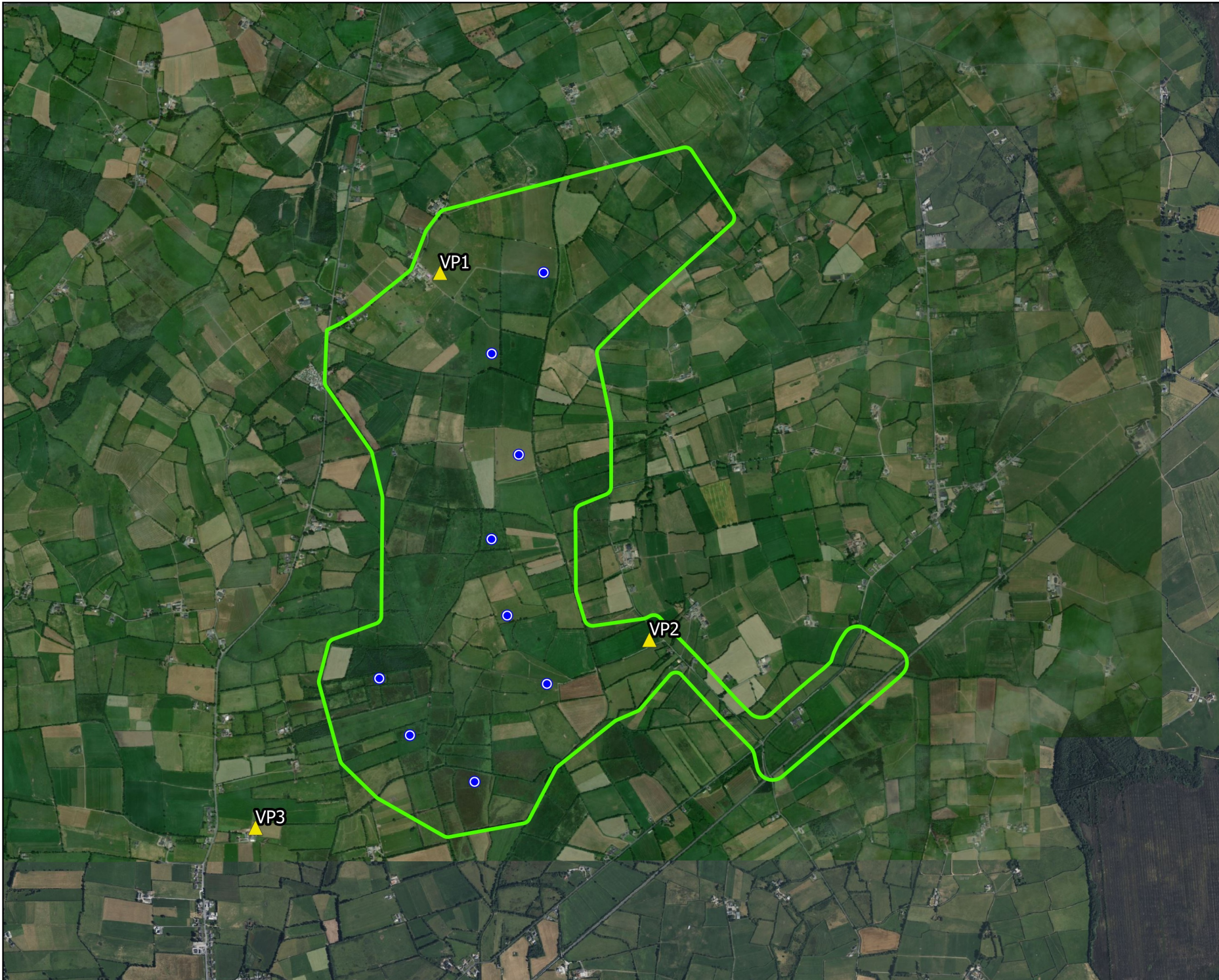
7.2.4.5 Breeding Raptor Surveys

Raptors include all harrier, falcon, buzzard, eagle, hawk, owl, kite and osprey species. Breeding raptor surveys were undertaken within the ornithology study area to a 2km radius and any notable habitats close to the 2km radius to identify occupied territories and monitor their breeding success near or within the Site. Survey methodology followed Hardey *et al.* (2013). Breeding raptor watches of 3 hours (supplemented by transects if necessary) were conducted during daylight at six breeding raptor (BR) locations in this survey area. Watches were conducted at four breeding raptor locations during the first survey in April 2021 and subsequently increased to six on gaining knowledge of where raptors were active. In May 2023, BR5 was moved to target a potential breeding owl location, but no breeding was observed so the surveyor returned to the original location for subsequent surveys. All raptor species observed were recorded and mapped and breeding status was assigned following BTO breeding status codes. Surveyors did not approach nest sites to avoid disturbance.

Breeding raptor locations were surveyed once per month during the core breeding season between April and July. Survey effort is presented in Appendix 7-2, including full details of dates, times and weather conditions. Figure 7-5 shows the breeding raptor locations.

7.2.4.6 Multidisciplinary Walkover Survey

The Proposed Grid Connection cabling route was surveyed in August and October 2022, and April and May 2023 through multidisciplinary walkover surveys. The route was systematically walked, while the surveyor recorded a range of species, including birds. Further details on this survey are available in Chapter 6 of this EIAR.



Map Legend

- EIA Study Boundary
- Proposed Turbine Locations
- ▲ Vantage Point

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Drawing Title
Vantage Point Locations

Project Title
Borrisbeg Wind Farm

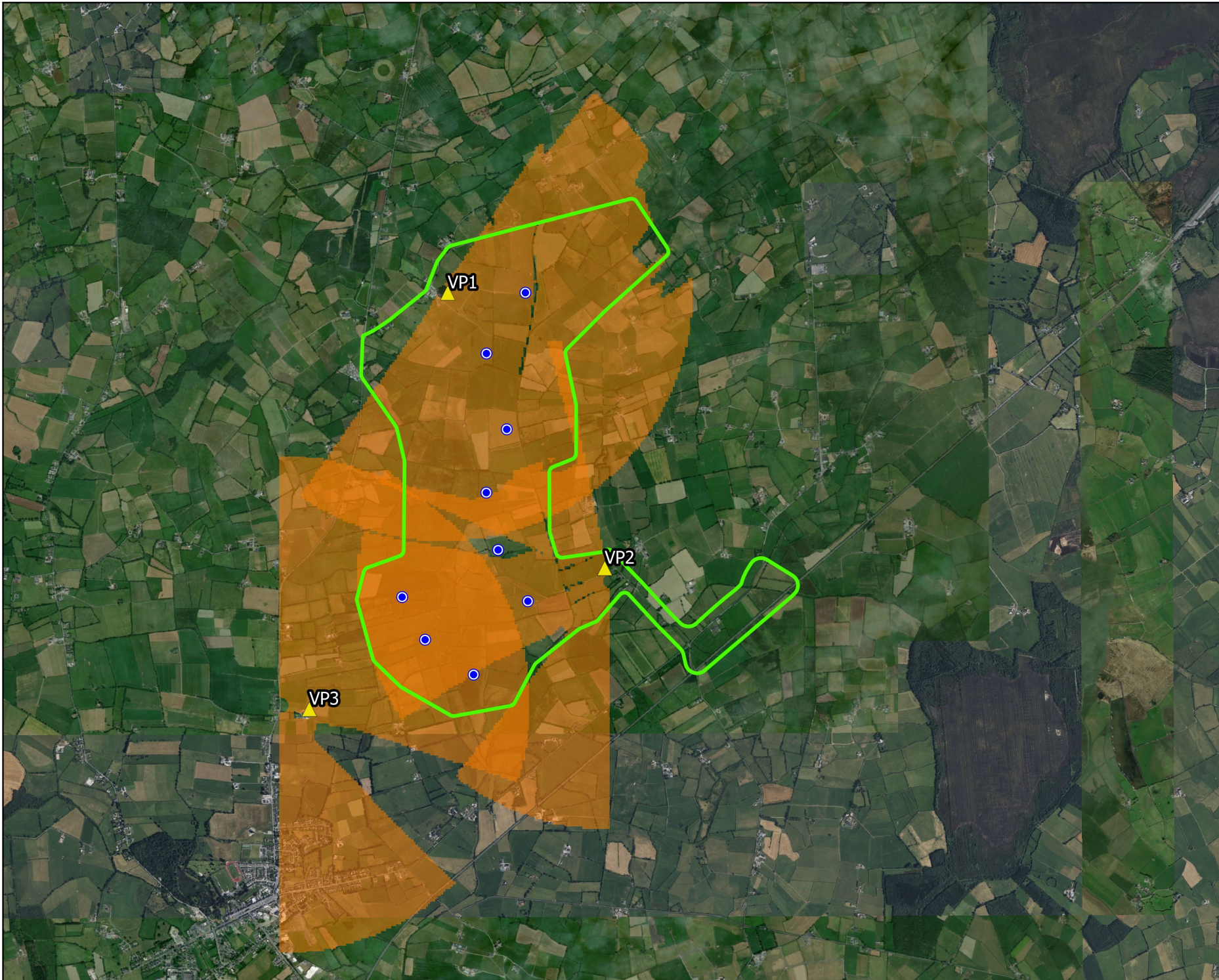
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Map Legend

-  EIA Study Boundary
-  Proposed Turbine Locations
-  Vantage Point
-  Viewshed



Drawing Title
Vantage Point Viewsheds

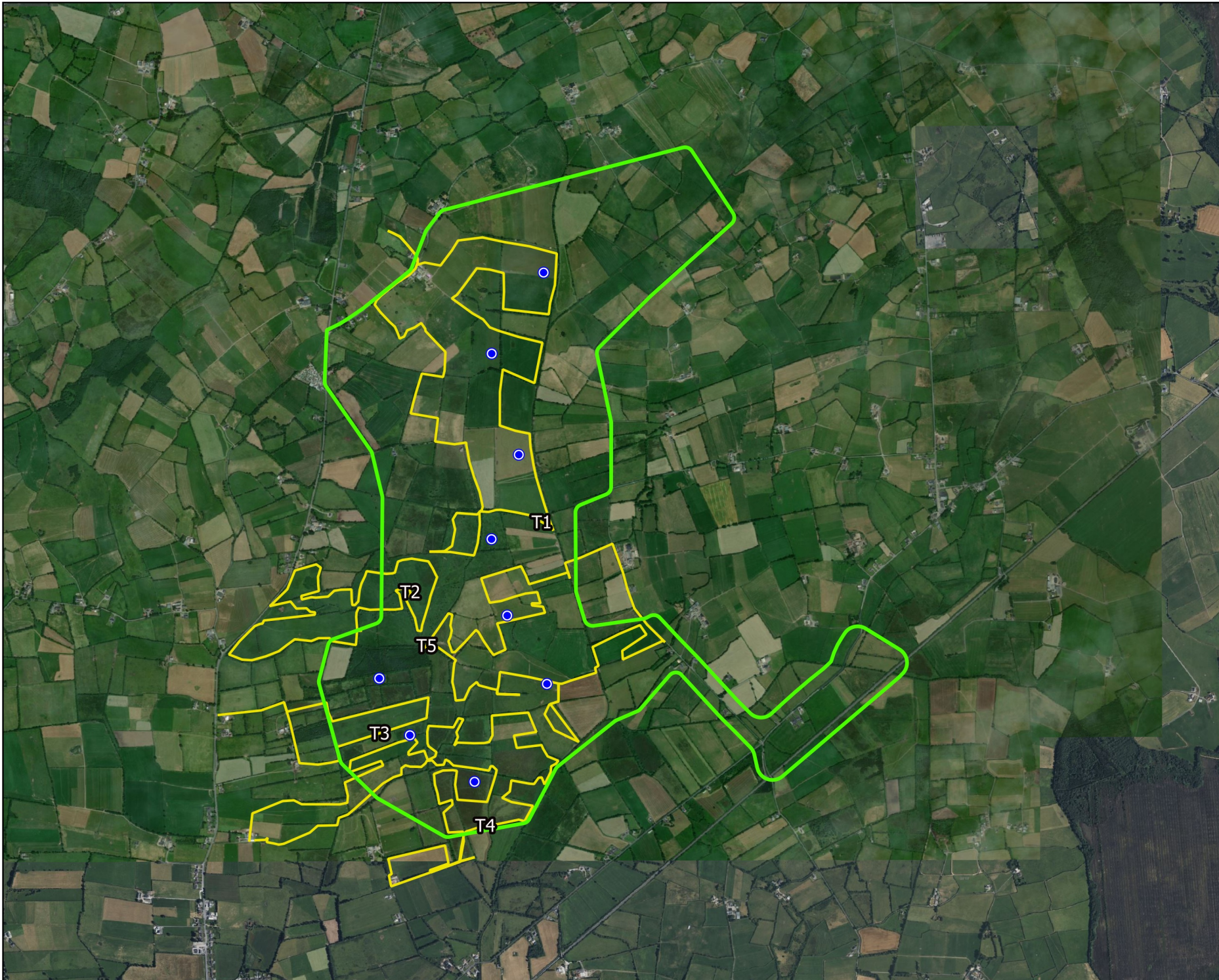
Project Title
Borrisbeg Wind Farm

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Map Legend

- EIA Study Boundary
- Proposed Turbine Locations
- Transect

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Drawing Title
Walkover Transect Routes

Project Title
Borrisbeg Wind Farm

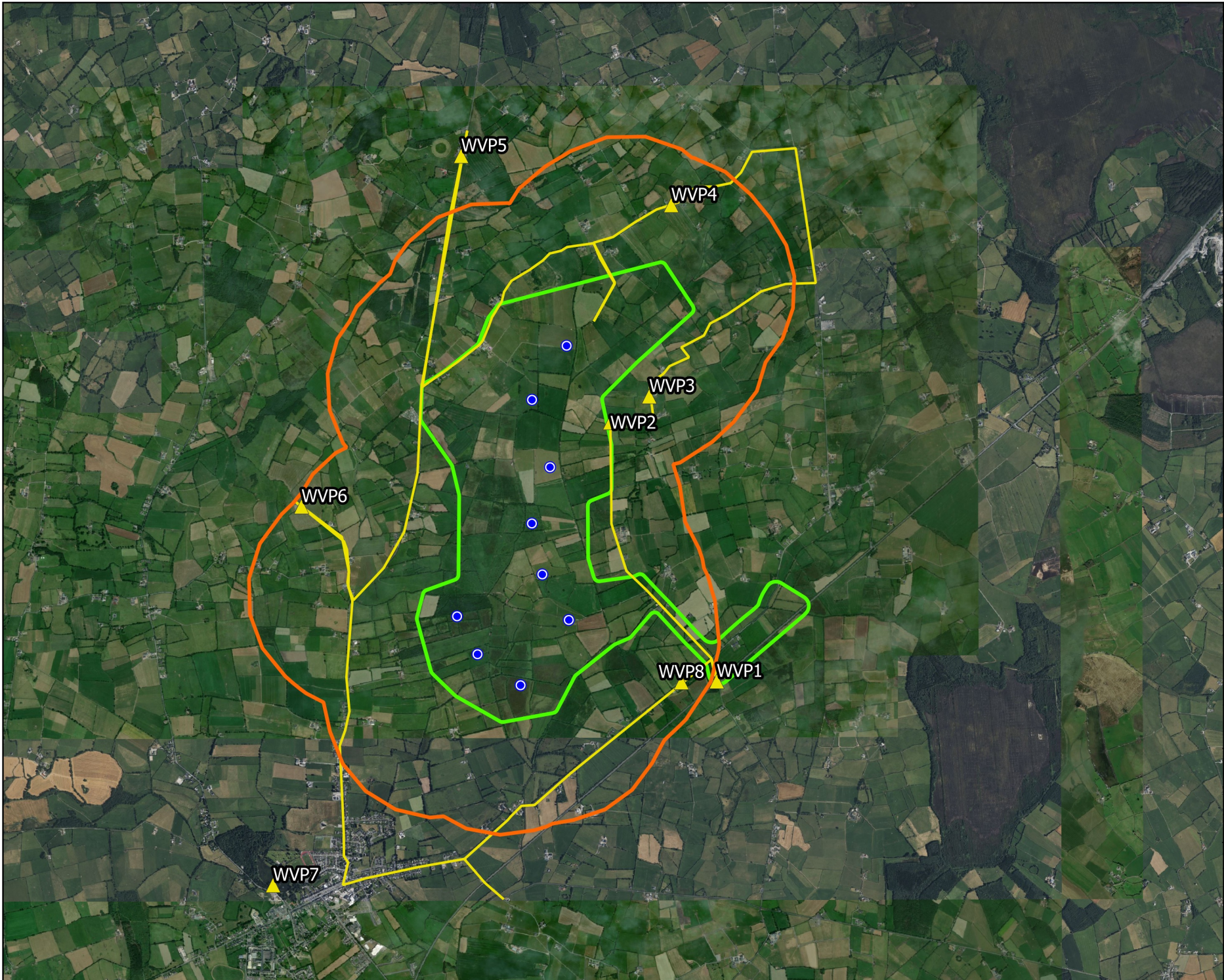
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Map Legend

- EIAR Study Boundary
- Proposed Turbine Locations
- Transect Route
- ▲ Vantage Points
- 1km Survey Radius



Drawing Title
Waterbird Distribution Survey

Project Title
Borrisbeg Wind Farm

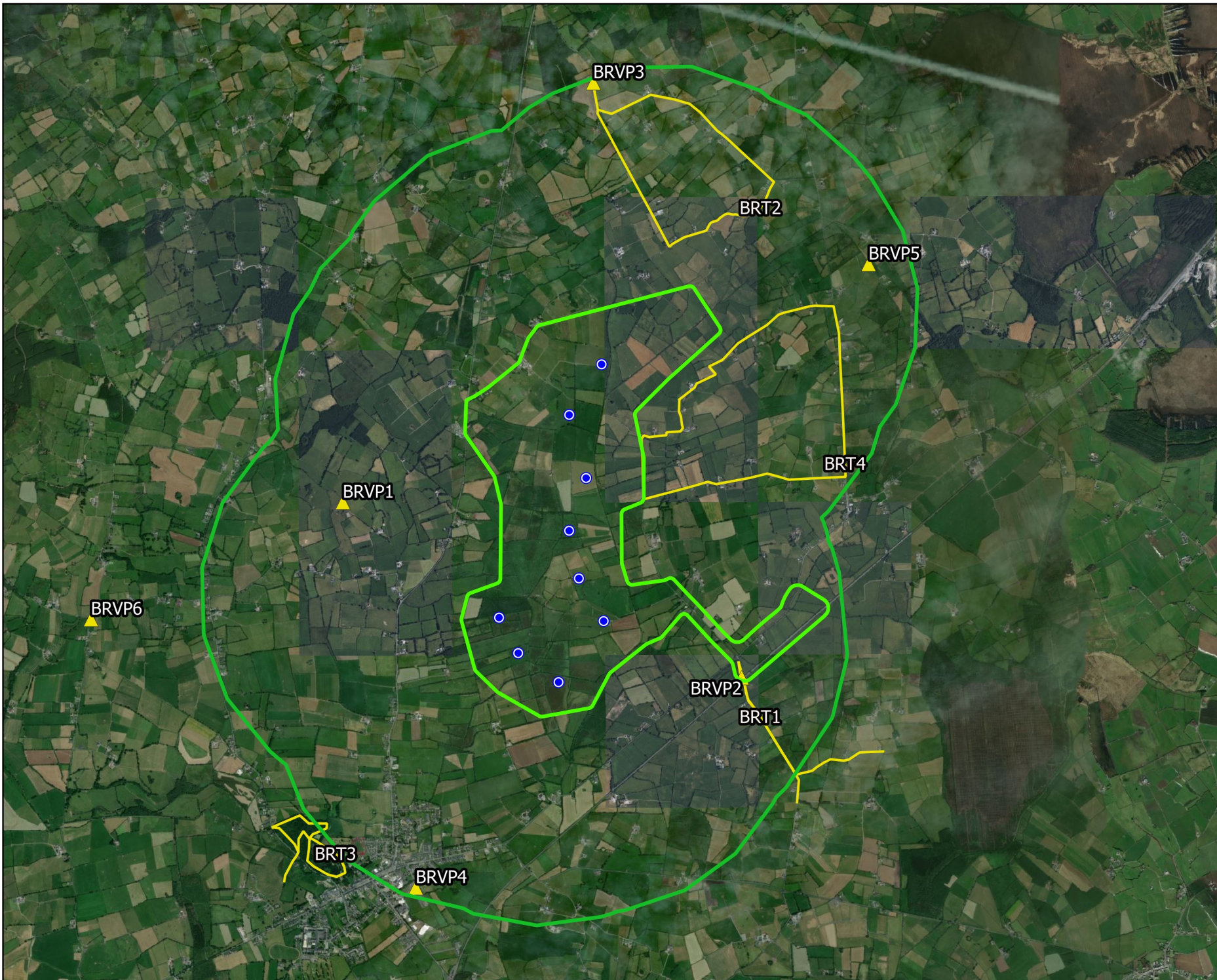
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Map Legend

- EIAR Study Boundary
- Proposed Turbine Locations
- ▲ Vantage Point
- Transect Route
- 2km Survey Radius



Drawing Title
Breeding Raptor Survey

Project Title
Borrisbeg Wind Farm

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Project No. 220310	Drawing No. Fig 7-5
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7.2.5 Receptor Evaluation and Impact Assessment

7.2.5.1 Potential Impacts Associated with the Proposed Project

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

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

For each of these three risks, the detailed knowledge of bird distribution and flight activity within and surrounding the Site has been used to predict potential impacts of the Proposed Project on birds. These impacts are also assessed cumulatively with other projects. The geographical framework and description of impacts are described below.

7.2.5.2 Geographical Framework

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

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

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

7.2.5.3 Description of Impacts

The sensitivity, magnitude and significance of impacts on bird populations resulting from the Proposed 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

The Percival (2003) methodology quantifies the **sensitivity** of a given species to the development type, the **magnitude** of the effect and the **significance** of the potential impact. Table 7-3 (sensitivity), Table 7-4 (magnitude of effect) and

Table 7-5 (determination of significance) outline the assessment criteria for each stage.

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

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

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

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

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

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

EPA (2022) Criteria

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

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

The significance of the effect is quantified as:

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

The duration of effects can be:

- **Momentary** - effects lasting from seconds to minutes.
- **Brief** - effects lasting less than a day.
- **Temporary** - effects lasting less than a year.
- **Short-term** - effects lasting 1 to 7 years.
- **Medium term** - effects lasting 7 to 15 years.
- **Long term** - effects lasting 15 to 60 years.
- **Permanent** - effects lasting over 60 years.

- **Reversible** – effects that can be undone (e.g. through remediation or restoration).

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

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

The probability of the effect may be:

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

The effects may also be described in relation to their extent and context. Extent describes the population affected by an effect, while context relates the effect to the established baseline conditions.

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 was undertaken at the Site between September 2020 and September 2023. Results derived from a continuous 37 months of surveying at the Site and hinterland, undertaken in line with NatureScot guidance, are analysed to inform this assessment. As such, the surveys undertaken provide the information necessary to allow a complete, comprehensive and robust assessment of the potential impacts of the Proposed Project on avian receptors.

7.2.6.2 Mitigation

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

7.2.6.3 Limitations

The information provided in this EIAR chapter accurately and comprehensively describes the baseline environment and provides an informed prediction of the likely impacts of the Proposed Project. It also prescribes mitigation as necessary and describes the predicted residual effects. Furthermore, the surveys,



analysis and reporting have been undertaken in accordance with the appropriate guidelines. Therefore, no significant limitations in the scope, scale or context of the assessment have been identified.

7.3 Baseline Ornithological Conditions

7.3.1 Designated Sites within the ZOI of the Project Site

A screening assessment and Natura Impact Statement (NIS) were prepared to provide the competent authority with the information necessary to complete an Appropriate Assessment (AA) for the Proposed Project in compliance with Article 6(3) of the EU Habitats Directive (92/43/EEC). According to EPA (2022):

“A biodiversity section of an EIAR ... should not repeat the detailed assessment of potential effects on European sites contained in documentation prepared as part of the Appropriate Assessment process, but it should refer to the findings of that separate assessment”.

Therefore, this section provides a summary of the key findings regarding SPAs and nationally designated sites. For a detailed assessment of any potential impacts on SPAs, refer to the AA and NIS associated with Chapter 6 of this EIAR.

Sites designated for nature conservation within the potential ZOI of the Proposed Project were identified using GIS software. The ZOI is derived utilising a precautionary approach. Initially, sites within a 15km radius of the proposed works are identified. 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’ (SNH, 2016) was consulted. This document provides guidance on identifying of connectivity between the Site 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 AA and NIS and summarised below.

Two SPAs were located within 15km of the Site. These SPAs are listed and summarised in Table 7-6. Apart from sites which are encompassed by these SPAs, no other nationally designated sites of ornithological significance occur within the potential ZOI.

Table 7-6 Designated sites in the Zone of Influence

Site Name	Distance from proposed works	Special Conservation Interests for which the site has been designated	Conservation Objectives	Zone of Influence Determination and Identification of Pathways for Effect
Slieve Bloom Mountains SPA	13.5km from the Site	<p>➤ Hen Harrier (<i>Circus cyaneus</i>) [A082]</p>	<p>Detailed conservation objectives for this site, (Version 1, September 20225), were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>There will be no direct effects as the Proposed Project footprint is located entirely outside the designated site.</p> <p>There is no potential for indirect effects as the Proposed Project is located outside the core foraging range of 2km and maximum foraging range of 10km for this species (SNH 2016).</p> <p>There is no direct hydrological connectivity with the SPA and no pathway for indirect effects on its SCI has been identified. The SPA is located within a separate sub-catchment, therefore there will be no indirect effects on the SPA via surface or groundwater deterioration.</p> <p>No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects and the site is not within the Likely Zone of Impact and no further assessment is required.</p>
River Nore SPA	14.3km from the Site	<p>➤ Kingfisher (<i>Alcedo atthis</i>) [A229]</p>	<p>Detailed First Order Site-specific conservation objectives for this site (Version 1, October 20226), were reviewed as part of the assessment and are available at www.npws.ie</p>	<p>There will be no direct effects as the Proposed Project footprint is located entirely outside the designated site.</p>

Site Name	Distance from proposed works	Special Conservation Interests for which the site has been designated	Conservation Objectives	Zone of Influence Determination and Identification of Pathways for Effect
				<p>There is no direct hydrological connectivity with the SPA and no pathway for indirect effects on its aquatic SCIs has been identified. The SPA is located within a separate sub catchment, therefore there will be no indirect effects on the SPA via surface or groundwater deterioration.</p> <p>No pathway for likely significant effect on this European Site was identified, when considered in the absence of any mitigation, individually or cumulatively with other plans or projects and the site is not within the Likely Zone of Impact and is not considered further in this assessment.</p>

7.3.2 Breeding and Wintering Bird Atlas Records

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

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

The Site lies within hectad S17. Table 7-7 and Table 7-8 present a list of species of conservation interest recorded from the relevant hectads, with regard to breeding and wintering respectively.

Table 7-7 Breeding Bird Atlas data.

Species Name	Breeding Atlas 1968-1972	Breeding Atlas 1988-1991	Breeding Atlas 2007-2011
	S17	S17	S17
Coot	confirmed breeding	-	-
Corncrake	probable breeding	-	-
Curlew	probable breeding	-	-
Grey Heron	possible breeding	confirmed breeding	probable breeding
Grey Wagtail	confirmed breeding	confirmed breeding	-
Kestrel	confirmed breeding	confirmed breeding	confirmed breeding
Kingfisher	confirmed breeding	-	-
Lapwing	possible breeding	possible breeding	-
Little Grebe	confirmed breeding	-	-
Mallard	confirmed breeding	confirmed breeding	confirmed breeding
Meadow Pipit	confirmed breeding	confirmed breeding	probable breeding
Moorhen	confirmed breeding	confirmed breeding	possible breeding
Mute Swan	confirmed breeding	possible breeding	confirmed breeding
Peregrine Falcon	-	-	probable breeding
Red Grouse	confirmed breeding	-	-
Snipe	confirmed breeding	-	probable breeding
Sparrowhawk	possible breeding	confirmed breeding	probable breeding
Stock Dove	confirmed breeding	-	-
Swift	confirmed breeding	possible breeding	confirmed breeding

Species Name	Breeding Atlas 1968-1972	Breeding Atlas 1988-1991	Breeding Atlas 2007-2011
	S17	S17	S17
Water Rail	probable breeding	-	-
Whinchat	confirmed breeding	-	-
Yellowhammer	confirmed breeding	-	-

Table 7-8 Wintering Bird Atlas data.

Species Name	Wintering Atlas 1981-1984	Wintering Atlas 2007-2011
	S17	S17
Barn Owl	-	present
Black-headed Gull	present	present
Coot	present	present
Cormorant	present	-
Curlew	present	present
Golden Plover	present	-
Grey Heron	present	present
Grey Wagtail	present	
Greylag Goose	-	present
Herring Gull	present	-
Kestrel	-	present
Kingfisher	present	-
Lapwing	present	present
Little Egret	-	present
Little Grebe	present	present
Mallard	present	present
Meadow Pipit	present	present
Moorhen	present	present
Mute Swan	present	present
Pochard	present	-
Redwing	present	present
Snipe	present	present
Sparrowhawk	present	present

Species Name	Wintering Atlas 1981-1984	Wintering Atlas 2007-2011
	S17	S17
Stock Dove	present	present
Teal	present	present
Tufted Duck	present	-
Wigeon	-	present
Yellowhammer	present	-

7.3.3 Bird Sensitivity Mapping Tool

A Bird Sensitivity Mapping Tool for wind energy development was developed by BirdWatch Ireland to provide a measured spatial indication of where protected birds are likely to be sensitive to wind energy developments. The tool can be accessed via the National Biodiversity Data Centre Website (www.biodiversityireland.ie) and is accompanied by a guidance document (McGuinness *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 Site is located within areas of **low** bird sensitivity to wind energy developments. The Site boundary is 37km from the nearest area of high sensitivity.

7.3.4 National Biodiversity Data Centre Records

The National Biodiversity Data Centre (NBDC) Biodiversity Maps provide records of flora and fauna within 10km hectads across Ireland. Data is available from the map viewer on the NBDC website (<https://maps.biodiversityireland.ie/Map>). The Site lies within hectad S17. Table 7-9 lists the bird species that have been recorded in these 10km Grids.

Table 7-9 National Biodiversity Data Centre records

Common Name	NBDC Dataset
Barn Owl	Bird Atlas 2007 - 2011
Black-headed Gull	Bird Atlas 2007 - 2011
Coot	Bird Atlas 2007 - 2011
Cormorant	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.
Corncrake	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.
Curlew	Bird Atlas 2007 - 2011
Dipper	Bird Atlas 2007 - 2011
Golden Plover	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.
Grey Heron	Birds of Ireland
Grey Wagtail	Bird Atlas 2007 - 2011
Greylag Goose	Bird Atlas 2007 - 2011

Common Name	NBDC Dataset
Herring Gull	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.
Kestrel	Birds of Ireland
Kingfisher	Birds of Ireland
Lapwing	Bird Atlas 2007 - 2011
Little Egret	Bird Atlas 2007 - 2011
Little Grebe	Bird Atlas 2007 - 2011
Long-eared Owl	Birds of Ireland
Mallard	Birds of Ireland
Meadow Pipit	Bird Atlas 2007 - 2011
Montagu's Harrier	Rare birds of Ireland
Moorhen	Bird Atlas 2007 - 2011
Mute Swan	Birds of Ireland
Peregrine Falcon	Bird Atlas 2007 - 2011
Pochard	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.
Red Grouse	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.
Redwing	Bird Atlas 2007 - 2011
Snipe	Birds of Ireland
Sparrowhawk	Bird Atlas 2007 - 2011
Stock Dove	Bird Atlas 2007 - 2011
Swift	Swifts of Ireland
Teal	Bird Atlas 2007 - 2011
Tufted Duck	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.
Water Rail	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.
Wigeon	Bird Atlas 2007 - 2011
Whinchat	The First Atlas of Breeding Birds in Britain and Ireland: 1968-1972.
White-winged Tern	Rare birds of Ireland
Yellowhammer	The First Atlas of Wintering Birds in Britain and Ireland: 1981/82-1983/84.

7.3.5 Irish Wetland Bird Survey Records

The Irish Wetland Bird Survey (IWeBS), coordinated by BirdWatch Ireland, monitors wintering waterbird populations at their wetland sites across Ireland. IWeBS site locations are available at <https://birdwatchireland.ie/our-work/>. Datasets for the following sites were sourced from www.birdwatchireland.ie and reviewed:

- > Cabragh Wetlands
- > Drangan Beg
- > Durrow Curragh (River Erkina)
- > Gortdrum
- > Lough Derg (Shannon)
- > Lough Derg (Shannon) Aerial
- > Lough Eorna
- > Lyonstown Stud Farm
- > Marlfield Lake
- > Pat Reddan's Lake
- > River Suir Middle
- > River Suir Upper
- > Rockwell College Lake
- > Walsh's Sandpit Rathcool

7.3.6 Rare and Protected Species Dataset

An information request was sent to NPWS requesting records from the Rare and Protected Species Database. The following records were obtained from the NPWS on the 13th of April 2023:

Hen Harrier

Hen harrier was recorded at a possible breeding site in hectad S07 during the National Hen Harrier Survey in 2015 (hectad adjacent to where the Site is located).

Peregrine Falcon

Two peregrine falcon nest sites were recorded in hectad S17 (hectad within which the Site is located), and two unoccupied nest sites were recorded in hectad S07 (hectad adjacent to where the Site is located) during the National Breeding Peregrine Survey in 2017.

7.3.7 Field Survey Results

During the survey period, breeding territories for lapwing, snipe, buzzard, sparrowhawk and meadow pipit were identified within the Site. Breeding territories for barn owl, kestrel and grey wagtail were identified in the hinterland. No regularly used roosts were identified within the Site or hinterland.

The target species recorded within the potential ZOI of the Site during field surveys are listed in Table 7-10, along with a summary of breeding and roosting status. The following sections describe the records of each target species under the individual survey type headings.

Table 7-10 Target species recorded in the Potential ZOI of the Proposed Project

Species	Overall breeding status	Overall wintering status
Hen Harrier	Non-breeding.	No regularly used roosts identified.
Kingfisher	One bird was recorded flying in suitable breeding habitat within the Site once each in summer 2021 and summer 2022. No nest site was located.	No regularly used roosts identified.
Dunlin	Non-breeding.	No regularly used roosts identified. Observed roosting within the Site on one occasion.
Golden Plover	Non-breeding.	No regularly used roosts identified. Observed roosting within the Site on two occasions and 1.8km from the nearest proposed turbine on one occasion.
Greenland White-fronted Goose	Does not breed in Ireland.	No regularly used roosts identified.
Merlin	Non-breeding.	No regularly used roosts identified.
Peregrine Falcon	Non-breeding.	No regularly used roosts identified.
Short-eared Owl	Scarce breeding bird in Ireland.	No regularly used roosts identified.
Little Egret	Non-breeding.	No regularly used roosts identified. Observed roosting 1km from the nearest proposed turbine on one occasion.
Whooper Swan	Does not breed in Ireland.	No regularly used roosts identified.
Barn Owl	Probable Breeding. Active traditional nest site approximately over 2km from the Site.	It is possible that the barn owl at the known traditional nest site (see 'Overall breeding status') was present all year as barn owls can maintain their territory over the winter for roosting.
Kestrel	Confirmed Breeding. There was one breeding territory identified 3km from the nearest proposed turbine.	No regularly used roosts identified.
Curlew	Non-breeding.	No regularly used roosts identified.

Species	Overall breeding status	Overall wintering status
Lapwing	Confirmed Breeding. There was one breeding territory identified within the Site (650m from the nearest proposed turbine).	No regularly used roosts identified Observed roosting within the Site on three occasions over three winter seasons.
Snipe	Probable Breeding. One bird was recorded drumming (breeding display) within the Site.	No regularly used roosts identified. Observed roosting within the Site on one occasion and 2.7km from the nearest proposed turbine on one occasion.
Stock Dove	Non-breeding.	No regularly used roosts identified.
Buzzard	Confirmed Breeding. There were breeding territories identified within the Site and 800m, 820m, 1.5km and 1.8km from the nearest proposed turbine.	No regularly used roosts identified.
Sparrowhawk	Confirmed Breeding. There was one breeding territory identified within the Site.	No regularly used roosts identified.
Grey Wagtail	Confirmed Breeding. There was one breeding territory identified 1.8km from the nearest proposed turbine.	No regularly used roosts identified.
Meadow Pipit	Confirmed Breeding. There was breeding within the Site.	No regularly used roosts identified.
Redwing	Does not breed in Ireland.	No regularly used roosts identified. Six flocks observed roosting within the Site over three winter seasons.
Swift	Non-breeding.	Does not overwinter in Ireland.

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

- Distribution of activity for target species during vantage point surveys;
- Target species observed during breeding and winter walkover surveys;
- Target species observed during waterbird distribution surveys;
- Monthly abundance of raptors during breeding raptor surveys;
- Monthly abundance of woodcock during breeding woodcock surveys;
- Non-target species observed during vantage point, winter walkover and breeding walkover surveys.

Hen Harrier

Hen harrier was recorded in the winter season. Raw survey data and maps are provided in Appendix 7-4.

Vantage Point Survey

Hen harrier was observed six times during vantage point surveys in the winter months. All observations were of individuals males or “ringtails” (female or juvenile) flying or hunting within the Site, all below PCH. Birds were seen near dusk but no roosting was observed.

Winter Walkover Survey

Hen harrier was observed six times during winter walkover surveys. All observations were of individual ringtails flying or hunting within the Site.

Incidental Records

There was one incidental record of hen harrier over the survey period. In February 2022, one ringtail was observed perched and then flying within the Site.

7.3.7.2 Kingfisher

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

Winter Walkover Survey

Kingfisher was observed twice during winter walkover surveys. In December 2022, one bird was observed hunting near the River Suir 1km south of the nearest proposed turbine, and in March 2023, one bird was observed flying 800m north of the nearest proposed turbine.

Breeding Walkover Survey

Kingfisher was observed three times during breeding walkover surveys. One bird was observed flying in suitable breeding habitat (watercourses) in April 2021, May 2022 and May 2023, in the Site. No evidence of nesting was identified.

7.3.7.3 Dunlin

Dunlin was recorded during the winter season. Raw survey data and maps are provided in Appendix 7-4.

Waterbird Distribution Survey

Dunlin was observed once during a waterbird distribution survey in January 2023. Two birds were observed flying in the south-eastern area of the Site.

Incidental Records

There was one incidental record of dunlin during a vantage point survey in December 2022. One bird was observed roosting in a flooded field in the south-eastern area of the Site.

7.3.7.4 Golden Plover

Golden plover was recorded during the winter and passage seasons. Raw survey data and maps are provided in Appendix 7-4.

Vantage Point Survey

Golden plover was observed 156 times during vantage point surveys in the winter and spring passage months. Of these, 151 were flight and 5 were non-flight observations, including at PCH. There were 111 flight observations within 500m of the turbines and the maximum flock size counted in flight was 576 birds. Of the non-flight observations, two were of birds calling within 500m of the turbines. The remaining observations were of birds calling c. 690m east and 1.1km west of the nearest proposed turbines.

Winter Walkover Survey

Golden plover was observed four times during winter walkover surveys in the core winter months (November to February). All observations were within the Site, in the middle and southern areas, in flooded fields. Observations were of flocks flying, with a maximum count of 419 birds.

Waterbird Distribution Survey

Golden plover was observed 25 times during waterbird distribution surveys. Within the Site, there was one observation of 42 birds roosting and one observation of one bird foraging in a flooded field in the south-eastern area, and one observation of 11 birds foraging in an agricultural field in the northern area. Outside the Site, there was one observation of 17 birds roosting and/or foraging in a field of wheat 1.8km northwest of the nearest proposed turbine, and one observation each of 28, 22 and 87 birds foraging in agricultural fields 1.3km east, 1.6km east and 2.7km west of the nearest proposed turbine, respectively. There were 10 observations of up to 234 birds flying within the Site. The remaining observations were of up to 110 birds flying more than 500m from the nearest proposed turbines.

Incidental Records

There were seven incidental records of golden plover over the survey period. There was one observation of 187 birds roosting in a flooded field the south-eastern area of the Site in December 2022. There was also one observation of 64 birds flying through the Site in April 2021. The remaining observations were of up to 290 birds flying more than 500m from the nearest proposed turbines and one observation of 117 birds foraging in an agricultural field 2km west of the nearest proposed turbine.

7.3.7.5 Greenland White-fronted Goose

Greenland white-fronted goose was recorded during the winter season. Raw survey data and maps are provided in Appendix 7-4.

Vantage Point Survey

Greenland white-fronted goose was observed once during a vantage point survey. In March 2021, 25 birds were observed traveling through the south-western area of the Site.

7.3.7.6 Merlin

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

Vantage Point Survey

Merlin was observed nine times during vantage point surveys during the core winter months of December and January, and the shoulder months in August and March. Of these, eight were flight observations and one was a non-flight observation. There were six flight observations within 500m of the turbines, including at PCH. All flight observations were of males and females flying or hunting. The non-flight observation was of a male perched on a tree in the north-western area of the Site.

Winter Walkover Survey

Merlin was observed twice during a winter walkover survey. In October 2020, a female was seen twice flying along a hedgerow in the northern area of the Site. The bird was seen near dusk and it was possible that she roosted in the area. However, no other roosting behaviour was recorded during three seasons of winter surveys at the Site and roosting habitat is limited in the Site, therefore merlin is not considered to be regularly roosting in the area.

Incidental Records

There were six incidental records of merlin over the survey period. There were three observations of individuals, including a female, flying, hunting and perching in the northern and southern areas of the Site. The remaining observations were of individuals flying, hunting and perching at least 600m from the nearest proposed turbine.

7.3.7.7 Peregrine Falcon

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

Vantage Point Survey

Peregrine falcon was observed 19 times during vantage point surveys during the winter and breeding seasons. Of these, 18 were flight observations and 1 was a non-flight observation, including at PCH. There were 12 flight observations within 500m of the turbines. All observations were of males and females flying or hunting. The non-flight observation was of a male perching in a tree in the northern area of the Site in August 2021.

Winter Walkover Survey

Peregrine falcon was observed once during a winter walkover survey. In March 2023, one bird was seen flying 520m north of the nearest proposed turbine.

Breeding Walkover Survey

Peregrine falcon was observed three times during a breeding walkover survey. In July 2021, a male was seen hunting twice in the western area of the Site and up to 1.7km west of the nearest proposed turbine. Later on the same day, one bird (possibly the same male) was also hunting in the western area of the Site. No evidence of breeding was identified.

Breeding Raptor Survey

Peregrine falcon was observed four times during breeding raptor surveys. Birds were hunting outside the Site, including a bird perched on the church steeple in Templemore. No evidence of breeding was identified.

Incidental Records

There were four incidental records of peregrine falcon over the survey period. In January 2021, one bird was seen flying and perching in the north-eastern area of the Site. In August 2021, 2 birds were seen flying over the north-eastern area of the Site. The remaining two observations were of individuals flying or perching up to 1.1km northeast of the nearest proposed turbine.

7.3.7.8 Short-eared Owl

Short-eared owl was recorded during the breeding season. Raw survey data and maps are provided in Appendix 7-4.

Breeding Walkover Survey

Short-eared owl was observed once during a breeding walkover survey. On one occasion in June 2021, one bird was seen hunting in suitable breeding habitat (wet grassland and meadows) in the western area of the Site. However, this species is a scarce breeding bird in Ireland (the majority of the population breed in Scandinavia and Russia), and no other evidence of breeding was identified.

Incidental Records

There was one incidental record of short-eared owl over the survey period. In June 2021, a few hours after the observation during the breeding walkover survey, one bird (possibly the same bird seen previously) was perched on a fence post in the same area where the bird was seen during the breeding walkover survey.

7.3.7.9 Little Egret

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

Vantage Point Survey

Little egret was observed five times during vantage point surveys. Small groups were observed travelling through the Site, including at PCH.

Winter Walkover Survey

Little egret was observed once during a winter walkover survey. In January 2022, one bird was seen feeding in a flooded field in the southern area of the Site.

Waterbird Distribution Survey

Little egret was observed four times during waterbird distribution surveys. In December 2020, one bird was seen flying over wet grassland in the southern area of the Site, and in December 2022, one bird was seen feeding in a flooded field in the south-eastern area of the Site. In March 2023, two birds were seen roosting in an agricultural field 1km east of the nearest proposed turbine. The remaining observation was of one bird flying from perch to perch at Templemore Lake 2.8km southwest of the nearest proposed turbine.

Incidental Records

There were two incidental records of little egret over the survey period. In May 2021, one bird was flying at College Hill 2km west of the nearest proposed turbine, and in July 2022, one bird was flying along the south-eastern area of the Site.

7.3.7.10 Whooper Swan

Whooper swan was recorded during the winter season. Raw survey data and maps are provided in Appendix 7-4.

Vantage Point Survey

Whooper swan was observed seven times during vantage point surveys. Of these, six were flight observations and one was a non-flight observation, including at PCH. In January 2021, 10 birds were flying in the southern area of the Site. In October 2022, five birds flew to a flooded field in the south-eastern area of the Site and foraged there. The remaining observations were of up to seven birds flying up to 1.5km from the nearest proposed turbine.

Waterbird Distribution Survey

Whooper swan was observed once during a waterbird distribution survey. In January 2021, 10 birds were flying across the southern area of the Site.

7.3.7.11 Barn Owl

Barn owl was recorded during the breeding season. Raw survey data and maps are provided in Appendix 7-4. Survey maps relating to the barn owl breeding territory/roost are contained in Confidential Appendix 7-5.

Breeding Walkover Survey

In May 2023, a barn owl was heard calling from a veteran tree during a breeding walkover survey. An evening watch was conducted at this location subsequently the same month (during a breeding raptor survey), but no barn owl breeding activity was recorded and it was concluded that there was no nest at this location.

Incidental Records

There were two incidental records of barn owl over the survey period. In March 2023, fresh pellets were found beneath a known traditional nest site in a tree 2.7km southwest of the nearest proposed turbine (Confidential Appendix 7-5). In April 2023, an owl was seen leaving this nest hole. This indicates breeding and/or roosting at this nest site.

7.3.7.12 Kestrel

Kestrel was recorded during the winter and breeding seasons. Raw survey data and maps are provided in Appendix 7-4. Survey maps relating to the kestrel breeding territories are contained in Confidential Appendix 7-5.

Vantage Point Survey

Kestrel was observed 220 times during vantage point surveys. Of these, 203 were flight and 17 were non-flight observations, including at PCH. There were 130 flight observations within 500m of the turbines. The majority of flight observations were of up to four birds hunting, flying and traveling.

In August 2021, there were three observations of three birds (three fledglings, or two fledglings and an adult female) flying and hunting within the northern area and up to 1.5km west of the nearest proposed turbine (confirmed breeding). An adult male was also seen with them in the northern area of the Site. In April 2022, a food pass was seen between a male and female in the south-western area and up to 800m southwest of the nearest proposed turbine (confirmed breeding). In the same area in June 2022, a male was seen mobbing a buzzard, and two males were exhibiting territorial behaviour. In October 2020, an immature male was seen flying and hunting 900m southwest of the nearest proposed turbine (confirmed breeding, but not certain it hatched in the area).

Of the non-flight observations, seven were of individuals perching or roosting (during the day) within 500m of the turbines. The remaining non-flight observations were of individuals perching, scanning, preening or calling up to 1km from the nearest proposed turbine.

Winter Walkover Survey

Kestrel was observed 24 times during winter walkover surveys. Of these, 18 observations were of up to two birds hunting, flying, mobbing a buzzard, perching and roosting (during the day) within the Site. The remaining observations were of individuals hunting, flying and perching further than 500m from the nearest proposed turbine.

Breeding Walkover Survey

Kestrel was observed six times during breeding walkover surveys. All observations were of individuals hunting in suitable breeding habitat within the Site. No further evidence of breeding was identified.

Breeding Raptor Survey

Kestrel was observed 84 times during breeding raptor surveys throughout the breeding season. In the 2021 breeding season, a breeding territory was identified 3km south-east of the nearest proposed turbine (hereafter Strogue; Confidential Appendix 7-5). In April 2021, a probable breeding pair was seen flying in and out of a probable nest site at Strogue, a male was seen carrying food towards the nest site (confirmed breeding), and a male was alarm calling in that area when buzzards were present. Individuals were seen hunting in Strogue frequently throughout the 2021 breeding season, although no fledglings were seen. In June 2022, a probable breeding pair was seen flying and hunting in Strogue, but no further evidence of breeding was identified.

In May 2021, a probable breeding pair was seen flying, hunting and mobbing rooks at Lisnareelin, 3.8km west of the nearest proposed turbine. No further evidence of breeding was identified. The remaining observations during breeding raptor surveys were of individuals hunting and flying, two of which were within the Site.

Incidental Records

There were 27 incidental records of kestrel over the survey period. Observations were of individuals flying, hunting or perching in the Site and up to 2.6km from the nearest proposed turbine.

7.3.7.13 Curlew

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

Vantage Point Survey

Curlew was observed once during a vantage point survey. In October 2022, one bird flew up from a flooded field when a buzzard was present, and back down again in the south-eastern area of the Site.

Breeding Walkover Survey

Curlew was observed once during a breeding walkover survey. In June 2022, four birds flew across the centre of the Site. No evidence of breeding was identified.

Incidental Records

There were two incidental records of curlew over the survey period. In September 2021, four birds were seen flying and landing out of sight 1.5km southeast of the nearest proposed turbine. In October 2022, one bird was heard calling 500m southeast of the nearest proposed turbine.

7.3.7.14 Lapwing

Lapwing was recorded during the winter and breeding seasons. Raw survey data and maps are provided in Appendix 7-4. Survey maps relating to the lapwing breeding territory are contained in Confidential Appendix 7-5.

Vantage Point Survey

Lapwing was observed 134 times during vantage point surveys. Of these, 130 were flight and 4 were non-flight observations, including at PCH. There were 84 flight observations within 500m of the turbines.

In March 2021, there were four observations of up to five birds displaying in the north-western area of the Site. From March 2021 to June 2021, there were also 22 observations of up to 11 birds mobbing predators (buzzard, rook, hooded crow and lesser black-backed gull) in the western and north-western area of the Site, suggesting breeding activity. Breeding was confirmed near this area in the 2021 breeding season (see 'Breeding Walkover Survey'). There were 18 observations of up to 6 birds flying in the same area in the 2022 breeding season. The remaining flight observations were of up to 350 birds flying.

Of the non-flight observations, there was one observation of 13 birds roosting near a pond 870m west of the nearest proposed turbine in January 2021. The remaining observations were of up to two birds flying and/or calling at least 550m from the nearest proposed turbine.

Winter Walkover Survey

Lapwing was observed 14 times during winter walkover surveys. All observations were within the Site. In March 2021, there was one observation of two birds mobbing a hen harrier near the lapwing's breeding territory (see 'Breeding Walkover Survey') in the north-western area of the Site. In November 2022 and December 2022, there were 14 and 375 birds, respectively, foraging and/or roosting in a flooded field in the south-eastern area of the Site. The remaining observations were of up to 58 birds flying.

Breeding Walkover Survey

Lapwing was observed 10 times during breeding walkover surveys. In April 2021, two chicks and an incubating female were seen within the Site, 650m southwest of the nearest proposed turbine (confirmed breeding; Confidential Appendix 7-5). In the 2022 breeding season, there was one observation of three birds flying and landing in a field near the breeding territory, but no evidence of breeding was identified.

In April 2022, there was one observation of one bird foraging in a muddy agricultural field in the eastern area of the Site. The remaining observations were of up to 12 birds flying.

Waterbird Distribution Survey

Lapwing was observed 32 times during waterbird distribution surveys. Of these, 16 were within the Site. In October 2022 and December 2022, there were 55 and 3 birds, respectively, foraging in a recently ploughed field in the south-eastern area of the Site. In January 2023, there were 78, 374 and 250 birds foraging, roosting and flying, respectively, in a flooded field in the south-eastern area of the Site. One bird was foraging in that area in February 2023 also.

In January 2021 and February 2021, 29 and 4 birds, respectively, were foraging in agricultural fields 1.5km southeast and 650m east of the nearest proposed turbines, respectively. Also in January 2021, two birds were roosting 500m west of the nearest proposed turbine. In December 2022, 239, 6 and 53 birds were foraging in agricultural and flooded fields 1.6km east, 800m southwest and 1.4km northeast of the nearest proposed turbines, respectively. In January 2023, 3, 9 and 27 birds were foraging in agricultural fields 780m southwest, 1km southeast and 2.3km west of the nearest proposed turbines, respectively. The remaining observations were of up to 96 birds flying.

Incidental Records

There were two incidental records of lapwing over the survey period. In December 2022, there were 233 birds roosting in a flooded field in the south-eastern area of the Site. In January 2021, there were 32 birds foraging in an agricultural field and 123 birds flying in the same area 1.6km east of the nearest proposed turbine.

7.3.7.15 Snipe

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

Vantage Point Survey

Snipe was observed 98 times during vantage point surveys. Of these, 73 were flight and 25 were non-flight observations. There were 58 flight observations within 500m of the turbines. All flight observations were of up to 17 birds flying or being flushed. Of the non-flight observations, seven were within 500m of the turbines, one of which was of a bird heard drumming (displaying) in the south-eastern area of the Site in April 2021. Also in April 2021, there were another two observations of one bird heard drumming 590m east of the nearest proposed turbine, near the bird drumming within 500m of the turbines. The remaining non-flight observations were of individual birds calling and preening.

Winter Walkover Survey

Snipe was recorded 48 times during winter walkover surveys. Of these, 44 observations were within the Site. In October 2020, there was one observation of 30 birds flying low in the southern area of the Site. The remaining observations were of up to three birds being flushed, flying and/or calling.

Breeding Walkover Survey

Snipe was observed three times during breeding walkover surveys. All observations were of up to two birds being flushed from agricultural fields and a river in the northern area of the Site in April 2022 and April 2023. No evidence of breeding was identified.

Waterbird Distribution Survey

Snipe was observed 12 times during waterbird distribution surveys. Of these, four observations were of up to five birds feeding, preening, flying and/or calling within the Site. In November 2020 and December 2020, five and four birds, respectively, were foraging in a flooded field 1.4km southeast of the nearest proposed turbines. In December 2022, one bird was roosting at Templemore Lake 2.7km southwest of the nearest proposed turbine. The remaining observations were of individuals flying, calling or being flushed.

Incidental Records

There were 11 incidental records of snipe over the survey period. Of these, seven were within the Site. In October 2022 and December 2022, there were six and seven birds, flying and roosting, respectively, in a flooded field in the south-eastern area of the Site. In May 2021 and June 2021, one bird was heard chipping 2.4km east of the nearest proposed turbine. The remaining observations were of up to two birds flying or being flushed.

7.3.7.16 **Stock Dove**

Stock Dove was recorded during the passage season. Raw survey data and maps are provided in Appendix 7-4.

Vantage Point Survey

Stock dove was observed once during a vantage point survey. In August 2022, two birds were flying in the south-western area of the Site.

7.3.7.17 **Buzzard**

Buzzard was recorded during the winter and breeding seasons. Raw survey data and maps are provided in Appendix 7-4. Survey maps relating to the buzzard breeding territories are contained in Confidential Appendix 7-5.

Vantage Point Survey

Buzzard was observed 786 times during vantage point surveys. Of these, 684 were flight and 102 were non-flight observations, including at PCH. There were 439 flights within 500m of the turbines. Breeding was recorded during vantage point surveys and is outlined below. The remaining flight observations were of up to seven birds hunting, soaring, mobbing other birds (including other buzzards) and travelling.

In June 2021, one bird was seen carrying prey to a probable nest site (confirmed breeding) at Borrisbeg, 820m southwest of the nearest proposed turbine (Confidential Appendix 7-5). In June and July 2021, there were six observations of one bird visiting another probable nest site in the middle of the Site (probable breeding, but see 'Breeding Walkover Survey'; Confidential Appendix 7-5). In August 2021, there were four flight observations of individual juvenile birds within 500m of the turbines, some near both probable nest sites described above, indicating successful breeding.

In June 2022, one bird was seen carrying prey to a probable nest site (confirmed breeding) at Rosnamanniff, 800m north of the nearest proposed turbine (Confidential Appendix 7-5).

In June 2023, birds were observed displaying within the Site, and a bird was seen carrying prey in the Borrisbeg area (as in 2021). In August, juvenile birds were seen here, indicating successful breeding. In July 2023, a bird was also seen carrying food in the direction of Graiguebeg, where a nest was located (see 'Breeding Raptor Survey').

Of the non-flight observations, 37 were within 500m of the turbines. In August and September 2021, there were seven observations of individual juvenile birds calling, four of which were within 500m of the turbines. The remaining observations were of up to three birds calling, perched, preening, roosting (during the day) and feeding.

Winter Walkover Survey

Buzzard was observed 55 times during winter walkover surveys throughout the winter seasons. Of these, 39 observations were within the Site. All observations were of up to three birds flying, hunting, soaring, calling, perched and on the ground.

Breeding Walkover Survey

Buzzard was observed 87 times during breeding walkover surveys. Of these, 72 observations were within the Site.

In July and August 2021, there were six observations of up to two juvenile birds flying and calling near the probable nest site in the middle of the Site (confirmed breeding; Confidential Appendix 7-5). There were also two observations of a juvenile bird calling near the nest site at Borrisbeg 820m southwest of the nearest proposed turbine (Confidential Appendix 7-5). In June 2022, there was one observation of a bird carrying prey in the southwest area of the Site (confirmed breeding), but the location of this breeding territory was not identified. The remaining observations were of up to eight birds (one observation) soaring, hunting, calling, flying, perched and displaying.

Breeding Raptor Survey

Buzzard was observed 167 times during breeding raptor surveys throughout the breeding seasons. Of these, 15 observations were within the Site. Observations included up to five birds soaring, hunting, calling, perched and displaying. Evidence of breeding is outlined below.

In July 2021, two fledged birds were perched and another juvenile bird was heard calling at Graffin 1.8km east of the nearest proposed turbine (confirmed breeding). Also in July 2021, at least one juvenile was heard calling at an identified breeding territory at Strogue 1.8km east of the nearest proposed turbine (confirmed breeding; Confidential Appendix 7-5).

In May and June 2022, there were three observations of one bird visiting the nest site at Strogue (probable breeding). In June 2022, there was one observation of a bird carrying prey 2.4km north of the nearest proposed turbine (confirmed breeding) but a breeding territory was not identified. In April 2022, there was one observation of one bird carrying nest material to a tree 900m northeast of the nearest proposed turbine, with another bird present nearby (probable breeding).

In April 2023, four birds were observed flying together, including displaying birds clasping talons at Gortnagowna, over 2km from the Site. In May 2023, territorial behaviour was observed at Graiguebeg, and a nest was located in a tree here, over 2km from the Site. In late June, two adults with a juvenile were observed in the same area (confirmed breeding).

Incidental Records

There were 65 incidental records of buzzard over the survey period. In August 2021, one juvenile was heard calling in the western area of the Site (confirmed breeding). Other observations were of up to three birds perched, soaring, flying, hunting and roosting (during the day).

7.3.7.18 Sparrowhawk

Sparrowhawk was recorded during the winter and breeding seasons. Raw survey data and maps are provided in Appendix 7-4. Survey maps relating to the sparrowhawk breeding territories are contained in Confidential Appendix 7-5.

Vantage Point Survey

Sparrowhawk was observed 72 times during vantage point surveys. Of these, 67 were flight and 5 were non-flight observations, including at PCH. There were 48 flight and 2 non-flight observations within 500m of the turbines.

In July 2021, there was one observation of one bird carrying prey 670m west of the nearest proposed turbine, and in August 2021 a juvenile was heard calling around this area (confirmed breeding; Confidential Appendix 7-5). In May 2023, a juvenile was observed 790m south-west of the nearest proposed turbine, but its place of origin was unknown. The remaining observations were of up to two birds flying, hunting, circling, perched, feeding and displaying.

Winter Walkover Survey

Sparrowhawk was observed seven times during winter walkover surveys. Of these, six were within the Site. All observations were of individual males and females flying, hunting and perched.

Breeding Walkover Survey

Sparrowhawk was observed 15 times during breeding walkover surveys. All observations were within the Site. In June 2021, there was one observation of a bird carrying prey to a probable nest site in the southern area of the Site (confirmed breeding; Confidential Appendix 7-5). In July and August 2021, up to three fledglings were flying and calling in the middle of the Site (confirmed breeding). The remaining observations were of up to two birds hunting, flying and calling.

Breeding Raptor Survey

Sparrowhawk was observed nine times during breeding raptor surveys. All observations were of individuals hunting and flying outside the Site.

Incidental Records

There were five incidental records of sparrowhawk over the survey period. All observations were of individuals hunting, perched and flying.

7.3.7.19 Grey Wagtail

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

Vantage Point Survey

Grey wagtail was observed four times during vantage point surveys during the winter and breeding seasons. All observations were of one bird flying and foraging at least 650m from the nearest proposed turbines.

Winter Walkover Survey

Grey wagtail was observed twice during winter walkover surveys. In October 2020, one bird was foraging in the southern area of the Site. In December 2022, one bird was foraging 610m west of the nearest proposed turbine.

Breeding Walkover Survey

Grey wagtail was observed once during a breeding walkover survey. In May 2021, one bird was perched on the bank of a lake. No evidence of breeding was identified.

Waterbird Distribution Survey

Grey wagtail was observed four times during waterbird distribution surveys. All observations were of up to three birds foraging at Templemore Lake, 2.6km southwest of the nearest proposed turbine.

Incidental Records

There were seven incidental records of grey wagtail over the survey period. In April 2021, a breeding pair was seen bringing food to a nest 1.8km south of the nearest proposed turbine (confirmed breeding). The remaining observations were of up to two birds flying and foraging.

7.3.7.20 Meadow Pipit

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

Vantage Point Survey

Meadow pipit was observed 54 times during vantage point surveys. A maximum count of nine birds in November 2022 was made. In the 2021, 2022 and 2023 breeding seasons, there were observations of up to three birds displaying in suitable nesting habitat (probable breeding). The remaining observations were of birds flying, foraging and calling.

Winter Walkover Survey

Meadow pipit was observed 20 times during winter walkover surveys. A maximum count of 17 birds in January 2022 was made.

Breeding Walkover Survey

Meadow pipit was observed 87 times during breeding walkover surveys throughout the breeding seasons. A maximum count of seven birds displaying was made. There was also observations of birds nesting, carrying food and with juveniles in the Site (confirmed breeding).

Incidental Records

There were 76 incidental records of meadow pipit over the survey period. A maximum count of 25 birds foraging in September 2021 was made. The remaining observations were of up to nine birds displaying, singing, calling, foraging and flying.

7.3.7.21 Redwing

Redwing was recorded during the winter season. Raw survey data and maps are provided in Appendix 7-4.

Vantage Point Survey

Redwing was observed 39 times during vantage point surveys in the winter months. In December 2022, there was one observation of 230 birds foraging in the north-western area of the Site. In February 2023, 6 and 65 birds were seen roosting in the north-western area of the Site, and 300 birds were seen roosting in the south-eastern area of the Site (550m from the nearest proposed turbine). In January 2023, 250 birds were seen flying, and two flocks of 120 and 190 birds were seen foraging. A flock of 110 birds were also seen flying in February 2023. The remaining observations were of up to 120 birds flying or foraging.

Winter Walkover Survey

Redwing was observed 33 times during winter walkover surveys throughout the winter months. A maximum count of 260 birds flying in January 2023 was made. There were also observations of up to 180 birds feeding and up to 26 birds roosting (during the day) within the Site.

Incidental Records

There were 18 incidental records of redwing over the survey period. A maximum count of 342 birds foraging in January 2023 was made.

7.3.7.22 Swift

Swift was recorded during the breeding season. Raw survey data and maps are provided in Appendix 7-4.

Vantage Point Survey

Swift was observed 23 times during vantage point surveys. Of these, 13 observations were within 500m of the turbines. All observations were of up to four birds flying and/or foraging.

Breeding Walkover Survey

Swift was observed nine times during breeding walkover surveys. Up to five birds were seen flying and foraging.

Incidental Records

There were 100 incidental records of swift over the survey period. A maximum count of 43 birds feeding within the Site in July 2021 was made. Display flights were observed in Templemore, approximately 2.2km south-west of the nearest proposed turbine in July 2021.

7.3.7.23 Yellowhammer

Yellowhammer was recorded during the breeding season. Raw survey data and maps are provided in Appendix 7-4.

Incidental Records

There was one incidental record of yellowhammer over the survey period. A single bird was observed singing in Rosnamaniff, 1.8km north-west of the nearest proposed turbine, in May 2023.

7.4 Receptor Evaluation

7.4.1 Determination of Population Importance

A determination of population importance for birds within the likely ZOI is provided below, following criteria described in Section 7.2.5. Estimates of national population sizes were obtained from the most recent species-specific national survey, or national surveys by Burke *et al.* (2018), Lewis *et al.* (2019a), Crowe *et al.* (2014) and Lewis *et al.* (2019b), or Ireland's Article 12 Reporting 2013-2018 (European Union, 2022), depending on what literature was available. Estimates for mean county population sizes were obtained from species-specific surveys, a review of IWeBS sites within Tipperary¹, or derived from national estimates, according to what literature was available.

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

7.4.1.1 Hen Harrier

The national breeding population of hen harrier is estimated to be 108-157 pairs (Ruddock *et al.*, 2016) and the national wintering population is estimated to be 373 birds (NPWS Article 12 Reporting). Therefore, a regularly occurring population of one breeding pair or three wintering birds is required for classification as National Importance. In the absence of reliable county population estimates, and following the precautionary principle, any records of hen harrier that are not of National Importance are treated as County Importance.

Hen harrier was occasionally observed hunting during the winter season. At least two individual birds were recorded. Thus, hen harrier in the winter season is considered to be a population of **County Importance**.

7.4.1.2 Kingfisher

The national breeding population of kingfisher is estimated to be 368-1,031 pairs (NPWS Article 12 Reporting). In the absence of more detailed county-level information, the county breeding population is estimated to be 14-40 pairs, assuming an even spatial distribution across the 26 counties of Ireland covered by these data. Therefore, a regularly occurring breeding population of four pairs is required for classification as National Importance and of one pair for classification as County Importance. Estimates for the national wintering population of kingfisher are not available due to survey constraints, however this species is believed to be widely distributed (Cummins *et al.*, 2010). Similarly, an estimate for the county wintering population cannot be made as IWeBS counts are generally too limited. Therefore, in the absence of national and county population estimates, and following the precautionary principle, regular records of wintering kingfisher are treated as County Importance.

Kingfisher was observed twice during a winter season, and once each during the 2021, 2022 and 2023 breeding season, with each observation of one bird. However, this is a secretive species that is difficult to detect during surveys, and is likely to be resident in the area year round. As such, it is considered to be a population of **County Importance**.

¹ Please note that these figures are estimates based on the best available information but should be interpreted with a degree of caution.

7.4.1.3 Dunlin

The national wintering population of dunlin is estimated to be 37,409 birds (Burke *et al.*, 2018), and the county wintering population is estimated to be one bird (IWeBS mean count for the period 2016/17 – 2020/21). Therefore, a regularly occurring wintering population of 374 birds is required for classification as National Importance and of one bird for classification as County Importance.

Dunlin was observed twice during the winter season, with up to two birds seen within the Site. Based on this low frequency of occurrence, there is **no regularly occurring population of ecological significance** using the Site.

7.4.1.4 Golden Plover

The national wintering population of golden plover is estimated to be 80,707 birds (Burke *et al.*, 2018), and the county population is estimated to be 580 birds (IWeBS mean count for the period 2016/17 – 2020/21, using records from IWeBS sites within 25km of the proposed turbines which is considered to be a reasonable approximation of the size of a county). Therefore, a regularly occurring wintering population of 807 birds is required for classification as National Importance and of 6 birds for classification as County Importance.

Golden plover was observed regularly during the winter seasons, with a maximum of 576 birds seen within the Site. Thus, this species is considered to be a population of **County Importance**.

7.4.1.5 Greenland White-fronted Goose

The national wintering population of Greenland white-fronted goose is estimated to be 10,418 birds (International Census of Greenland White-fronted Geese; Fox *et al.*, 2020). Therefore, a regularly occurring wintering population of 104 birds is required for classification as National Importance. The results of the census indicate that Greenland white-fronted geese are very localised in Ireland and not regularly recorded in the area of the Site in county Tipperary. Similarly, Greenland white-fronted geese were not recorded during Tipperary IWeBS counts between 2016/17 and 2020/21, nor were they recorded in the same hectad as the Site during the wintering Bird Atlases.

Greenland white-fronted goose was observed once during a winter season, with 25 birds seen travelling through the Site. Therefore, there is **no regularly occurring population of ecological significance** using the Site.

7.4.1.6 Merlin

Estimates for the national or county wintering population of merlin are not available (only breeding season censuses have been conducted). Therefore, in the absence of national and county population estimates, and following the precautionary principle, regular records of wintering merlin are treated as County Importance.

Merlin was observed frequently within the Site during the winter seasons. Thus, this species is considered to be a wintering population of **County Importance**.

7.4.1.7 Peregrine Falcon

The national breeding population of peregrine falcon is estimated to be 425 pairs (National Breeding Peregrine Survey 2017). In the absence of more detailed county-level information, the county breeding population is estimated to be 16 pairs, assuming an even spatial distribution across the 26 counties of Ireland covered by these data. Therefore, a regularly occurring breeding population of four pairs is required for classification as National Importance and of one pair for classification as County Importance. Estimates for the national or county wintering population of peregrine falcon are not available. Therefore, in the absence of national and county population estimates, and following the precautionary principle, regular records of wintering peregrine falcon are treated as County Importance.

Peregrine falcon was observed frequently during surveys. There was no evidence of breeding, and but there were regular observations within the Site during the winter seasons. Thus, this species is considered to be a population of **County Importance**.

7.4.1.8 Short-eared Owl

Short-eared owl is a scarce breeding bird in Ireland, as the majority of the European population breeds in Scandinavia and Russia. Therefore, the national breeding population of short-eared owl is estimated to be just 0-5 pairs (Crowe *et al.*, 2021) and they are generally restricted to the uplands in the south-west and Northern Ireland.

Short-eared owl was observed twice during a breeding season on the same day (likely the same bird encountered twice), and the observations were likely of a non-breeding bird. Therefore, there is **no population of ecological significance** using the Site.

7.4.1.9 Little Egret

The national breeding population of little egret is estimated to be 323-645 pairs (NPWS Article 12 Reporting). In the absence of more detailed county-level information, the county breeding population is estimated to be 12-25 pairs, assuming an even spatial distribution across the 26 counties of Ireland covered by these data. The national wintering population of little egret is estimated to be 1,274 birds (Burke *et al.*, 2018) and the county wintering population is estimated to be 16 birds (IWeBS mean count for the period 2016/17 – 2020/21). Therefore, a regularly occurring population of 3 breeding pairs or 13 wintering birds is required for classification as National Importance and of 1 breeding pair or 1 wintering bird for classification as County Importance.

Little egret was observed frequently during the breeding and wintering seasons, and up to six birds were seen. Thus, this species is considered to be a population of **County Importance**.

7.4.1.10 Whooper Swan

The national population of whooper swan is estimated to be 14,467 birds, and the county population is estimated to be 441 birds (Burke *et al.*, 2021). Therefore, a regularly occurring population of 145 birds is required for classification as National Importance and of 4 birds for classification as County Importance.

Whooper swan was observed occasionally during surveys including foraging within the Site on one occasion, with a maximum of ten birds seen within the Site. Thus, on a precautionary basis, this species is considered to be a wintering population of **County Importance**.

7.4.1.11 Barn Owl

The national breeding population of barn owl is estimated to be 562-702 pairs (NPWS Article 12 Reporting). In the absence of more detailed county-level information, the county breeding population is estimated to be 22-27 pairs, assuming an even spatial distribution across the 26 counties of Ireland covered by these data. Therefore, a regularly occurring population of six breeding pairs is required for classification as National Importance and of one breeding pair for classification as County Importance. Estimates for the national or county wintering population of barn owl are not available. Therefore, in the absence of national and county population estimates, and following the precautionary principle, regular records of wintering barn owl are treated as County Importance.

Barn owl were seen to be using a traditional nest site over 2km from the Site early in the breeding season. Barn owl was heard once calling at the Site, but subsequent surveys in this area identified no territory. There is considered to be **no population of ecological significance** using the Site.

7.4.1.12 Kestrel

The national population of kestrel is estimated to be 13,500 birds (Lewis *et al.*, 2019). In the absence of more detailed county-level information, the county population is estimated to be 519 birds, assuming an even spatial distribution of birds across the 26 counties of Ireland covered by these data. Therefore, a regularly occurring population of 135 birds is required for classification as National Importance and of 5 birds for classification as County Importance.

Kestrel was regularly observed within the Site and surrounds during the breeding and winter seasons. Birds were hunting within the Site. One territory and another probable territory were identified, both of which were further than 500m from the nearest proposed turbine. However, fledglings were seen using the Site in the 2021 breeding season. In the 2022 breeding season, a breeding pair were seen using the Site. This indicates that a pair were breeding near the Site in both breeding seasons, although no breeding territory was located. Kestrels have brood sizes of four to five chicks, and the survival rate for birds in their first year is 32%². Fledglings also remain near the adults' breeding territory until the following breeding season. Therefore, it is likely that 3 to 4 birds would be using the Site by the end of the winter season. Thus, this species is considered to be a population of **Local Importance (higher value)**.

7.4.1.13 Curlew

The national breeding population of curlew is estimated to be 105-119 pairs, and the county population is estimated to be 5 pairs (Colhoun *et al.*, 2022). The national wintering population of curlew is estimated to be 28,300 birds (Burke *et al.*, 2018) and the county wintering population is estimated to be 184 birds (IWeBS mean count for the period 2016/17 – 2020/21). As the breeding population is declining significantly in Ireland, on a precautionary basis, a regularly occurring population of one breeding pair is required for classification as National Importance, and thus as County Importance also. A regularly occurring population of 283 wintering birds is required for classification as National Importance and of 2 wintering birds for classification as County Importance.

Curlew was observed once during the breeding season, and there was no evidence of breeding activity during two breeding seasons of survey. Curlew was observed three times during the winter season, with a maximum of four birds seen 1.5km from the nearest proposed turbine. Therefore, there is **no population of ecological significance** using the Site.

² <https://www.bto.org/understanding-birds/birdfacts/kestrel>

7.4.1.14 Lapwing

The national breeding population of lapwing is estimated to be 520 pairs (NPWS Article 12 Reporting). In the absence of more detailed county-level information, the county breeding population is estimated to be 20 pairs, assuming an even spatial distribution across the 26 counties of Ireland covered by these data. The national wintering population of lapwing is estimated to be 69,823 birds (Burke *et al.*, 2018) and the county wintering population is estimated to be 518 birds (IWeBS mean count for the period 2016/17 – 2020/21, using records from IWeBS sites within 25km of the proposed turbines, which is considered a reasonable approximation of the size of a county). Therefore, a regularly occurring population of 5 breeding pairs or 698 wintering birds is required for classification as National Importance and of 1 breeding pair or 5 wintering birds for classification as County Importance.

Lapwing was regularly observed within the Site and surrounds during the breeding and winter seasons. One breeding territory was identified within the Site with one breeding pair. Also, a maximum of 375 birds were seen within the Site in the winter season. Thus, this species is considered to be a population of **County Importance**.

7.4.1.15 Snipe

The national population of snipe is estimated to be 8,550 birds (NPWS Article 12 Reporting). In the absence of more detailed county-level information, the county breeding population is estimated to be 164 pairs, assuming an even spatial distribution across the 26 counties of Ireland covered by these data. The county wintering population is estimated to be 26 birds (IWeBS mean count for the period 2016/17 – 2020/21), although this may be an underestimate due to the cryptic nature of this species. Therefore, a regularly occurring population of 86 birds is required for classification as National Importance.

Snipe was regularly observed within the Site and surrounds during the breeding and winter seasons. Breeding displays (drumming) were recorded within the Site, and a maximum count of 30 birds were seen within the Site in the winter season. Thus, this species is considered to be a population of **County Importance**.

7.4.1.16 Stock Dove

The national population of stock dove is estimated to be 27,486 pairs (Lewis *et al.*, 2019). In the absence of more detailed county-level information, the county population is estimated to be 1,057 pairs, assuming an even spatial distribution across the 26 counties of Ireland covered by these data. Therefore, a regularly occurring population of 275 pairs is required for classification as National Importance and of 11 pairs for classification as County Importance.

Stock dove was observed once during surveys, and two birds were seen within the Site. Therefore, there is **no population of ecological significance** using the Site.

7.4.1.17 Buzzard

The national population of buzzard is estimated to be 1,938 breeding pairs (NPWS Article 12 Reporting). In the absence of more detailed county-level information, the county population is estimated to be 75 breeding pairs, assuming an even spatial distribution across the 26 counties of Ireland covered by these data. Buzzard is not an SCI of an SPA within 15km of the Site, nor listed on Annex I, and is a Green Listed BoCCI species, indicating it is of lower conservation priority.

Buzzard was regularly observed within the Site and surrounds during the breeding and winter seasons. Birds were hunting within the Site, one breeding territory within the Site was identified, and further territories were in the hinterland. Thus, on a precautionary basis, this species is considered to be a population of **Local Importance (higher value)**.

7.4.1.18 Sparrowhawk

The national population of sparrowhawk is estimated to be 11,859 birds (Lewis *et al.*, 2019). In the absence of more detailed county-level information, the county population is estimated to be 456 birds, assuming an even spatial distribution across the 26 counties of Ireland covered by these data. Sparrowhawk is not an SCI of an SPA within 15km of the Site, nor listed on Annex I, and is a Green Listed BoCCI species, indicating it is of lower conservation priority.

Sparrowhawk was regularly observed within the Site and surrounds during the breeding and winter seasons. Birds were hunting within the Site, one breeding territory within the Site was identified, and another breeding territory within 1km of the turbines was identified. Thus, on a precautionary basis, this species is considered to be a population of **Local Importance (higher value)**.

7.4.1.19 Grey Wagtail

The national population of grey wagtail is estimated to be 50,768 birds (Lewis *et al.*, 2019). In the absence of more detailed county-level information, the county population is estimated to be 1,953 birds, assuming an even spatial distribution across the 26 counties of Ireland covered by these data. Therefore, a regularly occurring population of 508 birds is required for classification as National Importance and of 20 birds for classification as County Importance.

This species was occasionally observed during surveys, including within the Site, though is likely to be under-recorded due to its ecology and preferred habitats. It is considered to be a population of **Local Importance (Lower Value)**.

7.4.1.20 Meadow Pipit

The national population of meadow pipit is estimated to be 1,351,995 birds (Lewis *et al.*, 2019). In the absence of more detailed county-level information, the county population is estimated to be 52,000 birds, assuming an even spatial distribution across the 26 counties of Ireland covered by these data. Therefore, a regularly occurring population of 13,520 birds is required for classification as National Importance and of 520 birds for classification as County Importance.

Meadow pipit was abundant within the Site and surrounds during surveys. Birds were foraging, displaying and breeding. Thus, given that this is an abundant and widespread species, it is considered to be a population of **Local Importance (Lower Value)**.

7.4.1.21 Redwing

Estimates for the national or county wintering population of redwing are not available. However, the estimate for Europe is 26,300,000-40,300,000 birds, a proportion of which visit Ireland in winter.

Redwing was abundant within the Site and surrounds during surveys. Birds were foraging and roosting, with a maximum count of 342 birds made. Thus, given that this is a widespread species, it is considered to be a wintering population of **Local Importance (Lower Value)**.

7.4.1.22 Swift

The national population of swift is estimated to be 51,728 birds (Lewis *et al.*, 2019). In the absence of more detailed county-level information, the county population is estimated to be 1,990 birds, assuming an even spatial distribution across the 26 counties of Ireland covered by these data. Therefore, a regularly occurring population of 517 birds is required for classification as National Importance and of 20 birds for classification as County Importance.

Swift was observed within the Site during surveys with the majority of flocks being less than 10 birds (maximum of 43 birds seen on one occasion). Thus, given that this is a widespread species, it is considered to be a population of **Local Importance (Lower Value)**.

7.4.1.23 Yellowhammer

The national population of yellowhammer is estimated to be 217,252 birds (Lewis *et al.*, 2019). In the absence of more detailed county-level information, the county Tipperary population is estimated to be approximately 11,434 birds, assuming an even spatial distribution across the 19 counties of Ireland where this species was frequently recorded in the distribution map provided in Lewis *et al.* (2019). Therefore, a regularly occurring population of 2,173 birds is required for classification as National Importance and of 114 birds for classification as County Importance.

A single yellowhammer was observed on one occasion outside the Site during surveys. Therefore, there is **no population of ecological significance** using the Site.

7.4.2 Identification of Key Ornithological Receptors

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

Table 7-11 Receptor evaluation and selection criteria rational

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
Hen Harrier	Annex I Birds Directive & Raptor	<u>Wintering</u> County Importance	<p>Hen harrier was occasionally recorded hunting within the Site during winter. On a precautionary basis, the potential for direct habitat loss cannot be excluded. As such, an assessment of direct habitat loss is required.</p> <p>Birds were occasionally recorded hunting within the Site during winter. On a precautionary basis, the potential for disturbance/displacement cannot be excluded. As such, an assessment of disturbance/displacement is required.</p> <p>Hen harrier was not recorded flying within the Site at PCH. A collision risk assessment is not required.</p>	Yes
Kingfisher	Annex I Birds Directive & SCI of River Nore SPA	<u>All Seasons</u> County Importance	<p>Kingfisher was not recorded using habitats within the Site. As such, an assessment of direct habitat loss is not required.</p> <p>Birds were occasionally recorded within the Site during the breeding season. Given that this species can be elusive, on a precautionary basis, the potential for disturbance/displacement cannot be excluded. As such, an assessment of disturbance/displacement is required.</p> <p>Kingfisher was not recorded flying over the Site at PCH. As such, an assessment of collision risk is not required.</p>	Yes

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
Dunlin	Annex I Birds Directive & Red List (Breeding & Wintering Populations)	No population of ecological significance recorded	<p>Dunlin was recorded roosting within the Site on one occasion during the survey period. This low frequency of occurrence limits the potential for impacts of habitat loss. As such, an assessment of direct habitat loss is not required.</p> <p>Birds were recorded within the Site on two occasions during the survey period. This low frequency of occurrence limits the potential for impacts of disturbance/displacement. As such, an assessment of disturbance/displacement is not required.</p> <p>Dunlin was not recorded flying over the Site at PCH. As such, an assessment of collision risk is not required.</p>	No
Golden Plover	Annex I Birds Directive & Red List (Breeding & Wintering Populations)	<u>Wintering and Passage</u> County Importance	<p>Golden plover was recorded roosting and foraging within grassland habitat in the Site. The potential for direct habitat loss cannot be excluded. As such, an assessment of direct habitat loss is required.</p> <p>Birds were regularly recorded within the Site. The potential for disturbance/displacement cannot be excluded. As such, an assessment of disturbance/displacement is required.</p> <p>Golden plover was recorded flying within the Site at PCH. The potential for collision risk cannot be excluded. As such, an assessment of collision risk is required.</p>	Yes

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
Greenland White-fronted Goose	Annex I Birds Directive & Red List (Wintering Populations)	No population of ecological significance recorded	<p>Greenland white-fronted goose was not recorded using habitats within the Site. As such, an assessment of direct habitat loss is not required.</p> <p>Birds were recorded travelling through the Site on one occasion over the entire survey period. This low frequency of occurrence limits the potential for disturbance/displacement. As such, an assessment of disturbance/displacement is not required.</p> <p>Greenland white-fronted goose was recorded flying within the Site at PCH on one occasion during three winter seasons of survey. There was no evidence to suggest that this is a commuter or migratory route, given that birds were seen on only one occasion during a comprehensive suite of surveys including dawn and dusk surveys. Greenland white-fronted goose has not been recorded in previous wintering bird atlases nor the NBDC records for the hectad in which the Site is located, nor at Tipperary IWeBS sites since 2010/11. It is likely that this flock was passing through the area, limiting the potential for collision risk. As such, an assessment of collision risk is not required.</p>	No
Merlin	Annex I Birds Directive & Raptor	<u>Wintering and Passage</u> County Importance	<p>Merlin was recorded hunting within the Site during winter. The potential for direct habitat loss cannot be excluded. As such, an assessment of direct habitat loss is required.</p> <p>Birds were recorded hunting within the Site during winter. The potential for disturbance/displacement cannot be excluded. As such, an assessment of disturbance/displacement is required.</p> <p>Merlin was recorded flying within the Site at PCH. The potential for collision risk cannot be excluded. As such, an assessment of collision risk is required.</p>	Yes

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
Peregrine Falcon	Annex I Birds Directive & Raptor	<u>All Seasons</u> County Importance	<p>Peregrine falcon was regularly recorded hunting within the Site. The potential for direct habitat loss cannot be excluded. As such, an assessment of direct habitat loss is required.</p> <p>Birds were regularly recorded hunting within the Site. The potential for disturbance/displacement cannot be excluded. As such, an assessment of disturbance/displacement is required.</p> <p>Peregrine falcon was recorded flying within the Site at PCH. The potential for collision risk cannot be excluded. As such, an assessment of collision risk is required.</p>	Yes
Short-eared Owl	Annex I Birds Directive & Raptor	No population of ecological significance recorded	<p>Short-eared owl was recorded hunting within the Site on one occasion. Given the low frequency of occurrence, the potential for direct habitat loss is limited. As such, an assessment of direct habitat loss is not required.</p> <p>One bird was recorded within the Site on one day. Given the low frequency of occurrence, the potential for disturbance/displacement is limited. As such, an assessment of disturbance/displacement is not required.</p> <p>Short-eared owl was not recorded flying over the Site at PCH. As such, an assessment of collision risk is not required.</p>	No
Little Egret	Annex I Birds Directive	<u>All seasons</u> County Importance	<p>Little egret was recorded foraging within the Site on two occasions in the winter season. Given the low frequency of birds using habitat within the Site, the potential for direct habitat loss is limited. As such, an assessment of direct habitat loss is not required.</p>	Yes

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
			<p>Birds were occasionally recorded foraging and flying within the Site. Given the low frequency of occurrence, the potential for disturbance/displacement is limited. As such, an assessment of disturbance/displacement is not required.</p> <p>Little egret was recorded flying within the Site at PCH. The potential for collision risk cannot be excluded. As such, an assessment of collision risk is required.</p>	
Whooper Swan	Annex I Birds Directive	<u>Wintering</u> County Importance	<p>Whooper swan was recorded foraging within the Site on one occasion. Given the low frequency of occurrence, the potential for direct habitat loss is limited. As such, an assessment of direct habitat loss is not required.</p> <p>Birds were occasionally recorded flying within the Site. The potential for disturbance/displacement cannot be excluded. As such, an assessment of disturbance/displacement is required.</p> <p>Whooper swan was recorded flying within the Site at PCH. The potential for collision risk cannot be excluded. As such, an assessment of collision risk is required.</p>	Yes
Barn Owl	Red List (Breeding Populations) & Raptor	No population of ecological significance	<p>Barn owl was not recorded using the Site (one auditory record on Site during the survey period). Barn owl was recorded at a traditional nest site over 2km from the Site. The separation distance between the nest site and the Site is such that no impact of the development is anticipated. As such, the potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the development site is of significance to this species. An assessment of direct habitat loss, disturbance/displacement and collision risk is not required.</p>	No

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
Kestrel	Red List (Breeding Populations) & Raptor	<u>All Seasons</u> Local Importance (higher value)	<p>Kestrel was regularly recorded hunting, preening and roosting within the Site. Kestrel fledglings were also observed using habitats in the northern area of the Site. The potential for direct habitat loss cannot be excluded. As such, an assessment of direct habitat loss is required.</p> <p>Birds were regularly recorded hunting, preening and roosting within the Site and up to five territories were located in the surrounding area. The disturbance distance for kestrel is up to 200m (based on a person walking; Goodship and Furness, 2022), therefore the separation distance between the territories and the Site is such that no impact is anticipated. However, kestrel fledglings were also observed using habitats in the northern area of the Site and surrounds. Therefore, the potential for disturbance/displacement cannot be excluded. As such, an assessment of disturbance/displacement is required.</p> <p>Kestrel was recorded flying within the Site at PCH. The potential for collision risk cannot be excluded. As such, an assessment of collision risk is required.</p>	Yes
Curlew	Red List (Breeding & Wintering Populations)	No population of ecological significance recorded	<p>Curlew was recorded using habitats within the Site once during winter and was not using the Site during the breeding season. Given the low frequency of occurrence, the potential for direct habitat loss is limited. As such, an assessment of direct habitat loss is not required.</p> <p>Birds were recorded foraging or flying within the Site on two occasions over the survey period. Given the low frequency of occurrence, the potential for disturbance/displacement is limited. As such, an assessment of disturbance/displacement is not required.</p> <p>Curlew was not recorded flying within the Site at PCH. As such, an assessment of collision risk is not required.</p>	No

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
Lapwing	Red List (Breeding & Wintering Populations)	<u>All Seasons</u> County Importance	<p>Lapwing was regularly recorded foraging, roosting and displaying in habitats within the Site. The potential for direct habitat loss cannot be excluded. As such, an assessment of direct habitat loss is required.</p> <p>Birds were regularly recorded roosting, foraging, displaying and flying within the Site. A territory was also identified within the Site boundary, 650m southwest of the nearest proposed turbine, and two chicks were seen there. The disturbance distance for lapwing in the breeding season is on average 108m (Hötter <i>et al.</i>, 2006), therefore the separation distance between the breeding territory turbines is such that no operational impact is anticipated. However, as birds were also recorded within the Site during the winter and breeding season, the potential for disturbance/displacement cannot be excluded. As such, an assessment of disturbance/displacement is required.</p> <p>Lapwing was recorded flying within the Site at PCH. The potential for collision risk cannot be excluded. As such, an assessment of collision risk is required.</p>	Yes
Snipe	Red List (Breeding & Wintering Populations)	<u>All Seasons</u> County Importance	<p>Snipe was regularly recorded flying within the Site. Snipe was occasionally recorded roosting, displaying and feeding and within the Site. The potential for direct habitat loss cannot be excluded. As such, an assessment of direct habitat loss is required.</p> <p>Birds were recorded roosting, displaying, feeding and flying within the Site. The potential for disturbance/displacement cannot be excluded. As such, an assessment of disturbance/displacement is required.</p> <p>Snipe was recorded flying within the Site at PCH. The potential for collision risk cannot be excluded. As such, an assessment of collision risk is required.</p>	Yes

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
Stock Dove	Red List (Breeding Populations)	No population of ecological significance recorded	As per NatureScot guidance, it is generally considered that passerine bird species are not significantly impacted by wind farms due to their ecology. Although stock dove is not a true passerine bird species, its ecology would be similar to that of a passerine bird species. As such, the potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the development will significantly impact this species. An assessment of direct habitat loss, disturbance/displacement and collision risk is not required.	No
Buzzard	Raptor	<u>All Seasons</u> Local Importance (higher value)	<p>Buzzard was regularly recorded hunting within the Site. A nest site was also identified and fledglings were recorded using the Site. The potential for direct habitat loss cannot be excluded. As such, an assessment of direct habitat loss is required.</p> <p>Birds were recorded hunting, carrying prey and flying within the Site (including fledglings) and nest sites were identified in the surrounding area (800m, 820m, 1.5km and 1.8km from the nearest proposed turbine). The disturbance distance for buzzard is up to 200m (based on a person walking; Goodship and Furness, 2022), therefore the separation distance between the nest sites and the Site is such that no operational impact is anticipated. However, due to the presence of a nest site within the Site, and regular activity within the Site, the potential for disturbance/displacement cannot be excluded. As such, an assessment of disturbance/displacement is required.</p> <p>Buzzard was recorded flying within the Site at PCH. The potential for collision risk cannot be excluded. As such, an assessment of collision risk is required.</p>	Yes

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
Sparrowhawk	Raptor	<u>All Seasons</u> Local Importance (higher value)	<p>Sparrowhawk was regularly recorded hunting within the Site. A nest site was also identified and fledglings were recorded within the Site. The potential for direct habitat loss cannot be excluded. As such, an assessment of direct habitat loss is required.</p> <p>Birds were recorded hunting, carrying prey and flying within the Site. A juvenile bird was heard calling in the breeding season approximately 670m west of the nearest proposed turbine, suggesting the presence of a nest site in that area. There is no literature available on the disturbance distance for sparrowhawk. However, due to the presence of a nest site within the Site, and regular activity within the Site, the potential for disturbance/displacement cannot be excluded. As such, an assessment of disturbance/displacement is required.</p> <p>Sparrowhawk was recorded flying within the Site at PCH. The potential for collision risk cannot be excluded. As such, an assessment of collision risk is required.</p>	Yes
Grey Wagtail	Red List (Breeding Populations)	<u>All Seasons</u> Local Importance (lower value)	<p>As per NatureScot guidance, it is generally considered that passerine bird species are not significantly impacted by wind farms due to their ecology. As such, the potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the development will significantly impact this species. An assessment of direct habitat loss, disturbance/displacement and collision risk is not required.</p>	No

Species	Conservation Status	NRA Evaluation	Rationale for inclusion/exclusion as KOR	KOR
Meadow Pipit	Red List (Breeding Populations)	<u>All Seasons</u> Local Importance (lower value)	As per NatureScot guidance, it is generally considered that passerine bird species are not significantly impacted by wind farms due to their ecology. As such, the potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the development will significantly impact this species. An assessment of direct habitat loss, disturbance/displacement and collision risk is not required.	No
Redwing	Red List (Wintering Populations)	<u>Wintering</u> Local Importance (lower value)	As per NatureScot guidance, it is generally considered that passerine bird species are not significantly impacted by wind farms due to their ecology. As such, the potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the development will significantly impact this species. An assessment of direct habitat loss, disturbance/displacement and collision risk is not required.	No
Swift	Red List (Breeding Populations)	<u>Breeding</u> Local Importance (lower value)	As per NatureScot guidance, it is generally considered that passerine bird species are not significantly impacted by wind farms due to their ecology. As such, the potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the development will significantly impact this species. An assessment of direct habitat loss, disturbance/displacement and collision risk is not required.	No
Yellowhammer	Red List (Breeding Populations)	No population of ecological significance recorded	As per NatureScot guidance, it is generally considered that passerine bird species are not significantly impacted by wind farms due to their ecology. As such, the potential for direct habitat loss, disturbance/displacement and collision risk are limited and there is no evidence to suggest that the development will significantly impact this species. An assessment of direct habitat loss, disturbance/displacement and collision risk is not required.	No

7.4.3 Key Ornithological Receptor Sensitivity Determination

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

High Sensitivity KORs are:

- Hen harrier (ecologically sensitive species)

Medium Sensitivity KORs are:

- Kingfisher (Annex I & county important population)
- Golden plover (Annex I & county important population)
- Merlin (Annex I & county important population)
- Peregrine falcon (Annex I & county important population)
- Little Egret (Annex I & county important population)
- Whooper Swan (Annex I & county important population)
- Kestrel (BoCCI Red Listed & county important population)
- Lapwing (BoCCI Red Listed & county important population)
- Snipe (BoCCI Red Listed & county important population)

Low Sensitivity KORs are:

- Buzzard (lower conservation concern)
- Sparrowhawk (lower conservation concern)

7.5 Potential Impacts

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

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

7.5.1 Do-Nothing Effect

If the Proposed Project were not to proceed, the site would continue to be managed under the various current management practices. The site is principally characterised by improved agricultural grassland utilised for livestock grazing, and some wet grassland, commercial forestry plantation and arable land. It is assumed that the character of the bird community, including the KORs identified, will remain much as it is described in the baseline ornithological conditions.

In addition, if the Proposed Project were not to proceed, the opportunity to restore a segment of the Eastwood River by improving channel stability, instream habitat and establishing a natural wooded riparian buffer would be lost. Please see Appendix 6-4 Biodiversity Management and Enhancement Plan for details of the restoration of a segment of the river.

7.5.2 Effects on Key Ornithological Receptors during Construction and Operation

The tables in the following sections describe potential effects on KORs that may occur during the construction and operation of the Proposed Wind Farm. The magnitude and significance of these effects are then defined according to Percival (2003) and EPA (2022) criteria. The Proposed Grid Connection is assessed separately in Section 7.5.5.

7.5.2.1 Hen Harrier (Wintering)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Construction Phase			
Direct Habitat Loss	<p>Hen harrier was occasionally recorded hunting within the Site over three winter seasons. No roosting site was identified.</p> <p>Birds were observed hunting in farmland on the Site. Farmland is not a scarce resource locally. Extensive areas of similar hunting habitat will remain, as the footprint of the development accounts for a small proportion of the Site and there is an abundance of farmland habitat in the surrounding area. Based on this and the low frequency of hunting hen harrier within the Site, no significant effects of direct habitat loss are anticipated at the county, national or international scale.</p>	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of a <i>High</i> sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.	Likely long-term constant slight negative effect
Disturbance	<p>This species was occasionally recorded hunting within the Site over three winter seasons. No roosting site was identified.</p> <p>During wind farm construction, displacement has been suggested potentially to occur up to 500m around construction works, with some disruption up to 1km, depending on line of visibility (Madders, 2004, cited in Bright <i>et al.</i>, 2006). It is assumed that temporary disturbance will occur around the Site during construction works. However, given the low number of records within 500m of the works area, this species is not considered to be dependent on the Site or surrounds for hunting. In addition, farmland is not a scarce resource locally.</p>	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of a <i>High</i> sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.	Likely short-term frequent slight negative effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
	Based on the low frequency of hunting hen harrier and the availability of alternative hunting habitat, no significant effects of disturbance are anticipated at the county, national or international scale.		
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	No Effect	No Effect
Displacement and Barrier Effect	<p>This species was occasionally recorded hunting within the Site over three winter seasons. No roosting site was identified.</p> <p>Pearce-Higgins <i>et al.</i> (2009) found significant avoidance of turbines by hen harrier within 250m, and reduced flight activity (52%) by hen harrier within 500m of turbines at operating wind farms. However, given the low number of hen harrier records within 500m of the turbines, this species is not considered to be dependent on the Site for roosting or hunting. In addition, areas of hunting habitat will remain during operation, as the footprint of the development accounts for a small proportion of the Site, and farmland is not a scarce resource locally. Based on the low frequency of hunting hen harrier and the availability of alternative hunting habitat, no significant displacement or barrier effects are anticipated at the county, national or international scale.</p>	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of a <i>High</i> sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.	Likely long-term constant slight negative effect
Collision Risk	This species was not recorded flying at PCH during the extensive vantage point survey work undertaken. Collision related mortality is not likely to significantly impact this species, based on available data. No significant effects of collision risk are anticipated.	No Effect	No Effect

7.5.2.2 Kingfisher (All seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Construction Phase			
Direct Habitat Loss	<p>Kingfisher was recorded flying within the Site during the breeding season on three occasions over the survey period. It was not recorded hunting or breeding within the Site.</p> <p>Kingfisher was not recorded using habitats in the Site during surveys. As such, the potential for effects of direct habitat loss is low. In addition, as part of the Proposed Wind Farm design, it is proposed to restore appropriate pattern, profile and dimension to a segment of the Eastwood River channel in the Site, with a view to improving stability of the channel and restoring in stream habitat. This may benefit kingfisher by creating suitable riparian hunting habitat. No significant effects of direct habitat loss are anticipated.</p>	<p>The magnitude of the effect is assessed as <i>Negligible</i>. The cross tabulation of a <i>Medium</i> sensitivity species and <i>Negligible</i> impact corresponds to a Very Low effect significance.</p>	<p>Likely long-term constant not significant negative effect</p>
Disturbance	<p>This species was recorded flying within the Site during the breeding season on three occasions over the survey period. It was not recorded hunting or breeding within the Site. It was also recorded hunting and flying during the winter season, over 800m from the nearest proposed turbine.</p> <p>No literature is available describing at what distance from construction areas kingfishers are likely to be disturbed. Goodship and Furness (2022) suggest disturbance up to 100m from humans could occur, and that they are particularly sensitive to human disturbance during the breeding season. It is assumed that temporary disturbance will occur around the Site during construction works. However, kingfisher is not considered to be dependent on the Site or immediate surrounds for hunting or breeding. Therefore, no significant effects of disturbance are anticipated at the county, national or international scale.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>. The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> impact corresponds to a Low effect significance.</p>	<p>Likely short-term frequent slight negative effect</p>

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	No Effect	No Effect
Displacement and Barrier Effect	<p>This species was recorded flying within the Site during the breeding season on three occasions over the survey period. It was not recorded hunting or breeding within the Site. It was also recorded hunting and flying during the winter season, over 800m from the nearest proposed turbine.</p> <p>No literature is available describing if wind farms have displacement or barrier effects on kingfishers. Goodship and Furness (2022) suggest disturbance up to 100m from humans could occur, and that they are particularly sensitive to human disturbance during the breeding season, but they may also be able to habituate to the disturbance. However, kingfisher is not considered to be dependent on the Site or immediate surrounds for hunting or breeding. Therefore, no significant displacement or barrier effects are anticipated at the county, national or international scale.</p>	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.	Likely long-term constant slight negative effect
Collision Risk	This species was not recorded flying at PCH during the extensive vantage point survey work undertaken. Collision related mortality is also not likely to significantly impact this species, given the typically low altitude of flights along watercourses. No significant effects of collision risk are anticipated.	No Effect	No Effect

7.5.2.3 Golden Plover (Wintering and Passage)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Construction Phase			
Direct Habitat Loss	<p>Golden plover was recorded roosting, foraging and flying within the Site during the winter. Up to 187 birds were observed using the Site.</p> <p>During surveys, golden plover were using farmland grass fields in the Site for foraging and roosting. Farmland is not a scarce resource locally, therefore there is an abundance of similar habitat in the surrounding area that will be available to golden plover. However, given the relatively large flock sizes observed throughout the winter, the magnitude of the effect of direct habitat loss is assessed as medium.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>. The cross tabulation of a <i>Medium</i> sensitivity species and <i>Medium</i> impact corresponds to a Low effect significance.</p>	Likely long-term constant slight negative effect
Disturbance	<p>Golden plover was recorded roosting, foraging and flying within the Site during the winter. Up to 187 birds were observed using the Site and up to 576 birds were observed flying over the Site. There were also observations in the hinterland of up to 117 birds up to 2km from the nearest proposed turbine.</p> <p>Pearce-Higgins <i>et al.</i> (2012) did not find any significant negative affect of construction works on breeding golden plover populations (though it must be taken into account that the number of sites studied was low), while Goodship and Furness (2022) suggest golden plover could be disturbed up to 500m from humans. It is assumed that temporary disturbance will occur around the Site during construction works. Golden plover were using farmland fields when foraging and roosting, or else in flight prospecting fields, and, as farmland is not a scarce resource locally, there is an abundance of available habitat in the surrounding area. However, given the relatively large flock sizes observed through the winter, the magnitude of the effect of disturbance is assessed as medium.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>. The cross tabulation of a <i>Medium</i> sensitivity species and <i>Medium</i> impact corresponds to a Low effect significance.</p>	Likely short-term frequent slight negative effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	No Effect	No Effect
Displacement and Barrier Effect	<p>Golden plover was recorded roosting, foraging and flying within the Site during the winter. Up to 187 birds were observed using the Site, and up to 576 birds were observed flying over the Site. There were also observations in the hinterland of up to 117 birds up to 2km from the nearest proposed turbine.</p> <p>Hötter <i>et al.</i> (2006) found golden plover was disturbed from wind farms at an average minimum distance of 175m during the winter season. During surveys, golden plover were using farmland fields when foraging and roosting, or else in flight prospecting fields, and no commuting was observed. As farmland is not a scarce resource locally, there is an abundance of available habitat in the surrounding area. However, given the relatively large flock sizes observed through the winter, the magnitude of displacement or barrier effects is assessed as medium.</p>	The magnitude of the effect is assessed as <i>Medium</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Medium</i> impact corresponds to a <i>Low</i> effect significance.	Likely long-term constant slight negative effect
Collision Risk	<p>The species was recorded flying within PCH during vantage point surveys. A “Random” collision risk analysis has been undertaken (full details provided in Appendix 7-6). The model used for the analysis assumes that waterbird species, including golden plover, are active for 25% of dark hours, in addition to daylight hours. The collision risk has been calculated at a ratio of 55.95 collisions per year.</p> <p>Annual mortality of adult golden plover has been calculated at 27% per annum (Sandercock, 2003). If 55.95 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 (c.580) by 36%. As the magnitude of the predicted collision risk is high (Percival, 2003), a Bird Mitigation Plan with the objective of reducing golden plover flight activity in the turbine area has been prepared.</p>	The magnitude of the effect is assessed as <i>High</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>High</i> impact corresponds to a <i>Medium</i> effect significance.	Likely long-term constant moderate negative effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
	This is described in Section 7.6.2.2 and Appendix 7-7. Following successful implementation of the mitigation plan, no significant effects of collision risk are anticipated.		

7.5.2.4 Merlin (Wintering and Passage)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Construction Phase			
Direct Habitat Loss	<p>Merlin was frequently recorded hunting within the Site over three winter seasons. No roosting site was identified.</p> <p>Birds were hunting in farmland and along field boundaries. Farmland is not a scarce resource locally. Extensive areas of hunting habitat will remain, as the footprint of the development accounts for a small proportion of the Site, and there is an abundance of similar suitable hunting habitat in the surrounding area. Based on this, no significant effects of direct habitat loss are anticipated at the county, national or international scale.</p>	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.	Likely long-term constant slight negative effect
Disturbance	<p>Merlin was frequently recorded hunting within the Site over three winter seasons. No roosting site was identified.</p> <p>Few studies have been done on the effects of disturbance on merlin during the winter. Goodship and Furness (2022) suggest disturbance up to 200m from humans can occur. It is assumed that temporary disturbance will occur around the Site during construction works. However, as farmland is not a scarce resource locally, there is an abundance of available habitat in the surrounding area. Based on this, no significant effects of disturbance are anticipated at the county, national or international scale.</p>	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.	Likely short-term frequent slight negative effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	No Effect	No Effect
Displacement and Barrier Effect	<p>Merlin was frequently recorded hunting within the Site over three winter seasons. No roosting site was identified.</p> <p>Few studies have been done on the effects of disturbance on merlin in wind farms during the winter. Goodship and Furness (2022) suggest disturbance up to 200m from humans can occur. Areas of hunting habitat will remain during operation, as the footprint of the development accounts for a small proportion of the Site, and, as farmland is not a scarce resource locally, there is also an abundance of available habitat in the surrounding area. Based on this, no significant displacement or barrier effects are anticipated at the county, national or international scale.</p>	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.	Likely long-term constant slight negative effect
Collision Risk	The species was recorded flying within PCH during vantage point surveys. A “Random” collision risk analysis has been undertaken (full details provided in Appendix 7-6). The collision risk has been calculated at a ratio of 0.015 collisions per year, or one bird every 69 years. The predicted collision risk is negligible.	The magnitude of the effect is assessed as <i>Negligible</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Negligible</i> impact corresponds to a <i>Very Low</i> effect significance.	Likely long-term constant not significant negative effect

7.5.2.5 Peregrine Falcon (All seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Construction Phase			
Direct Habitat Loss	<p>Peregrine falcon was frequently recorded hunting within the Site during the winter and breeding seasons.</p> <p>Birds were observed hunting in farmland. Farmland is not a scarce resource locally. Extensive areas of similar hunting habitat will remain, as the footprint of the development accounts for a small proportion of the Site, and there is an abundance of similar suitable hunting habitat in the surrounding area. Based on this, no significant effects of direct habitat loss are anticipated at the county, national or international scale.</p>	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.	Likely long-term constant slight negative effect
Disturbance	<p>This species was frequently recorded hunting and flying within the Site during the winter and breeding season. No breeding territory was identified within the 2km survey area.</p> <p>Ruddock and Whitfield (2007) found that peregrine falcons can be disturbed up to 750m from humans. It is assumed that temporary disturbance will occur around the Site during construction works. However, peregrine falcon has been documented to become accustomed to various sources of human disturbance. In addition, as farmland is not a scarce resource locally, there is an abundance of available habitat in the surrounding area. Based on this, no significant effects of disturbance are anticipated at the county, national or international scale.</p>	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.	Likely short-term frequent slight negative effect
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	No Effect	No Effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Displacement and Barrier Effect	<p>This species was frequently recorded hunting and flying within the Site during the winter and breeding season. No breeding territory was identified within the 2km survey area.</p> <p>Ruddock and Whitfield (2007) found that peregrine falcons can be disturbed up to 750m from humans. Areas of hunting habitat will remain during operation, as the footprint of the development accounts for a small proportion of the Site, and, as farmland is not a scarce resource locally, there is an abundance of available habitat in the surrounding area. Based on this, no significant displacement or barrier effects are anticipated at the county, national or international scale.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>. The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.</p>	<p>Likely long-term constant slight negative effect</p>
Collision Risk	<p>The species was recorded flying within PCH during vantage point surveys. A “Random” collision risk analysis has been undertaken (full details provided in Appendix 7-6). The collision risk has been calculated at a ratio of 0.165 collisions per year, or one bird every 6 years.</p> <p>Annual mortality of adult peregrine falcon has been calculated at 19% per annum (Craig <i>et al.</i>, 2004). If 0.165 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 (c.32) by 3%.</p> <p>In addition, peregrine falcon recorded during surveys are likely attracted to the presence of their prey species lapwing and golden plover at the Site. A Bird Mitigation Plan with the objective of reducing lapwing and golden plover activity in the Site has been prepared (see Section 7.6.2.2 and Appendix 7-7). A reduction of lapwing and golden plover presence in the Site may in turn reduce flight activity of peregrine falcon.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>. The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.</p>	<p>Likely long-term constant slight negative effect</p>

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
	The predicted collision risk is low. No significant effects of collision risk are anticipated at the county, national or international scale.		

7.5.2.6 Little Egret (All seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Construction Phase			
Direct Habitat Loss	<p>Little egret was recorded using habitats within the Site once during the winter season.</p> <p>Little egret use of habitats in the Site was limited. As such, the potential for effects of direct habitat loss is low. No significant effects of direct habitat loss are anticipated.</p>	The magnitude of the effect is assessed as <i>Negligible</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Negligible</i> impact corresponds to a Very Low effect significance.	Likely long-term constant not significant negative effect
Disturbance	<p>Little egret was recorded using habitats within the Site once during the winter season. It was also recorded foraging and flying within the surrounding area. No breeding territory was identified.</p> <p>Few studies have been done on the effects of disturbance on little egrets. It is assumed that temporary disturbance will occur around the Site during construction works. There was a low number of little egret records within the Site and immediate surrounds, and no breeding site was identified over the survey period, therefore this species is not considered to be dependent on the Site or surrounds for roosting, foraging or breeding. Based on this, no significant effects of disturbance are anticipated.</p>	The magnitude of the effect is assessed as <i>Negligible</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Negligible</i> impact corresponds to a Very Low effect significance.	Likely short-term frequent not significant negative effect
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	No Effect	No Effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Displacement and Barrier Effect	<p>Little egret was recorded using habitats within the Site once during the winter season. It was also recorded foraging and flying within the surrounding area. No breeding territory was identified.</p> <p>Few studies have been done on the effects of disturbance on little egrets. There was a low number of little egret records within 500m of the turbines, and no breeding site was identified over the survey period, therefore this species is not considered to be dependent on the Site or surrounds for roosting, foraging or breeding. Based on this, no significant displacement or barrier effects are anticipated at the county, national or international scale.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>. The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.</p>	<p>Likely long-term constant slight negative effect</p>
Collision Risk	<p>The species was recorded flying within PCH during vantage point surveys. A “Random” collision risk analysis has been undertaken (full details provided in Appendix 7-6). The model used for the analysis assumes that waterbird species, including little egret, are active for 25% of dark hours, in addition to daylight hours. The collision risk has been calculated at a ratio of 0.174 collisions per year, or one bird every 6 years.</p> <p>Annual mortality of adult little egret has been calculated at 28.8% per annum (Halfner <i>et al.</i>, 1998). If 0.174 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 (c.16) by 4%. The predicted collision risk is low. No significant effects of collision risk are anticipated at the county, national or international scale.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>. The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.</p>	<p>Likely long-term constant slight negative effect</p>

7.5.2.7 Whooper Swan (Wintering)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Construction Phase			
Direct Habitat Loss	<p>Whooper swan was recorded foraging once within the Site during the winter season.</p> <p>Given the low number of records and low number of birds within the Site over three winter seasons of survey, this species is not considered to be dependent on the Site for roosting or foraging. No significant effects of direct habitat loss are anticipated.</p>	The magnitude of the effect is assessed as <i>Negligible</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Negligible</i> impact corresponds to a Very Low effect significance.	Likely long-term constant not significant negative effect
Disturbance	<p>Whooper swan was recorded foraging once within the Site during the winter season. It was also occasionally recorded foraging and flying within 500m of the Site over the survey period. No roosting site was identified.</p> <p>Few studies have been done on the effects of disturbance on whooper swan during the winter. Goodship and Furness (2022) suggest disturbance up to 600m from humans can occur, based on studies on geese. It is assumed that temporary disturbance will occur around the Site during construction works. However, given the low frequency of occurrence of whooper swan within 500m of the Site, no significant effects of disturbance are anticipated at the county, national or international scale.</p>	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> impact corresponds to a Low effect significance.	Likely short-term frequent slight negative effect
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	No Effect	No Effect
Displacement and Barrier Effect	Whooper swan was recorded foraging once within the Site during the winter season. It was also occasionally recorded foraging and flying within 500m of the turbines over the survey period. No roosting site was identified.	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i>	Likely long-term constant slight negative effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
	Few studies have been done on the effects of disturbance on whooper swan during the winter. Goodship and Furness (2022) suggest disturbance up to 600m from humans can occur, based on studies on geese. However, given the low frequency of occurrence of whooper swan within 500m of the turbines, no significant displacement or barrier effects are anticipated at the county, national or international scale.	impact corresponds to a Low effect significance.	
Collision Risk	<p>The species was recorded flying within PCH during vantage point surveys. A “Random” collision risk analysis has been undertaken (full details provided in Appendix 7-6). The model used for the analysis assumes that waterbird species, including whooper swan, are active for 25% of dark hours, in addition to daylight hours. The collision risk has been calculated at a ratio of 0.21 collisions per year, or one bird every 5 years.</p> <p>Annual mortality of adult whooper swan has been calculated at 20% per annum (Brazil, 2003). If 0.21 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 (c.441) by 0.24%. The predicted collision risk is negligible. No significant effects of collision risk are anticipated.</p>	The magnitude of the effect is assessed as <i>Negligible</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Negligible</i> impact corresponds to a Very Low effect significance.	Likely long-term constant not significant negative effect

7.5.2.8 Kestrel (All seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Construction Phase			
Direct Habitat Loss	Kestrel was recorded hunting regularly within the Site throughout the survey period. Fledglings and a probable breeding pair were also recorded within the Site. No breeding territory was identified within the Site.	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i>	Likely long-term constant slight negative effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
	<p>Kestrel was observed using farmland for hunting. Kestrel is unlikely to be dependent on the Site habitat, given its wide-ranging and generalist nature. In addition, farmland is not a scarce resource locally. Extensive areas of similar hunting habitat will remain, as the footprint of the development accounts for a small proportion of the Site, and there is an abundance of similar suitable hunting habitat in the surrounding area. Based on this, no significant effects of direct habitat loss are anticipated at the county, national or international scale.</p>	<p>impact corresponds to a Low effect significance.</p>	
Disturbance	<p>This species was recorded hunting and flying regularly within 500m of the Site throughout the survey period, mostly within farmland. Fledglings and a probable breeding pair were also recorded within the Site. One breeding territory was identified 3km from the nearest proposed turbine.</p> <p>Few studies have been done on the effects of disturbance around construction areas on kestrel. Goodship and Furness (2022) suggest disturbance from humans up to 200m during the breeding season can occur. It is assumed that temporary disturbance will occur around the Site during construction works. However, kestrel is unlikely to be dependent on the Site, given its wide-ranging and generalist nature. In addition, as farmland is not a scarce resource locally, there is an abundance of available habitat in the surrounding area. The breeding territory is located ~3km away from the works area, thus no impact of construction disturbance is anticipated given the separation distance. Based on this, no significant effects of disturbance are anticipated at the county, national or international scale.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>. The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> impact corresponds to a Low effect significance.</p>	<p>Likely short-term frequent slight negative effect</p>
Operational Phase			
Direct Habitat Loss	<p>Direct habitat loss effects are not anticipated.</p>	No Effect	No Effect
Displacement and Barrier Effect	<p>This species was recorded hunting and flying regularly within 500m of the turbines throughout the survey period, mostly within farmland. Fledglings and</p>	<p>The magnitude of the effect is assessed as <i>Low</i>. The cross tabulation of a <i>Medium</i></p>	<p>Likely long-term constant slight negative effect</p>

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
	<p>a probable breeding pair were also recorded within the Site. One breeding territory was identified 3km from the nearest proposed turbine.</p> <p>Studies have generally found low levels of turbine avoidance among kestrels (Hötker <i>et al.</i>, 2006; Madders and Whitfield, 2006; Pearce Higgins <i>et al.</i>, 2009). Kestrel is unlikely to be dependent on the Site, given its wide-ranging and generalist nature. In addition, as farmland is not a scarce resource locally, there is an abundance of available habitat in the surrounding area. The kestrel breeding territory is located 3km away from the nearest proposed turbine, thus no impact of displacement is anticipated given the separation distance. Based on this, no significant displacement or barrier effects are anticipated at the county, national or international scale.</p>	<p>sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.</p>	
Collision Risk	<p>The species was recorded flying within PCH during vantage point surveys. A “Random” collision risk analysis has been undertaken (full details provided in Appendix 7-6). The collision risk has been calculated at a ratio of 2.136 collisions per year.</p> <p>Annual mortality of adult kestrel has been calculated at an average 35% per annum (range 30%-40%; Orta <i>et al.</i>, 2020). If 2.136 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 (c.519) by 1%. The predicted collision risk is low. No significant effects of collision risk are anticipated at the county, national or international scale.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>. The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.</p>	Likely long-term constant slight negative effect

7.5.2.9 Lapwing (All seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Construction Phase			
Direct Habitat Loss	<p>During the winter season, lapwing was regularly recorded foraging and roosting within the Site, with a maximum count of 375 birds. During the breeding season, a breeding territory was identified in the north-west of the Site with one breeding pair.</p> <p>Lapwing was recorded using farmland fields within the Site, including for breeding. The turbine layout avoids siting turbines or other infrastructure within the lapwing breeding territory so that this area will remain available to lapwing. Extensive areas of similar foraging and roosting habitat will also remain in the winter season, as there is an abundance of similar suitable farmland habitat in the surrounding area. However, given the relatively large flock sizes observed through the winter, the magnitude of the effect of direct habitat loss is assessed as medium.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>. The cross tabulation of a <i>Medium</i> sensitivity species and <i>Medium</i> impact corresponds to a Low effect significance.</p>	<p>Likely long-term constant slight negative effect</p>
Disturbance	<p>During the winter season, lapwing was regularly recorded foraging and roosting within the Site, with a maximum count of 375 birds. During the breeding season, a breeding territory was identified in the north-west of the Site with one breeding pair.</p> <p>Pearce-Higgins <i>et al.</i> (2012) did not find any significant negative affect of construction works on breeding lapwing populations, although the number of sites studied was low. It is assumed that temporary disturbance will occur around the Site during construction works. Lapwing were using farmland fields when foraging and roosting, or else in flight prospecting fields, and, as farmland is not a scarce resource locally, there is an abundance of available habitat in the surrounding area. However, given the relatively large flock sizes observed through the winter, the magnitude of the effect of disturbance is assessed as medium.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>. The cross tabulation of a <i>Medium</i> sensitivity species and <i>Medium</i> impact corresponds to a Low effect significance.</p>	<p>Likely short-term frequent slight negative effect</p>

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	No Effect	No Effect
Displacement and Barrier Effect	<p>During the winter season, lapwing was regularly recorded foraging and roosting within the Site, with a maximum count of 375 birds. During the breeding season, a breeding territory was identified in the north-west of the Site with one breeding pair.</p> <p>Hötter <i>et al.</i> (2006) found lapwing was disturbed from wind farms at an average minimum distance of 108m during the breeding season, and 260m during the winter season. Pearce-Higgins <i>et al.</i> (2009) found that proximity to wind farms did not have a significant negative affect on breeding lapwing populations. The turbine layout avoids siting turbines within the lapwing breeding territory so that this area will remain available to lapwing; the nearest proposed turbine position is 650m away, which exceeds the disturbance distance found by Hötter <i>et al.</i> (2006). During winter surveys, lapwing were using farmland fields when foraging and roosting, or else in flight prospecting fields, and no commuting was observed. As farmland is not a scarce resource locally, there is an abundance of available habitat in the surrounding area. However, given the relatively large flock sizes observed through the winter, the magnitude of displacement or barrier effects is assessed as medium.</p>	The magnitude of the effect is assessed as <i>Medium</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Medium</i> impact corresponds to a Low effect significance.	Likely long-term constant slight negative effect
Collision Risk	The species was recorded flying within PCH during vantage point surveys. A “Random” collision risk analysis has been undertaken (full details provided in Appendix 7-6). The model used for the analysis assumes that waterbird species, including lapwing, are active for 25% of dark hours, in addition to daylight hours. A separate collision risk assessment was conducted for the winter and breeding season because of the difference in flight behaviour and activity in foraging/roosting winter flocks compared to breeding birds.	The magnitude of the effect for breeding population is assessed as <i>Medium</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Medium</i> impact corresponds to a Low effect significance.	<p>Breeding: Likely long-term constant slight negative effect</p> <p>Wintering: Likely long-term constant moderate negative effect</p>

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
	<p>The collision risk has been calculated at a ratio of 0.639 collisions (breeding) and 68.673 collisions (wintering) per year. Annual mortality of adult lapwing has been calculated at 29.50% per annum (Peach et al., 1994).</p> <p>Breeding: If 0.639 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 (c.40) by 5%. The predicted collision risk is medium.</p> <p>Wintering: If 68.673 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 wintering population (c.518) by 45%. As the magnitude of the predicted collision risk is high (Percival, 2003), a Bird Mitigation Plan with the objective of reducing lapwing flight activity in the turbine area has been prepared. This is described in Section 7.6.2.2 and Appendix 7-7. Following successful implementation of the mitigation plan, no significant effects of collision risk are anticipated.</p>	<p>The magnitude of the effect for wintering populations is assessed as <i>High</i>. The cross tabulation of a <i>Medium</i> sensitivity species and <i>High</i> impact corresponds to a <i>Medium</i> effect significance.</p>	

7.5.2.10 Snipe (All seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Construction Phase			
Direct Habitat Loss	<p>Snipe was regularly recorded using habitats in the Site, including one observation of a bird displaying and one observation of a bird roosting and feeding.</p> <p>Snipe was observed using farmland grassland. Farmland is not a scarce resource locally. Extensive areas of similar grassland habitat will remain, as the footprint of the development accounts for a small proportion of the Site, and</p>	<p>The magnitude of the effect is assessed as <i>Low</i>. The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.</p>	Likely long-term constant slight negative effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
	there is an abundance of similar habitat in the surrounding area. Based on this, no significant effects of direct habitat loss are anticipated at the county, national or international scale.		
Disturbance	<p>Snipe was regularly recorded using habitats in the Site, particularly farmland, including one observation of a bird displaying and one observation of a bird roosting and feeding. This species was also recorded displaying, foraging and roosting in the hinterland, up to 3km from the nearest proposed turbine.</p> <p>Few studies have been done on the effects of disturbance on snipe. It is assumed that temporary disturbance will occur around the Site during construction works. Farmland is not a scarce resource locally. Extensive areas of similar habitat will remain, as the footprint of the development accounts for a small proportion of the Site, and there is an abundance of similar suitable habitat in the surrounding area. Based on this, no significant effects of disturbance are anticipated at the county, national or international scale.</p>	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.	Likely short-term frequent slight negative effect
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	No Effect	No Effect
Displacement and Barrier Effect	<p>Snipe was regularly recorded using habitats in the Site, particularly farmland, including one observation of a bird displaying and one observation of a bird roosting and feeding. This species was also recorded displaying, foraging and roosting in the hinterland, up to 3km from the nearest proposed turbine.</p> <p>Few studies have been done on the effects of disturbance on snipe in wind farms. However, farmland is not a scarce resource locally; extensive areas of similar habitat will remain, as the footprint of the development accounts for a small proportion of the Site, and there is an abundance of similar suitable habitat in the surrounding area. Based on this, no significant displacement or barrier effects are anticipated at the county, national or international scale.</p>	The magnitude of the effect is assessed as <i>Low</i> . The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.	Likely long-term constant slight negative effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Collision Risk	<p>The species was recorded flying within PCH during vantage point surveys. A “Random” collision risk analysis has been undertaken (full details provided in Appendix 7-6). The model used for the analysis assumes that waterbird species, including snipe, are active for 25% of dark hours, in addition to daylight hours. The collision risk has been calculated at a ratio of 1.419 collisions per year.</p> <p>Annual mortality of adult snipe has been calculated at 37.50% per annum (Spence, 1988). If 1.419 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 (c.86) by 5%. The predicted collision risk is low. No significant effects of collision risk are anticipated at the county, national or international scale.</p>	<p>The magnitude of the effect is assessed as <i>Low</i>. The cross tabulation of a <i>Medium</i> sensitivity species and <i>Low</i> impact corresponds to a <i>Low</i> effect significance.</p>	<p>Likely long-term constant slight negative effect</p>

7.5.2.11 Buzzard (All seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Construction Phase			
Direct Habitat Loss	<p>Buzzard was regularly recorded hunting within the Site throughout the survey period. A breeding territory was identified within the Site, and fledglings were also recorded.</p> <p>This species is a wide-ranging generalist, and was using farmland within the Site. Extensive areas of similar hunting and breeding habitat will remain, as the footprint of the development accounts for a small proportion of the Site, and there is an abundance of similar suitable habitat in the surrounding area. However, given the presence of a breeding territory in the Site, the magnitude of the effect of direct habitat loss is assessed as medium.</p>	<p>The magnitude of the effect is assessed as <i>Medium</i>. The cross tabulation of a <i>Low</i> sensitivity species and <i>Medium</i> impact corresponds to a <i>Very Low</i> effect significance.</p>	<p>Likely long-term constant not significant negative effect</p>

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Disturbance	<p>Buzzard was regularly recorded hunting within the Site throughout the survey period. Breeding territories were also identified within the Site and 800m, 820m, 1.5km and 1.8km from the nearest proposed turbine.</p> <p>Goodship and Furness (2022) suggest disturbance of buzzard up to 450m from large scale works can occur, based on a study of forestry. It is assumed that temporary disturbance will occur around the Site during construction works. Buzzard is a wide-ranging generalist species and, as farmland is not a scarce resource locally, there is an abundance of similar suitable habitat in the surrounding area. However, given the presence of a breeding territory in the Site, the magnitude of the effect of disturbance is assessed as medium.</p>	The magnitude of the effect is assessed as <i>Medium</i> . The cross tabulation of a <i>Low</i> sensitivity species and <i>Medium</i> impact corresponds to a Very Low effect significance.	Likely short-term frequent not significant negative effect
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	No Effect	No Effect
Displacement and Barrier Effect	<p>Buzzard was regularly recorded hunting within the Site throughout the survey period. Breeding territories were also identified within the Site and 800m, 820m, 1.5km and 1.8km from the nearest proposed turbine.</p> <p>Pierce-Higgins <i>et al.</i> (2009) found that breeding buzzards avoided turbines at a distance of least 500m. Buzzard is a wide-ranging generalist species and, as farmland is not a scarce resource locally, there is an abundance of available habitat in the surrounding area. However, given the presence of a breeding territory in the Site, the magnitude of displacement or barrier effects is assessed as medium.</p>	The magnitude of the effect is assessed as <i>Medium</i> . The cross tabulation of a <i>Low</i> sensitivity species and <i>Medium</i> impact corresponds to a Very Low effect significance.	Likely long-term constant not significant negative effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Collision Risk	<p>The species was recorded flying within PCH during vantage point surveys. A “Random” collision risk analysis has been undertaken (full details provided in Appendix 7-6). The collision risk has been calculated at a ratio of 5.651 collisions per year.</p> <p>Annual mortality of adult buzzard has been calculated at 10% per annum (Kenward <i>et al.</i>, 2000). If 5.651 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 (c.150) by 38%. The predicted collision risk is high.</p>	The magnitude of the effect is assessed as <i>High</i> . The cross tabulation of a <i>Low</i> sensitivity species and <i>High</i> impact corresponds to a <i>Low</i> effect significance.	Likely long-term constant slight negative effect

7.5.2.12 Sparrowhawk (All seasons)

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Construction Phase			
Direct Habitat Loss	<p>Sparrowhawk was regularly recorded hunting, feeding and displaying within the Site throughout the survey period. A breeding territory was identified within the Site.</p> <p>This species is a wide-ranging generalist, and was using farmland within the Site. Extensive areas of similar hunting habitat will remain, as the footprint of the development accounts for a small proportion of the Site, and there is an abundance of similar suitable habitat in the surrounding area. However, given the presence of a breeding territory in the Site, the magnitude of the effect of direct habitat loss is assessed as medium.</p>	The magnitude of the effect is assessed as <i>Medium</i> . The cross tabulation of a <i>Low</i> sensitivity species and <i>Medium</i> impact corresponds to a <i>Very Low</i> effect significance.	Likely long-term constant not significant negative effect
Disturbance	Sparrowhawk was regularly recorded hunting, feeding and displaying within the Site throughout the survey period. Breeding territories were also identified within the Site and 670m from the nearest proposed turbine.	The magnitude of the effect is assessed as <i>Medium</i> . The cross tabulation of a <i>Low</i> sensitivity	Likely short-term frequent not significant negative effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
	There is no literature on the disturbance distance for sparrowhawk from construction work. It is assumed that temporary disturbance will occur around the Site during construction works. Sparrowhawk is a wide-ranging generalist species, and, as farmland is not a scarce resource locally, there is an abundance of similar suitable habitat in the surrounding area. However, given the presence of a breeding territory in the Site, the magnitude of the effect of disturbance is assessed as medium.	species and <i>Medium</i> impact corresponds to a Very Low effect significance.	
Operational Phase			
Direct Habitat Loss	Direct habitat loss effects are not anticipated.	No Effect	No Effect
Displacement and Barrier Effect	<p>Sparrowhawk was regularly recorded hunting, feeding and displaying within the Site throughout the survey period. Breeding territories were also identified within the Site and 670m from the nearest proposed turbine.</p> <p>There is no literature on the disturbance distance for sparrowhawk from wind farms. However, sparrowhawk is a wide-ranging generalist species, and, as farmland is not a scarce resource locally, there is an abundance of similar suitable habitat in the surrounding area. However, given the presence of a breeding territory in the Site, the magnitude of displacement or barrier effects is assessed as medium.</p>	The magnitude of the effect is assessed as <i>Medium</i> . The cross tabulation of a <i>Low</i> sensitivity species and <i>Medium</i> impact corresponds to a Very Low effect significance.	Likely long-term constant not significant negative effect

Potential effects during the construction and operational phases of the Proposed Project		Significance (Percival, 2003)	Significance (EPA, 2017)
Collision Risk	<p>The species was recorded flying within PCH during vantage point surveys. A “Random” collision risk analysis has been undertaken (full details provided in Appendix 7-6). The collision risk has been calculated at a ratio of 0.274 collisions per year, or one bird every 4 years.</p> <p>Annual mortality of adult sparrowhawk has been calculated at 31% per annum (Newton, 1986). If 0.274 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 (c.456) by 0.2%. The predicted collision risk is negligible. No significant effects of collision risk are anticipated.</p>	<p>The magnitude of the effect is assessed as <i>Negligible</i>. The cross tabulation of a <i>Low</i> sensitivity species and <i>Negligible</i> impact corresponds to a Very Low effect significance.</p>	<p>Likely long-term constant not significant negative effect</p>

7.5.3 Effects on Key Ornithological Receptors during Decommissioning

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

Potential impacts during the decommissioning phase of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2017)
Direct Habitat Loss	Direct or indirect effects are not anticipated.	No Effect	No Effect
Disturbance	As above for the construction phase for each species in Section 7.5.2.	As above for the construction phase for each species in Section 7.5.2.	As above for the construction phase for each species in Section 7.5.2.

7.5.4 Effects Associated with the Turbine Delivery Route

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

Potential impacts along the turbine delivery route of the Proposed Project		Significance (Percival 2003)	Significance (EPA 2022)
Direct Habitat Loss	Minor accommodation works are proposed at the M7 junction with the N62, involving temporary stoning up of the verges, and at the site entrance. All works are minor, temporary and mostly contained within the road carriage. Once the abnormal loads have been delivered, these areas will be reseeded. No significant effects of direct habitat loss are anticipated.	The effect significance for all KORs is classed as no greater than Very Low	The effect significance for all KORs is classed as no greater than likely long-term imperceptible negative effect
Disturbance	The existing habitats in the areas of accommodation works along the turbine delivery route do not have the potential to support other species of conservation interest in the area. On a precautionary basis, it is assumed that some temporary disturbance may occur during works. However, given the extent of similar habitat for KORs in the wider area and the minor nature of the works, no significant effects of disturbance are anticipated.	The effect significance for all KORs is classed as no greater than Very Low	The effect significance for all KORs is classed as no greater than likely long-term imperceptible negative effect

7.5.5 Effect Associated with the Proposed Grid Connection

The Proposed Grid Connection includes an underground cable route which will commence from the proposed onsite 110kV substation and will break into the existing 110kV Ikerrin to Thurles overhead line through two new end masts. The c. 2km of proposed underground cabling route is located within the existing public road corridor (L-7039) and within agricultural fields (full details in Chapter 4 of this EIAR).

The existing habitats along the underground cabling route and at the connection to the overhead line do not have the potential to support other bird species of conservation interest in the area. Given the low ecological value of the habitat and the extent of similar habitat in the wider area, significant effects of direct habitat loss in relation to KORs are not predicted. It is assumed on a precautionary basis that some temporary disturbance may occur during construction works. However, given the low ecological value of the habitats and the extent of similar habitat in the wider area, significant effects of disturbance are not predicted. The effect significance for all KORs is classed as no greater than **Low** (Percival, 2003) or a **likely short-term slight negative effect** (EPA, 2022).

During the operational phase, the grid connection route in the existing public road corridor will revert back to its existing condition. A hardcore track and two new end masts breaking the existing overhead line will be within agricultural fields. Given the minor alterations to the existing environment and the low ecological value of this habitat, significant effects of displacement in relation to KORs are not predicted. The effect significance for all KORs is classed as no greater than **Very Low** (Percival, 2003) or a **likely long-term imperceptible negative effect** (EPA, 2022).

7.5.6 Effects on Designated Areas

The Site is not located within the boundaries of any European Sites (see Section 7.3.1). An AA screening was prepared to provide the information necessary to complete an AA for the Proposed Project. The screening identified and assessed a potential pathway for indirect effects on the Slieve Bloom Mountains SPA and River Nore SPA.

Following the screening, a Natura Impact Statement (NIS) was prepared which concluded that:

“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 development does not adversely affect the integrity of European sites.

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

As such, it can be concluded that the Proposed Project will not have an adverse impact on any European Sites designated for birds, either alone or in combination with other plans or projects.

No proposed National Heritage Area or National Heritage Area were considered as ornithological ecological receptors in their own right due to the separation distance from the Proposed Project and the absence of connectivity. The nearest National Heritage Area is Nore Valley Bogs NHA (Site Code 001853), which is c. 7km from the Site.

7.6 Mitigation and Best Practice Measures

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

- Design of the Proposed Project;
- Management of the development phases.

7.6.1 Design of the Proposed Project

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

- A breeding territory for lapwing was identified in the Site. The turbine layout of the Proposed Project has been specifically designed to minimise impacts to lapwing in their breeding territory. The nearest proposed turbines are located at least 650m from the breeding territory, which is greater than the 108m disturbance distance to wind farms outlined by Hötter *et al.* (2006).
- Hardstanding areas have been designed to the minimum size necessary to accommodate the turbine model that is selected.
- The Proposed Grid Connection has been selected to utilise a short underground cabling route using built infrastructure where possible and will be laid underground to avoid effects on roadside hedgerows and disturbance to nesting birds. The cable will be laid within the existing public road infrastructure or in low ecological value agricultural fields. Two end masts will be used to break into an existing overhead line.

7.6.2 Management of the Proposed Project Phases

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

7.6.2.1 Construction Phase

A Construction and Environmental Management Plan (CEMP) has been prepared and will be in place prior to the start of the construction phase. Full details of the CEMP are available in Chapter 4, while details pertinent to birds are summarised below. Note that these measures are proposed as industry best practice rather than to mitigate any identified significant effect and will be updated as required to address any conditions of a permission or findings of any pre-construction survey results.

- Works will commence outside the bird nesting season (1st of March to 31st of August inclusive). Any requirement for construction works to run into the subsequent breeding season following commencement will be informed by pre-construction bird surveys.
- The removal of woody vegetation will be undertaken in full compliance with Section 40 of the Wildlife Act 1976 – 2022. Where sections of woody vegetation are removed for the purposes of the junction and road upgrades, these will be replaced with suitable hedge/tree species which are common in the local context.
- During the construction phase, noise limits, noise control measures, hours of operation (i.e. dusk and dawn is high faunal activity time) and selection of plant items will be considered in relation to disturbance of birds. All plant and equipment for use will comply with the European

Communities (Noise Emission By Equipment For Use Outdoors) Regulations, 2001, as amended (SI 632/2001). Plant machinery will also be turned off when not in use.

- Silt fences will be installed as an additional water protection measure around existing watercourses.
- If winter roosting or breeding activity of birds of high conservation concern is identified during works, the roost or nest site will be located and no works shall be undertaken within a species-specific disturbance buffer in line with industry best practice (e.g. Goodship and Furness, 2022). No works shall be permitted within the buffer until it can be demonstrated that the roost/nest is no longer occupied.
- An Environmental Clerk of Works and Project Ecologist will be appointed. Duties will include:
 - Organise the undertaking of a pre-construction walkover bird survey to avoid significant effects on birds;
 - Inform and educate on-site personnel of the ornithological and ecological sensitivities within the Site;
 - Oversee management of ornithological issues during the construction period and advise on ornithological issues as they arise;
 - Provide guidance to contractors to ensure legal compliance with respect to protected species in the Site;
 - Liaise with officers of consenting authorities and other relevant bodies with regular updates in relation to construction progress as necessary.

7.6.2.2 Operational Phase

A Bird Mitigation Plan (Appendix 7-7) has been prepared for the Proposed Project to mitigate the potential effects of collision risk for lapwing and golden plover during the operational phase of the Proposed Wind Farm. For the majority of KORs assessed, the collision risk effect was determined to be no greater than ‘low’ significance (as defined by Percival [2003]). However, the effect was determined to be of ‘medium’ significance for lapwing and golden plover. It was deemed necessary to mitigate the significance of this effect. Thus, a Bird Mitigation Plan has been prepared for these two species, prescribing measures to mitigate this effect such that the significance of the residual effect will be of ‘low’ significance.

Collision risk mitigation will focus on reducing lapwing and golden plover flight activity within 500m of the turbines. Because lapwing and golden plover were observed flying in to forage and roost in fields within the study area, the mitigation approach is to remove attractive foraging and roosting features from these fields to deter birds from using them. The sward height of grass within these fields will be controlled to remove the stimulus for foraging and roosting. Tethered bird control kites will also be erected in the fields to provide additional visual deterrents. Similar approaches have been used to deter waders and seabirds from airfields in the UK to reduce the risk of collision with aircraft (e.g. Brough and Bridgman, 1980; O’Shea *et al.*, 2020). In addition, studies have shown that golden plover may use the presence of lapwing as a visual cue to identify suitable foraging areas and tend to fly over several flocks before choosing a flock to join (Barnard and Thompson, 1985). The absence of grounded flocks should further reduce the flight activity of these prospecting flocks in the turbine area.

This mitigation approach will be implemented in the areas of the site that were observed to be the most attractive to lapwing and golden plover. The results of pre-planning surveys from September 2020 to September 2023 indicate that lapwing and golden plover do not uniformly utilise the study area, rather specific areas were favoured. Such favoured fields that were also located in close proximity to turbines were targeted for mitigation. The land selection process is described in detail in Section 2.2 of the Bird Mitigation Plan (Appendix 7-7). A total of nine fields were selected for mitigation. These fields are within the Site and form part of the planning application.

It is proposed that a suitably qualified environmental scientist, ornithologist or ecologist will be engaged by the wind farm operator to oversee the implementation of this Bird Mitigation Plan. The management prescriptions will be implemented on an individual landowner-by-landowner basis, which is described in full in Section 2.4 of the Bird Mitigation Plan (Appendix 7-7). Monitoring and evaluation of the Bird Mitigation Plan will be carried out in conjunction with the proposed Bird Monitoring Programme (refer to Appendix 7-8). The Bird Monitoring Programme proposes a suite of bird surveys and collision monitoring carcass searches to be conducted at the Site during operation, in line with best practice guidance. The findings and results of mitigation field monitoring and evaluation, and a discussion on the effectiveness of the Bird Mitigation Plan will be reported in the Bird Monitoring Programme report that will be submitted to the Planning Authority at the end of each prescribed monitoring year.

7.6.2.3 Decommissioning Phase

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

7.7 Monitoring

The following monitoring measures are proposed as industry best practice rather than in response to any identified impacts associated with the Proposed Project. Important records of birds of conservation concern collected during monitoring surveys will be submitted to the National Biodiversity Data Centre.

A Bird Monitoring Programme has been prepared for the Proposed Project. It has been informed by surveys undertaken from September 2020 to September 2023 and is based on the identified KORs to monitor the bird population within the study area during each development phase (construction, operation and decommissioning). Monitoring is described for each phase below.

7.7.1 Construction

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 study area to identify sensitive sites (e.g. roosts). If works run into subsequent breeding or winter seasons, further pre-commencement surveys will be repeated to identify sensitive sites (e.g. roosts or nests). Breeding season surveys will be conducted once per month from April to July inclusive.

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.

7.7.2 Operation

A detailed post-construction Bird Monitoring Programme has been prepared for the operational phase of the Proposed Project (refer to Appendix 7-8 for further details). The programme of works will monitor parameters associated with collision, displacement/barrier effects and habituation during the lifetime of the project and were designed based on guidelines issued by SNH (2009). The following individual components are proposed:

- > Vantage point surveys;
- > Winter walkover surveys;
- > Breeding lapwing surveys;
- > Collision monitoring surveys.

A report summarising the findings of bird and collision monitoring surveys will be submitted to the Planning Authority and the NPWS at the end of each prescribed monitoring year. The report will provide the results of the surveys and discuss potential impacts on birds (particularly KORs) and any recommendations that may inform additional mitigation measures during the operational phase of the Proposed Wind Farm. The report will include the findings of the Bird Mitigation Plan (Appendix 7-7) and any additional associated recommendations. If lapwing or golden plover carcasses are found during

surveys, the significance of the effect on the county population will be evaluated and any necessary recommendations made.

7.7.3 **Decommissioning**

During the decommissioning phase, monitoring measures will be as per the construction phase described in Section 7.7.1.

Residual Effects

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

- > Hen harrier (wintering)
- > Kingfisher (all seasons)
- > Golden plover (wintering and passage)
- > Merlin (wintering and passage)
- > Peregrine falcon (all seasons)
- > Little egret (all seasons)
- > Whooper swan (wintering)
- > Kestrel (all seasons)
- > Lapwing (all seasons)
- > Snipe (all seasons)
- > Buzzard (all seasons)
- > Sparrowhawk (all seasons)

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

7.9 Cumulative Effects

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

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

This section first identifies other plans and projects in the vicinity of the Site and then assesses the potential for additive, antagonistic or synergistic impacts on KORs to occur.

7.9.1 Other Plans and Projects

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

7.9.1.1 Plans Considered in the Cumulative Impact Assessment

The following plans were considered in the cumulative impact assessment:

- Tipperary County Development Plan 2022-2028
- Mid-West Regional Planning Guidelines 2010-2022
- National Biodiversity Action Plan 2023-2027

7.9.1.2 Projects Considered in the Cumulative Impact Assessment

NatureScot guidance (SNH, 2012; 2018) was consulted while undertaking the cumulative assessment. SNH (2012; 2018) emphasises that the 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)’. A 25km radius of the Proposed Project was considered an appropriate regional scale given the foraging range of the KORs identified within the Proposed Project area.

To conduct the cumulative impact assessment, Tipperary, Kilkenny and Laois County Council online planning registers (these counties are within a 25km radius of the Site), relevant EIAR (or EIS) documents, planning application details and planning drawings in the vicinity of the proposed Site and their associated works were reviewed to identify past and future projects, their activities and their environmental impacts. The findings of this review are outlined in the following sections.

7.9.1.2.1 Developments/Landuses

The review of the County Council planning registers identified relevant general development planning applications in the vicinity of the Proposed Project. Most of these relate to the provision and/or alteration of one-off rural housing and agriculture-related structures, as described in Chapter 2 of the EIAR. Owing to the scale and nature of these developments, significant cumulative impacts are not anticipated.

Some areas within the wider surroundings 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.

7.9.1.2.2 Other Wind Farm Developments

Wind farm projects within 25km of the Proposed Wind Farm are provided in Table 7-12, including details of their planning status. A total of 108 existing turbines were identified for consideration. The environmental impacts of each permitted or existing wind farm are outlined in detail in this section. At the time of writing, it is noted that a public website detailing, at a high level, a proposal for 11 turbines at Brittas and adjacent townlands, Co. Tipperary, to be located approximately 10.5km south of the Site. Coordinate details for the proposed turbines are not publicly available. In light of the limited design details, an assessment of this proposal has not been included in this EIAR.

Table 7-12 Wind farm projects within 25km of the Site

County	Wind Farm	Planning Status	Number of Turbines	Separation Distance (turbine to turbine)
Tipperary	Lisheen I & II	Existing	30	c.8km
	Ballinveny	Existing	3	c.9km
	Monaincha Bog	Existing	15	c.10km
	Ballinlough-Ikerrin	Existing	3	c.13km
	Gortnahalla	Existing	1	c.16km
	Upperchurch	Existing	22	c.19km
	Curraghgraique	Existing	6	c.19km
	Cappawhite B	Existing	5	c.22km
	Skehanagh	Existing	5	c.23km
	Carrig	Existing	3	c.24km
Laois/Kilkenny	Lisheen III	Existing	8	c.10km
Tipperary/ Laois/ Kilkenny	Bruckana	Existing	14	c.8km

Lisheen I&II

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Lisheen I & II Wind Farm was considered. The planning files (ref. 06/510773 and ref. 09510100) were reviewed on the Tipperary County Council Planning Register. The Ecological Monitoring Programme for Lisheen I (which provided a summary of the results of the Environmental

Impact Assessment [EIS]), and the EIS Non Technical Summary for Lisheen II was reviewed. An assessment of potential impacts on birds was undertaken for this wind farm comprising of desk studies and field surveys.

At Lisheen I, whooper swan, golden plover, lapwing, curlew and yellowhammer were recorded infrequently and in small numbers during field surveys. Long-tailed duck, kestrel, snipe, woodcock, grey wagtail and meadow pipit were also recorded during field surveys. No information regarding potential effects on birds was available. At Lisheen II, it was concluded that there will not be any long-term negative impacts on birds using the site. Based on this information, as well as the location of Lisheen I & II Wind Farm, the nature of the habitats onsite (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on bird species associated with the Proposed Project when considered on its own, significant cumulative or in-combination effects on KORs with regard to displacement or collision mortality are not anticipated.

Ballinveny

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Ballinveny Wind Farm was considered. The planning file (ref. 5123301) was reviewed on the Tipperary County Council Planning Register and no information regarding potential effects on birds was available. However, given the location of the wind farm, the nature of the habitats onsite (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on bird species associated with the Proposed Project when considered on its own, significant cumulative or in-combination effects on KORs with regard to displacement or collision mortality are not anticipated.

Monaincha Bog

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Monaincha Bog Wind Farm was considered. The planning file (ref. 11510203) was reviewed on the Tipperary County Council Planning Register.

It was recommended that bird deterrents (such as discs or flappers) be attached to the guy wires of the masts on site to reduce collision risk, and that the removal of vegetation should take place outside the bird breeding season. Aside from this, no information regarding potential effects on birds was available. However, given the location of Monaincha Bog wind farm, the nature of the habitats onsite (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on bird species associated with the Proposed Project when considered on its own, significant cumulative or in-combination effects on KORs with regard to displacement or collision mortality are not anticipated.

Ballinlough-Ikerrin

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Ballinlough-Ikerrin Wind Farm was considered. The planning files (ref. 08510664 and ref. 5123301) were reviewed on the Tipperary County Council Planning Register and no information regarding potential effects on birds was available. However, given the location of Ballinlough-Ikerrin Wind Farm, the nature of the habitats onsite (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on bird species associated with the Proposed Project when considered on its own, significant cumulative or in-combination effects on KORs with regard to displacement or collision mortality are not anticipated.

Gortnahalla

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Gortnahalla Wind Farm was considered. The planning file (ref. 12510368) was reviewed on the Tipperary County Council Planning Register and no information regarding potential

effects on birds was available. However, given the location of Gortnahalla Wind Farm, the nature of the habitats onsite (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on bird species associated with the Proposed Project when considered on its own, significant cumulative or in-combination effects on KORs with regard to displacement or collision mortality are not anticipated.

Upperchurch

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Upperchurch Wind Farm was considered. The planning file (ref. 13510003) was reviewed on the Tipperary County Council Planning Register and the EIS was available. An assessment of potential impacts on birds was undertaken for this wind farm comprising of desk studies and field surveys. Hen harrier and kestrel were recorded infrequently during field surveys in both the breeding and winter season, while peregrine falcon was recorded once during the breeding season, and sparrowhawk was recorded once during the winter season.

Hen harrier was recorded once during the breeding and winter season, and both observations were of one bird foraging. There was no evidence of breeding on site. Similarly, kestrel was recorded infrequently foraging on site during the breeding and winter season, and there was no evidence of breeding on site. The study concluded that the impact of habitat loss and displacement was deemed 'not significant'. Also, based on the low number of observations of hen harrier and kestrel on site, collision risk for both species was considered 'not significant'.

Based on this information, as well as the location of Upperchurch Wind Farm, the nature of the habitats onsite (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on bird species associated with the Proposed Project when considered on its own, significant cumulative or in-combination effects on KORs with regard to displacement or collision mortality are not anticipated.

Curraghgraique

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Curraghgraique Wind Farm was considered. The planning files (ref. 5122877 and ref. 04511665) were reviewed on the Tipperary County Council Planning Register and the EIS was available. An assessment of potential impacts on birds was undertaken for this wind farm comprising of desk studies and field surveys. No birds of high conservation concern were recorded during field surveys.

Based on this information, as well as the location of Curraghgraique Wind Farm, the nature of the habitats onsite (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on bird species associated with the Proposed Project when considered on its own, significant cumulative or in-combination effects on KORs with regard to displacement or collision mortality are not anticipated.

Cappawhite B

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Cappawhite B Wind Farm was considered. The planning files (ref. 15600566 and ref. 12510385) were reviewed on the Tipperary County Council Planning Register and the EIS for the grid connection was available.

Hen harrier was recorded hunting at the site during surveys. The wind farm is 800m from the Slieve Felim to Silvermines Mountains SPA and is where the hen harrier recorded hunting at Cappawhite B wind farm breed. Based on this, it was recommended that a mitigation area for foraging hen harrier should be created at this wind farm to reduce habitat loss. Aside from this, no information regarding potential effects on birds was available. However, given the location of the wind farm, the nature of the habitats onsite (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on bird species associated with Cappawhite B Wind Farm when considered on its own,

significant cumulative or in-combination effects on KORs with regard to displacement or collision mortality are not anticipated.

Skehanagh

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Skehanagh Wind Farm was considered. The planning file (ref. 5123495) was reviewed on the Tipperary County Council Planning Register and no information regarding potential effects on birds was available. However, given the location of Skehanagh Wind Farm, the nature of the habitats onsite (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on bird species associated with the Proposed Project when considered on its own, significant cumulative or in-combination effects on KORs with regard to displacement or collision mortality are not anticipated.

Carrig

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Carrig Wind Farm was considered. The planning file (ref. 5123496) was reviewed on the Tipperary County Council Planning Register and no information regarding potential effects on birds was available. However, given the location of Carrig Wind Farm, the nature of the habitats onsite (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on bird species associated with the Proposed Project when considered on its own, significant cumulative or in-combination effects on KORs with regard to displacement or collision mortality are not anticipated.

Lisheen III

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Lisheen III Wind Farm was considered. The planning files (ref. 14202, ref. 14139 and ref. 14510138) were reviewed on the Kilkenny, Laois and Tipperary County Council Planning Registers respectively, and the EIS was reviewed. An assessment of potential impacts on birds was undertaken for this wind farm comprising of desk studies and field surveys. Peregrine falcon, snipe, meadow pipit were recorded infrequently during field surveys.

Peregrine falcon was recorded using the site at the end of the breeding season. There were no suitable nesting habitats for peregrine falcon on site or within vicinity of the site, and there was no evidence of breeding on site. The study concluded that the impact of habitat loss and displacement on birds of high conservation concern was deemed 'imperceptible'. Also, based on the lack of suitable breeding habitats on site, collision risk was considered 'low'. Based on this information, as well as the location of Lisheen III Wind Farm, the nature of the habitats onsite (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on bird species associated with the Proposed Project when considered on its own, significant cumulative or in-combination effects on KORs with regard to displacement or collision mortality are not anticipated.

Bruckana

The potential for the Proposed Project to result in significant cumulative or in-combination effects when assessed alongside Bruckana Wind Farm was considered. The planning file (ref. 10145) was reviewed on the Kilkenny County Council Planning Register. The site was deemed to be of low importance to most bird species, apart from snipe to whom it was of local importance. No additional information regarding potential effects on birds was available. However, given the location of the wind farm, the nature of the habitats onsite (as reviewed on publicly available aerial photography) and the lack of significant residual impacts on bird species associated with the Proposed Project when considered on its own, significant cumulative or in-combination effects on KORs with regard to displacement or collision mortality are not anticipated.

7.9.2 Assessment of Cumulative Effects

There were 12 KORs identified at the Proposed Project: hen harrier, kingfisher, golden plover, merlin, peregrine falcon, little egret, whooper swan, kestrel, lapwing, snipe, buzzard and sparrowhawk. A key consideration in the assessment of the potential for cumulative impacts to result in significant effects on KORs is proximity. For the purposes of this cumulative assessment, the local scale is considered to be a 5km radius of the Site. There are no wind farms within 5km of the Proposed Project; six wind farms are located within 5-15km and the remaining six wind farms are 15-25km.

Following SNH (2012) guidance, the cumulative impact assessment has been carried out at the scale of the importance rating of the receptor: County Importance (hen harrier, kingfisher, golden plover, merlin, peregrine falcon, little egret, whooper swan, lapwing and snipe) and Local Importance Higher Value (kestrel, buzzard and sparrowhawk). The assessment of cumulative effects on KORs is provided in Table 7-13 below. In particular, cumulative habitat loss and displacement associated with operational turbines is assessed. Short-term impacts (e.g. construction disturbance) are highly unlikely to give rise to significant cumulative impacts. For this reason, it is not considered further.

Table 7-13 Assessment of cumulative effects on KORs

KOR	Evaluation of Cumulative Impacts	Determination
Hen Harrier	<p>Hen harrier was occasionally recorded hunting within the Site over three winter seasons and no roosting site was identified. No hen harrier were recorded flying at PCH and no effects of collision risk are anticipated. Given the low frequency of occurrence, the significance of the displacement and barrier effect is 'low'.</p> <p>The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered. No significant effects were reported for any of the wind farms located within a 25km radius of the Site. The predicted rate of collisions for hen harrier is sufficiently low that significant cumulative effects between the Proposed Project and wind farms located within a 25km radius are not anticipated. Taking into consideration the reported effects at other wind farms and the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.</p>	Significant cumulative impacts are not predicted.
Kingfisher	<p>Kingfisher was recorded flying within the Site during the breeding season on three occasions over the survey period. It was not recorded hunting or breeding within the Site. In addition, as part of the Proposed Wind Farm design, it is proposed to restore appropriate pattern, profile and dimension to a segment of the Eastwood River channel in the Site, with a view to improving stability of the channel and restoring in stream habitat. This may benefit kingfisher by creating suitable riparian hunting habitat. No kingfisher were recorded flying at PCH and no effects of collision risk are anticipated. The significance of the displacement and barrier effect is 'low'.</p> <p>The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered. No significant effects were reported for any of the wind farms located within a 25km radius of the Site. The predicted rate of collisions for kingfisher is sufficiently low that significant cumulative effects between the Proposed Project and wind farms located within a 25km radius are not anticipated. Taking into consideration the reported effects at other wind farms and the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.</p>	Significant cumulative impacts are not predicted.

KOR	Evaluation of Cumulative Impacts	Determination
Golden Plover	<p>Golden plover was recorded roosting, foraging and flying within the Site and in the surrounding area during the winter. Following successful implementation of the Bird Mitigation Plan (Section 7.6 and Appendix 7-7), the significance of the residual collision risk effect is 'low'. The significance of the displacement and barrier effect is 'low'.</p> <p>The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered. No significant effects were reported for any of the wind farms located within a 25km radius of the Site. Following successful implementation of the Bird Mitigation Plan, the predicted rate of collisions for golden plover is sufficiently low that significant cumulative effects between the Proposed Project and wind farms located within a 25km radius are not anticipated. Taking into consideration the reported effects at other wind farms and the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.</p>	Significant cumulative impacts are not predicted.
Merlin	<p>Merlin was frequently recorded hunting within the Site over three winter seasons. No roosting site was identified. The significance of the collision risk effect is 'very low' and the significance of the displacement and barrier effect is 'low'.</p> <p>The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered. No significant effects were reported for any of the wind farms located within a 25km radius of the Site. The predicted rate of collisions for merlin is sufficiently low that significant cumulative effects between the Proposed Project and wind farms located within a 25km radius are not anticipated. Taking into consideration the reported effects at other wind farms and the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.</p>	Significant cumulative impacts are not predicted.
Peregrine Falcon	<p>Peregrine falcon was frequently recorded hunting within the Site during the winter and breeding seasons. The significance of the collision risk effect is 'low' and the significance of the displacement and barrier effect is 'low'.</p>	Significant cumulative impacts are not predicted.

KOR	Evaluation of Cumulative Impacts	Determination
	<p>The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered. No significant effects were reported for any of the wind farms located within a 25km radius of the Site. The predicted rate of collisions for peregrine falcon is sufficiently low that significant cumulative effects between the Proposed Project and wind farms located within a 25km radius are not anticipated. Taking into consideration the reported effects at other wind farms and the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.</p>	
Little Egret	<p>Little egret was recorded in the Site and surrounding area during the winter and breeding seasons. The significance of the collision risk effect is ‘low’ and the significance of the displacement and barrier effect is ‘low’.</p> <p>The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered. No significant effects were reported for any of the wind farms located within a 25km radius of the Site. The predicted rate of collisions for little egret is sufficiently low that significant cumulative effects between the Proposed Project and wind farms located within a 25km radius are not anticipated. Taking into consideration the reported effects at other wind farms and the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.</p>	Significant cumulative impacts are not predicted.
Whooper Swan	<p>Whooper swan was occasionally recorded foraging and flying within the Site and surrounds during the winter season. The significance of the collision risk effect is ‘very low’. Given the low frequency of occurrence, the significance of the displacement and barrier effect is ‘low’.</p> <p>The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered. No significant effects were reported for any of the wind farms located within a 25km radius of the Site. The predicted rate of collisions for whooper swan is sufficiently low that significant cumulative effects between the Proposed Project and wind farms located within a 25km radius are not anticipated. Taking into consideration the reported effects at other</p>	Significant cumulative impacts are not predicted.

KOR	Evaluation of Cumulative Impacts	Determination
	wind farms and the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.	
Kestrel	<p>Kestrel were regularly recorded hunting and flying within the site and surrounds and a breeding territory was identified 3km from the nearest proposed turbine. The significance of the collision risk effect is 'low' and the significance of the displacement and barrier effect is 'low'.</p> <p>The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered. No wind farms are located within a 5km radius of the Site. Taking this into consideration, along with the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.</p>	Significant cumulative impacts are not predicted.
Lapwing	<p>Lapwing was regularly recorded foraging and roosting within the Site during the winter season, and a breeding territory was identified in the north-west of the Site. The turbine layout avoids siting turbines or other infrastructure within the lapwing breeding territory so that this area will remain available to lapwing. The significance of the collision risk effect for the breeding population is 'low'. Following successful implementation of the Bird Mitigation Plan (Section 7.6 and Appendix 7-7), the significance of the residual collision risk effect for the wintering population is 'low'. The significance of the displacement and barrier effect (both breeding and winter populations) is 'low'.</p> <p>The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered. No significant effects were reported for any of the wind farms located within a 25km radius of the Site. Following successful implementation of the mitigation plan, the predicted rate of collisions for lapwing is sufficiently low that significant cumulative effects between the Proposed Project and wind farms located within a 25km radius are not anticipated. Taking into consideration the reported effects at other wind farms and the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.</p>	Significant cumulative impacts are not predicted.
Snipe	Snipe was regularly recorded within the Site and surrounds, including displaying, roosting and foraging. The significance of the collision risk effect is 'low' and the significance of the displacement and barrier effect is 'low'.	Significant cumulative impacts are not predicted.

KOR	Evaluation of Cumulative Impacts	Determination
	<p>The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered. No significant effects were reported for any of the wind farms located within a 25km radius of the Site. The predicted rate of collisions for snipe is sufficiently low that significant cumulative effects between the Proposed Project and wind farms located within a 25km radius are not anticipated. Taking into consideration the reported effects at other wind farms and the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.</p>	
Buzzard	<p>Buzzard were regularly recording hunting within the site and breeding territories were identified in the Site and surrounding area. The significance of the collision risk effect is ‘low’ and the significance of the displacement and barrier effect is ‘very low’.</p> <p>The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered. No wind farms are located within a 5km radius of the Site. Taking this into consideration, along with the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.</p>	Significant cumulative impacts are not predicted.
Sparrowhawk	<p>Sparrowhawk were regularly recorded hunting, feeding and displaying within the Site and surrounding area and a breeding territory was identified within the Site. The significance of both the collision risk effect and the displacement and barrier effect is ‘very low’.</p> <p>The potential for other developments to have resulted in significant cumulative or in combination effects when assessed alongside the Proposed Project was considered. No wind farms are located within a 5km radius of the Site. Taking this into consideration, along with the predicted effects of the Proposed Project, no significant residual additive, antagonistic or synergistic effects have been identified.</p>	Significant cumulative impacts are not predicted.

7.10 Conclusion

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